D2Q9 NSE,

a supplementary material for

Lattice Boltzmann Method Analysis Tool (LBMAT)

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Contents

1 Global definitions

In $\mathbb{R}^2$, the position and velocity vectors are given by $\boldsymbol{x} = (x_1, x_2)^T$ and $\boldsymbol{v} = (v_1, v_2)^T$, respectively.

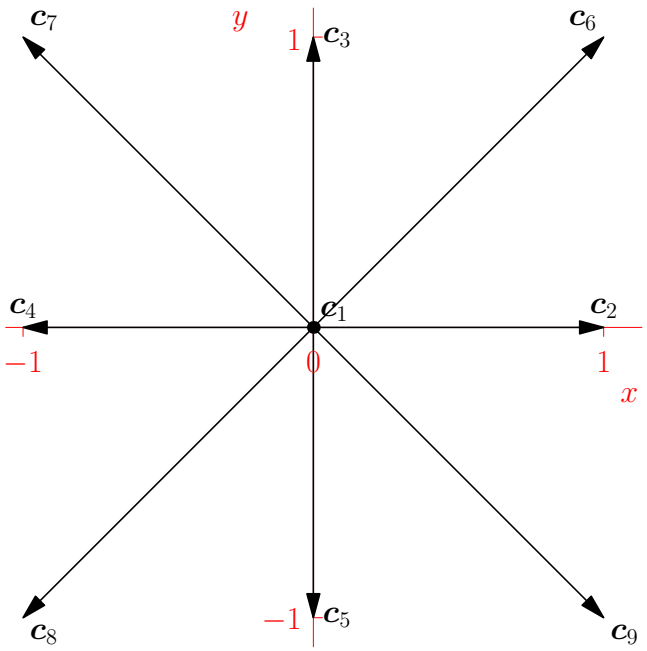
1.1 Discrete velocity vectors

Discrete velocity vectors and the lattice speed of sound are defined by

$$\{\boldsymbol{c}_i\}_{i=1}^{9} = \left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \end{pmatrix}, \begin{pmatrix} -1 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \begin{pmatrix} -1 \\ 1 \end{pmatrix}, \begin{pmatrix} -1 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \end{pmatrix} \right),$$

$$c_s = \frac{1}{\sqrt{3}},$$

respectively [1].



1.2 Raw and central moments

The raw and central moments are defined by

$$m_{\boldsymbol{\alpha}} := \sum_{i=1}^{9} f_i \boldsymbol{c}_i^{\boldsymbol{\alpha}},$$

and

$$k_{\boldsymbol{\alpha}} := \sum_{i=1}^{9} f_i (\boldsymbol{c}_i - \boldsymbol{v})^{\boldsymbol{\alpha}},$$

respectively, where $\boldsymbol{\alpha} = (\alpha_1, \alpha_2) \in \mathbb{Z}^2$ denotes a multi-index (as a row vector) and $\boldsymbol{c}_i^{\boldsymbol{\alpha}} := \prod_{j=1}^{2} [\boldsymbol{c}_i]_j^{\alpha_j}$.

1.3 Transformation matrix M

Matrix $\mathbf{M}$, that defines macroscopic quantities (moments) $\boldsymbol{\mu}$ by

$$\boldsymbol{\mu} = \mathbf{M}\boldsymbol{f},$$

with $\boldsymbol{f} = (f_1, f_2, \ldots, f_9)^T$, is selected such that

$$\boldsymbol{\mu} = \left(m_{(0,0)}, m_{(1,0)}, m_{(0,1)}, m_{(1,1)}, m_{(2,0)}, m_{(0,2)}, m_{(2,1)}, m_{(1,2)}, m_{(2,2)}\right)^T,$$

i.e., $\mathbf{M}$ is given by

$$\mathbf{M} = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & -1 & 0 & 1 & -1 & -1 & 1 \\ 0 & 0 & 1 & 0 & -1 & 1 & 1 & -1 & -1 \\ 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & -1 \\ 0 & 1 & 0 & 1 & 0 & 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & -1 & -1 \\ 0 & 0 & 0 & 0 & 0 & 1 & -1 & -1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 1 \end{pmatrix}.$$

1.4 Equilibrium

The corresponding equilibrium raw moments are defined using the continuous Maxwell–Boltzmann distribution function [1]

$$f^{(eq)}(\boldsymbol{\xi}) = \frac{\rho}{2\pi c_s^2} \exp\left(-\frac{||\boldsymbol{\xi} - \boldsymbol{v}||^2}{2c_s^2}\right)$$

as

$$m_{\boldsymbol{\alpha}}^{(eq)} = \int_{\mathbb{R}^2} \boldsymbol{\xi}^{\boldsymbol{\alpha}} f^{(eq)}(\boldsymbol{\xi}) \mathrm{d}\boldsymbol{\xi},$$

where $\alpha_i \in \{0, 1, 2\}$, $i = 1, 2$. Hence, the equilibrium moments $\boldsymbol{\mu}^{(eq)}$ satisfy

$$\boldsymbol{\mu}^{(eq)} = \begin{pmatrix} \rho \\ \rho v_1 \\ \rho v_2 \\ \rho v_1 v_2 \\ \rho(v_1^2 + c_s^2) \\ \rho(v_2^2 + c_s^2) \\ \rho v_2(c_s^2 + v_1^2) \\ \rho v_1(c_s^2 + v_2^2) \\ \rho\left(c_s^4 + c_s^2(v_1^2 + v_2^2) + v_1^2 v_2^2\right) \end{pmatrix}.$$

2 Spatial EPDEs

2.1 SRT

2.1.1 Definitions

Collision operator $\boldsymbol{C}$:

$$\boldsymbol{C}(\boldsymbol{f}) = \omega\left(\mathbf{M}^{-1}\boldsymbol{\mu}^{(eq)} - \boldsymbol{f}\right),$$

$\omega \in (0, 2)$.

2.1.2 Conservation of mass: ρ

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$$\frac{\partial\rho}{\partial t} + \frac{v_1\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1} + \frac{\rho\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{v_2\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \frac{\rho\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-1+v_1^2+3cs^2)\frac{v_1\delta_l^3}{12\delta_t}\frac{\partial^3\rho}{\partial x_1^3} + (-1+3v_1^2+cs^2)\frac{\rho\delta_l^3}{12\delta_t}\frac{\partial^3 v_1}{\partial x_1^3} -$$
$$\frac{\rho\delta_l^3cs^2}{6\delta_t}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2} - \frac{\rho\delta_l^3cs^2}{6\delta_t}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2} + (-1+v_2^2+3cs^2)\frac{v_2\delta_l^3}{12\delta_t}\frac{\partial^3\rho}{\partial x_2^3} + (-1+3v_2^2+cs^2)\frac{\rho\delta_l^3}{12\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} +$$
$$(-12v_1^2cs^2\omega - 6v_1^2 - 3v_1^4\omega - cs^4\omega + 2cs^4 - 2cs^2 + 3v_1^2\omega + cs^2\omega + 24v_1^2cs^2 + 6v_1^4)\frac{\delta_l^4}{24\delta_t\omega}\frac{\partial^4\rho}{\partial x_1^4} +$$
$$(-4+10v_1^2+6cs^2-5v_1^2\omega-3cs^2\omega+2\omega)\frac{v_1\rho\delta_l^4}{12\delta_t\omega}\frac{\partial^4 v_1}{\partial x_1^4} + (2-2v_1^2-6cs^2+v_1^2\omega+3cs^2\omega-\omega)\frac{v_1\rho\delta_l^4}{12\delta_t\omega}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2} +$$
$$(-2+\omega)\frac{\delta_l^4cs^4}{6\delta_t\omega}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} + (2-2v_2^2+v_2^2\omega-6cs^2+3cs^2\omega-\omega)\frac{v_2\rho\delta_l^4}{12\delta_t\omega}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3} +$$
$$(-6v_2^2 - 3v_2^4\omega - cs^4\omega + 2cs^4 - 12v_2^2cs^2\omega + 3v_2^2\omega + 24v_2^2cs^2 - 2cs^2 + 6v_2^4 + cs^2\omega)\frac{\delta_l^4}{24\delta_t\omega}\frac{\partial^4\rho}{\partial x_2^4} +$$
$$(-4+10v_2^2-5v_2^2\omega+6cs^2-3cs^2\omega+2\omega)\frac{v_2\rho\delta_l^4}{12\delta_t\omega}\frac{\partial^4 v_2}{\partial x_2^4} = 0.$$

2.1.3 Conservation of momentum: ρv_1


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$$v_1\frac{\partial\rho}{\partial t} + \rho\frac{\partial v_1}{\partial t} + (v_1^2+cs^2)\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1} + \frac{2v_1\rho\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{v_2v_1\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \frac{v_2\rho\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_2} + \frac{v_1\rho\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2} +$$
$$(-2+6v_1^2+4cs^2-3v_1^2\omega-2cs^2\omega+\omega)\frac{\delta_l^2}{\delta_t\omega}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_1} + (2-\omega)\frac{3v_1\rho\delta_l^2}{\delta_t\omega}\left(\frac{\partial v_1}{\partial x_1}\right)^2 + (-2+\omega)\frac{\delta_l^2cs^2}{2\delta_t\omega}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_1} +$$
$$(-2+\omega)\frac{\delta_l^2cs^2}{2\delta_t\omega}\frac{\partial\rho}{\partial x_2}\frac{\partial v_1}{\partial x_2} + (-2+2v_1^2+6cs^2-v_1^2\omega-3cs^2\omega+\omega)\frac{v_1\delta_l^2}{2\delta_t\omega}\frac{\partial^2\rho}{\partial x_1^2} +$$
$$(-2+6v_1^2+2cs^2-3v_1^2\omega-cs^2\omega+\omega)\frac{\rho\delta_l^2}{2\delta_t\omega}\frac{\partial^2 v_1}{\partial x_1^2} + (-2+\omega)\frac{\rho\delta_l^2cs^2}{2\delta_t\omega}\frac{\partial^2 v_2}{\partial x_1\partial x_2} + (-2+\omega)\frac{\rho\delta_l^2cs^2}{2\delta_t\omega}\frac{\partial^2 v_1}{\partial x_2^2} + C_1\frac{\delta_l^3}{12\delta_t\omega^2}\frac{\partial^3\rho}{\partial x_1^3} +$$
$$(-24+60v_1^2+5cs^2\omega^2+36cs^2+11v_1^2\omega^2-60v_1^2\omega-4\omega^2-36cs^2\omega+24\omega)\frac{v_1\rho\delta_l^3}{6\delta_t\omega^2}\frac{\partial^3 v_1}{\partial x_1^3} +$$
$$(12-12v_1^2-11cs^2\omega^2-36cs^2-3v_1^2\omega^2+12v_1^2\omega+3\omega^2+36cs^2\omega-12\omega)\frac{v_1\rho\delta_l^3}{12\delta_t\omega^2}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2} +$$
$$(-12-\omega^2+12\omega)\frac{\delta_l^3cs^4}{6\delta_t\omega^2}\frac{\partial^3\rho}{\partial x_1\partial x_2^2} - \frac{v_1\rho\delta_l^3cs^2}{6\delta_t}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2} + (-1+v_2^2+3cs^2)\frac{v_2v_1\delta_l^3}{12\delta_t}\frac{\partial^3\rho}{\partial x_2^3} +$$
$$(6-6v_2^2-3cs^2\omega^2+6v_2^2\omega-18cs^2+\omega^2+18cs^2\omega-6\omega-v_2^2\omega^2)\frac{v_2\rho\delta_l^3}{6\delta_t\omega^2}\frac{\partial^3 v_1}{\partial x_2^3} + (-1+3v_2^2+cs^2)\frac{v_1\rho\delta_l^3}{12\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} +$$
$$C_2\frac{v_1\delta_l^4}{12\delta_t\omega^3}\frac{\partial^4\rho}{\partial x_1^4} + C_3\frac{\rho\delta_l^4}{12\delta_t\omega^3}\frac{\partial^4 v_1}{\partial x_1^4} + C_4\frac{\rho\delta_l^4}{12\delta_t\omega^3}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2} + C_5\frac{v_1\delta_l^4cs^2}{12\delta_t\omega^3}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} +$$
$$(-24+72v_1^2+8cs^2\omega^2-cs^2\omega^3+12cs^2+36v_1^2\omega^2-108v_1^2\omega-12\omega^2-18cs^2\omega+36\omega)\frac{\rho\delta_l^4cs^2}{12\delta_t\omega^3}\frac{\partial^4 v_1}{\partial x_1^2\partial x_2^2} +$$
$$C_6\frac{v_2\delta_l^4cs^2}{12\delta_t\omega^3}\frac{\partial^4\rho}{\partial x_1\partial x_2^3} + (2-2v_2^2+v_2^2\omega-6cs^2+3cs^2\omega-\omega)\frac{v_2v_1\rho\delta_l^4}{12\delta_t\omega}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3} +$$
$$(-12+36v_2^2+2cs^2\omega^2-54v_2^2\omega-cs^2\omega^3-6\omega^2+18\omega+18v_2^2\omega^2)\frac{\rho\delta_l^4cs^2}{12\delta_t\omega^3}\frac{\partial^4 v_2}{\partial x_1\partial x_2^3} +$$
$$(-6v_2^2 - 3v_2^4\omega - cs^4\omega + 2cs^4 + 3v_2^2\omega - 2cs^2 - 12v_2^2cs^2\omega + 24v_2^2cs^2 + 6v_2^4 + cs^2\omega)\frac{v_1\delta_l^4}{24\delta_t\omega}\frac{\partial^4\rho}{\partial x_2^4} + C_7\frac{\rho\delta_l^4}{24\delta_t\omega^3}\frac{\partial^4 v_1}{\partial x_2^4} +$$
$$(-4+10v_2^2-5v_2^2\omega+6cs^2-3cs^2\omega+2\omega)\frac{v_2v_1\rho\delta_l^4}{12\delta_t\omega}\frac{\partial^4 v_2}{\partial x_2^4} = 0,$$

where:

$$C_1 = 7v_1^4\omega^2 + cs^4\omega^2 - 144v_1^2cs^2\omega - 36v_1^2 + 24v_1^2cs^2\omega^2 - 12cs^4\omega - 36v_1^4\omega + 12cs^4 - cs^2\omega^2 - 12cs^2 - 7v_1^2\omega^2 + 36v_1^2\omega + 36v_1^4 + 144v_1^2cs^2 + 12cs^2\omega$$

$$C_2 = 12 - 5cs^4\omega^3 + 90v_1^4\omega^2 + 82cs^4\omega^2 - 9v_1^4\omega^3 - 1008v_1^2cs^2\omega - 156v_1^2 + 404v_1^2cs^2\omega^2 - 216cs^4\omega - 34v_1^2cs^2\omega^3 - 216v_1^4\omega + 144cs^4 - 78cs^2\omega^2 + 10v_1^2\omega^3 + 6cs^2\omega^3 - 132cs^2 - 98v_1^2\omega^2 - \omega^3 + 234v_1^2\omega + 144v_1^4 + 8\omega^2 + 672v_1^2cs^2 + 198cs^2\omega - 18\omega$$

$$C_3 = 12 - cs^4\omega^3 + 310v_1^4\omega^2 + 14cs^4\omega^2 - 29v_1^4\omega^3 - 648v_1^2cs^2\omega - 252v_1^2 + 252v_1^2cs^2\omega^2 - 36cs^4\omega - 18v_1^2cs^2\omega^3 - 756v_1^4\omega + 24cs^4 - 22cs^2\omega^2 + 14v_1^2\omega^3 + 2cs^2\omega^3 - 36cs^2 - 154v_1^2\omega^2 - \omega^3 + 378v_1^2\omega + 504v_1^4 + 8\omega^2 + 432v_1^2cs^2 + 54cs^2\omega - 18\omega$$

$$C_4 = -cs^4\omega^3 - 26v_1^4\omega^2 + 20cs^4\omega^2 + 4v_1^4\omega^3 + 54v_1^2cs^2\omega + 36v_1^2 - 42v_1^2cs^2\omega^2 - 54cs^4\omega + 12v_1^2cs^2\omega^3 + 54v_1^4\omega + 36cs^4 - 12cs^2\omega^2 - 4v_1^2\omega^3 - 24cs^2 + 26v_1^2\omega^2 - 54v_1^2\omega - 36v_1^4 - 36v_1^2cs^2 + 36cs^2\omega$$

$$C_5 = 24 - 24v_1^2 - 46cs^2\omega^2 + v_1^2\omega^3 + 5cs^2\omega^3 - 72cs^2 - 14v_1^2\omega^2 - \omega^3 + 36v_1^2\omega + 14\omega^2 + 108cs^2\omega - 36\omega$$

$C_6 = 24 - 24v_2^2 - 42cs^2\omega^2 + 36v_2^2\omega + 3cs^2\omega^3 - 72cs^2 - \omega^3 + v_2^2\omega^3 + 14\omega^2 + 108cs^2\omega - 36\omega - 14v_2^2\omega^2$

$C_7 = -3cs^4\omega^3 + 72v_2^2 + 30cs^4\omega^2 + 108v_2^4\omega - 72cs^4\omega - 42v_2^4\omega^2 + 3v_2^4\omega^3 + 48cs^4 - 14cs^2\omega^2 - 108v_2^2\omega + cs^2\omega^3 - 24cs^2 + 216v_2^2cs^2\omega - 144v_2^2cs^2 - 84v_2^2cs^2\omega^2 - 72v_2^4 - 3v_2^2\omega^3 + 6v_2^2cs^2\omega^3 + 36cs^2\omega + 42v_2^2\omega^2$

2.1.4 Conservation of momentum: ρv_2

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$$v_2\frac{\partial\rho}{\partial t} + \rho\frac{\partial v_2}{\partial t} + \frac{v_2v_1\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1} + \frac{v_2\rho\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{v_1\rho\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_1} + (v_2^2+cs^2)\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \frac{2v_2\rho\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-2+\omega)\frac{\delta_l^2cs^2}{2\delta_t\omega}\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_1} +$$
$$(-2+\omega)\frac{\delta_l^2cs^2}{2\delta_t\omega}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_2} + (-2+6v_2^2+4cs^2-3v_2^2\omega-2cs^2\omega+\omega)\frac{\delta_l^2}{\delta_t\omega}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_2} + (2-\omega)\frac{3v_2\rho\delta_l^2}{\delta_t\omega}\left(\frac{\partial v_2}{\partial x_2}\right)^2 +$$
$$(-2+\omega)\frac{\rho\delta_l^2cs^2}{2\delta_t\omega}\frac{\partial^2v_2}{\partial x_1^2} + (-2+\omega)\frac{\rho\delta_l^2cs^2}{2\delta_t\omega}\frac{\partial^2v_1}{\partial x_1\partial x_2} + (-2+2v_2^2+6cs^2-v_2^2\omega-3cs^2\omega+\omega)\frac{v_2\delta_l^2}{2\delta_t\omega}\frac{\partial^2\rho}{\partial x_2^2} +$$
$$(-2+6v_2^2+2cs^2-3v_2^2\omega-cs^2\omega+\omega)\frac{\rho\delta_l^2}{2\delta_t\omega}\frac{\partial^2v_2}{\partial x_2^2} + (-1+v_1^2+3cs^2)\frac{v_2v_1\delta_l^3}{12\delta_t}\frac{\partial^3\rho}{\partial x_1^3} + (-1+3v_1^2+cs^2)\frac{v_2\rho\delta_l^3}{12\delta_t}\frac{\partial^3v_1}{\partial x_1^3} +$$
$$(6-6v_1^2-18cs^2+18cs^2\omega-v_1^2\omega^2+6v_1^2\omega-3cs^2\omega^2+\omega^2-6\omega)\frac{v_1\rho\delta_l^3}{6\delta_t\omega^2}\frac{\partial^3v_2}{\partial x_1^3} + (-12-\omega^2+12\omega)\frac{\delta_l^3cs^4}{6\delta_t\omega^2}\frac{\partial^3\rho}{\partial x_1^2\partial x_2} -$$
$$\frac{v_2\rho\delta_l^3cs^2}{6\delta_t}\frac{\partial^3v_2}{\partial x_1^2\partial x_2} + (12-12v_2^2-36cs^2+12v_2^2\omega+36cs^2\omega-11cs^2\omega^2+3\omega^2-12\omega-3v_2^2\omega^2)\frac{v_2\rho\delta_l^3}{12\delta_t\omega^2}\frac{\partial^3v_1}{\partial x_1\partial x_2^2} +$$
$$C_1\frac{\delta_l^3}{12\delta_t\omega^2}\frac{\partial^3\rho}{\partial x_2^3} + (-24+60v_2^2+36cs^2-60v_2^2\omega-36cs^2\omega+5cs^2\omega^2-4\omega^2+24\omega+11v_2^2\omega^2)\frac{v_2\rho\delta_l^3}{6\delta_t\omega^2}\frac{\partial^3v_2}{\partial x_2^3} +$$
$$(-cs^4\omega-6v_1^2+2cs^4-12v_1^2cs^2\omega-3v_1^4\omega-2cs^2+cs^2\omega+3v_1^2\omega+24v_1^2cs^2+6v_1^4)\frac{v_2\delta_l^4}{24\delta_t\omega}\frac{\partial^4\rho}{\partial x_1^4} +$$
$$(-4+10v_1^2+6cs^2-3cs^2\omega-5v_1^2\omega+2\omega)\frac{v_2v_1\rho\delta_l^4}{12\delta_t\omega}\frac{\partial^4v_1}{\partial x_1^4} + C_2\frac{\rho\delta_l^4}{24\delta_t\omega^3}\frac{\partial^4v_2}{\partial x_1^4} + C_3\frac{v_1\delta_l^4cs^2}{12\delta_t\omega^3}\frac{\partial^4\rho}{\partial x_1^3\partial x_2} +$$
$$(-12+36v_1^2+18v_1^2\omega^2-54v_1^2\omega+2cs^2\omega^2-6\omega^2-cs^2\omega^3+18\omega)\frac{\rho\delta_l^4cs^2}{12\delta_t\omega^3}\frac{\partial^4v_1}{\partial x_1^3\partial x_2} +$$
$$(2-2v_1^2-6cs^2+3cs^2\omega+v_1^2\omega-\omega)\frac{v_2v_1\rho\delta_l^4}{12\delta_t\omega}\frac{\partial^4v_2}{\partial x_1^3\partial x_2} + C_4\frac{v_2\delta_l^4cs^2}{12\delta_t\omega^3}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} +$$
$$(-24+72v_2^2+12cs^2-108v_2^2\omega-18cs^2\omega+8cs^2\omega^2-12\omega^2-cs^2\omega^3+36\omega+36v_2^2\omega^2)\frac{\rho\delta_l^4cs^2}{12\delta_t\omega^3}\frac{\partial^4v_2}{\partial x_1^2\partial x_2^2} +$$
$$C_5\frac{\rho\delta_l^4}{12\delta_t\omega^3}\frac{\partial^4v_1}{\partial x_1\partial x_2^3} + C_6\frac{v_2\delta_l^4}{12\delta_t\omega^3}\frac{\partial^4\rho}{\partial x_2^4} + C_7\frac{\rho\delta_l^4}{12\delta_t\omega^3}\frac{\partial^4v_2}{\partial x_2^4} = 0,$$

where:

$C_1 = -12cs^4\omega - 36v_2^2 - 36v_2^4\omega + 12cs^4 + 7v_2^4\omega^2 + cs^4\omega^2 - 12cs^2 + 36v_2^2\omega + 24v_2^2cs^2\omega^2 + 144v_2^2cs^2 + 12cs^2\omega + 36v_2^4 - cs^2\omega^2 - 144v_2^2cs^2\omega - 7v_2^2\omega^2$

$C_2 = -72cs^4\omega - 42v_1^4\omega^2 - 84v_1^2cs^2\omega^2 + 6v_1^2cs^2\omega^3 + 3v_1^4\omega^3 + 72v_1^2 - 3cs^4\omega^3 + 48cs^4 + 216v_1^2cs^2\omega + 108v_1^4\omega + 30cs^4\omega^2 - 24cs^2 - 3v_1^2\omega^3 + 36cs^2\omega + 42v_1^2\omega^2 - 108v_1^2\omega - 144v_1^2cs^2 - 14cs^2\omega^2 - 72v_1^4 + cs^2\omega^3$

$C_3 = 24 - 24v_1^2 - 72cs^2 + v_1^2\omega^3 + 108cs^2\omega - 14v_1^2\omega^2 - \omega^3 + 36v_1^2\omega - 42cs^2\omega^2 + 14\omega^2 + 3cs^2\omega^3 - 36\omega$

$C_4 = 24 - 24v_2^2 - 72cs^2 + 36v_2^2\omega + 108cs^2\omega - \omega^3 + v_2^2\omega^3 - 46cs^2\omega^2 + 14\omega^2 + 5cs^2\omega^3 - 36\omega - 14v_2^2\omega^2$

$C_5 = -54cs^4\omega + 36v_2^2 + 54v_2^4\omega - cs^4\omega^3 + 36cs^4 - 26v_2^4\omega^2 + 4v_2^4\omega^3 + 20cs^4\omega^2 - 24cs^2 - 54v_2^2\omega - 42v_2^2cs^2\omega^2 - 36v_2^2cs^2 + 36cs^2\omega + 12v_2^2cs^2\omega^3 - 36v_2^4 - 4v_2^2\omega^3 - 12cs^2\omega^2 + 54v_2^2cs^2\omega + 26v_2^2\omega^2$

$C_6 = 12 - 216cs^4\omega - 156v_2^2 - 216v_2^4\omega - 5cs^4\omega^3 + 144cs^4 + 90v_2^4\omega^2 - 9v_2^4\omega^3 + 82cs^4\omega^2 - 132cs^2 + 234v_2^2\omega + 404v_2^2cs^2\omega^2 + 672v_2^2cs^2 + 198cs^2\omega - 34v_2^2cs^2\omega^3 - \omega^3 + 144v_2^4 + 10v_2^2\omega^3 - 78cs^2\omega^2 - 1008v_2^2cs^2\omega + 8\omega^2 + 6cs^2\omega^3 - 18\omega - 98v_2^2\omega^2$

$C_7 = 12 - 36cs^4\omega - 252v_2^2 - 756v_2^4\omega - cs^4\omega^3 + 24cs^4 + 310v_2^4\omega^2 - 29v_2^4\omega^3 + 14cs^4\omega^2 - 36cs^2 + 378v_2^2\omega + 252v_2^2cs^2\omega^2 + 432v_2^2cs^2 + 54cs^2\omega - 18v_2^2cs^2\omega^3 - \omega^3 + 504v_2^4 + 14v_2^2\omega^3 - 22cs^2\omega^2 - 648v_2^2cs^2\omega + 8\omega^2 + 2cs^2\omega^3 - 18\omega - 154v_2^2\omega^2$

2.2 MRT

2.2.1 Definitions

Collision operator $\boldsymbol{C}$:

$$\boldsymbol{C}\left(\boldsymbol{f}\right)=\mathbf{M}^{-1}\mathbf{S}\left(\boldsymbol{\mu}^{(eq)}-\mathbf{M}\boldsymbol{f}\right),$$

where

$$\mathbf{S}=\mathrm{diag}(\omega_1,\omega_2,\omega_3,\omega_4,\omega_5,\omega_6,\omega_7,\omega_8,\omega_9),$$

$\omega_1,\omega_2,\ldots,\omega_9\in(0,2)$.

2.2.2 Conservation of mass: ρ

attached text file: `output_d2q9_nse_mrt1_symbolic_pde_00.txt`

$$\frac{\partial\rho}{\partial t}+\frac{v_1\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1}+\frac{\rho\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1}+\frac{v_2\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2}+\frac{\rho\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2}+(-1+v_1^2+3cs^2)\frac{v_1\delta_l^3}{12\delta_t}\frac{\partial^3\rho}{\partial x_1^3}+(-1+3v_1^2+cs^2)\frac{\rho\delta_l^3}{12\delta_t}\frac{\partial^3 v_1}{\partial x_1^3}-\frac{\rho cs^2\delta_l^3}{6\delta_t}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2}-\frac{\rho cs^2\delta_l^3}{6\delta_t}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2}+(-1+v_2^2+3cs^2)\frac{v_2\delta_l^3}{12\delta_t}\frac{\partial^3\rho}{\partial x_2^3}+(-1+3v_2^2+cs^2)\frac{\rho\delta_l^3}{12\delta_t}\frac{\partial^3 v_2}{\partial x_2^3}+(-cs^4\omega_5-6v_1^2+2cs^4-3v_1^4\omega_5-12v_1^2cs^2\omega_5-2cs^2+cs^2\omega_5+24v_1^2cs^2+3v_1^2\omega_5+6v_1^4)\frac{\delta_l^4}{24\delta_t\omega_5}\frac{\partial^4\rho}{\partial x_1^4}+(-4+10v_1^2+6cs^2-3cs^2\omega_5+2\omega_5-5v_1^2\omega_5)\frac{v_1\rho\delta_l^4}{12\delta_t\omega_5}\frac{\partial^4 v_1}{\partial x_1^4}+(3\omega_7cs^2+v_1^2\omega_7-\omega_7-3cs^2\omega_5+\omega_5-v_1^2\omega_5)\frac{v_2v_1\delta_l^4}{4\delta_t\omega_7\omega_5}\frac{\partial^4\rho}{\partial x_1^3\partial x_2}+(\omega_7cs^2+3v_1^2\omega_7-\omega_7-cs^2\omega_5+\omega_5-3v_1^2\omega_5)\frac{v_2\rho\delta_l^4}{4\delta_t\omega_7\omega_5}\frac{\partial^4 v_1}{\partial x_1^3\partial x_2}+(v_1^2\omega_7\omega_4\omega_5-3\omega_4cs^2\omega_5-\omega_7\omega_4\omega_5-6\omega_7cs^2\omega_5+3\omega_7\omega_4cs^2-3v_1^2\omega_4\omega_5-\omega_7\omega_4+v_1^2\omega_7\omega_4+3\omega_7\omega_4cs^2\omega_5+3\omega_4\omega_5)\frac{v_1\rho\delta_l^4}{12\delta_t\omega_7\omega_4\omega_5}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2}+(-2+\omega_4)\frac{cs^4\delta_l^4}{6\delta_t\omega_4}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2}+(-\omega_7+\omega_4)\frac{v_1\rho cs^2\delta_l^4}{2\delta_t\omega_7\omega_4}\frac{\partial^4 v_1}{\partial x_1^2\partial x_2^2}+(\omega_4-\omega_8)\frac{v_2\rho cs^2\delta_l^4}{2\delta_t\omega_4\omega_8}\frac{\partial^4 v_2}{\partial x_1^2\partial x_2^2}+(\omega_6-3\omega_6cs^2+v_2^2\omega_8+3cs^2\omega_8-\omega_8-\omega_6v_2^2)\frac{v_2v_1\delta_l^4}{4\omega_6\delta_t\omega_8}\frac{\partial^4\rho}{\partial x_1\partial x_2^3}+(v_2^2\omega_4\omega_8+3\omega_4cs^2\omega_8-3\omega_6v_2^2\omega_4+\omega_6v_2^2\omega_4\omega_8+3\omega_6\omega_4cs^2\omega_8-\omega_4\omega_8-6\omega_6cs^2\omega_8-\omega_6\omega_4\omega_8+3\omega_6\omega_4-3\omega_6\omega_4cs^2)\frac{v_2\rho\delta_l^4}{12\omega_6\delta_t\omega_4\omega_8}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3}+(\omega_6-\omega_6cs^2+3v_2^2\omega_8+cs^2\omega_8-\omega_8-3\omega_6v_2^2)\frac{v_1\rho\delta_l^4}{4\omega_6\delta_t\omega_8}\frac{\partial^4 v_2}{\partial x_1\partial x_2^3}+(-6v_2^2-3\omega_6v_2^4+2cs^4+\omega_6cs^2-2cs^2-\omega_6cs^4+24v_2^2cs^2+6v_2^4+3\omega_6v_2^2-12\omega_6v_2^2cs^2)\frac{\delta_l^4}{24\omega_6\delta_t}\frac{\partial^4\rho}{\partial x_2^4}+(-4+10v_2^2+2\omega_6-3\omega_6cs^2+6cs^2-5\omega_6v_2^2)\frac{v_2\rho\delta_l^4}{12\omega_6\delta_t}\frac{\partial^4 v_2}{\partial x_2^4}=0.$$

2.2.3 Conservation of momentum: ρv_1

attached text file: `output_d2q9_nse_mrt1_symbolic_pde_01.txt`

$$v_1\frac{\partial\rho}{\partial t}+\rho\frac{\partial v_1}{\partial t}+(v_1^2+cs^2)\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1}+\frac{2v_1\rho\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1}+\frac{v_2v_1\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2}+\frac{v_2\rho\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_2}+\frac{v_1\rho\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2}+(-2-2\omega_5cs^2+6v_1^2+4cs^2+\omega_5-3v_1^2\omega_5)\frac{\delta_l^2}{\delta_t\omega_5}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_1}+(2-\omega_5)\frac{3v_1\rho\delta_l^2}{\delta_t\omega_5}\left(\frac{\partial v_1}{\partial x_1}\right)^2+(-2+\omega_4)\frac{cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_1}+(-2+\omega_4)\frac{cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_2}\frac{\partial v_1}{\partial x_2}+(-2-3\omega_5cs^2+2v_1^2+6cs^2+\omega_5-v_1^2\omega_5)\frac{v_1\delta_l^2}{2\delta_t\omega_5}\frac{\partial^2\rho}{\partial x_1^2}+(-2-\omega_5cs^2+6v_1^2+2cs^2+\omega_5-3v_1^2\omega_5)\frac{\rho\delta_l^2}{2\delta_t\omega_5}\frac{\partial^2 v_1}{\partial x_1^2}+(-2+\omega_4)\frac{\rho cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial^2 v_2}{\partial x_1\partial x_2}+(-2+\omega_4)\frac{\rho cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial^2 v_1}{\partial x_2^2}+C_1\frac{\delta_l^3}{12\delta_t\omega_5^2}\frac{\partial^3\rho}{\partial x_1^3}+(-24-36\omega_5cs^2+60v_1^2+36cs^2+11v_1^2\omega_5^2+24\omega_5+5\omega_5^2cs^2-4\omega_5^2-60v_1^2\omega_5)\frac{v_1\rho\delta_l^3}{6\delta_t\omega_5^2}\frac{\partial^3 v_1}{\partial x_1^3}+C_2\frac{v_2v_1\delta_l^3}{\delta_t\omega_7\omega_4\omega_5^2}\frac{\partial^3\rho}{\partial x_1^2\partial x_2}+C_3\frac{v_2\rho\delta_l^3}{\delta_t\omega_7\omega_4\omega_5^2}\frac{\partial^3 v_1}{\partial x_1^2\partial x_2}+C_4\frac{v_1\rho\delta_l^3}{12\delta_t\omega_7\omega_4^2\omega_5^2}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2}+(-12+12\omega_4-\omega_4^2)\frac{cs^4\delta_l^3}{6\delta_t\omega_4^2}\frac{\partial^3\rho}{\partial x_1\partial x_2^2}+(-12\omega_7\omega_5-12\omega_4^2\omega_5+12\omega_7\omega_4\omega_5+12\omega_4^2-\omega_7\omega_4^2\omega_5-12\omega_7\omega_4+12\omega_4\omega_5)\frac{v_1\rho cs^2\delta_l^3}{6\delta_t\omega_7\omega_4^2\omega_5}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2}+(2\omega_4-\omega_4^2+\omega_4\omega_8-2\omega_8)\frac{v_2\rho cs^2\delta_l^3}{\delta_t\omega_4^2\omega_8}\frac{\partial^3 v_2}{\partial x_1\partial x_2^2}+C_5\frac{v_2v_1\delta_l^3}{12\omega_6\delta_t\omega_4\omega_8}\frac{\partial^3\rho}{\partial x_2^3}+C_6\frac{v_2\rho\delta_l^3}{6\delta_t\omega_4^2\omega_8}\frac{\partial^3 v_1}{\partial x_2^3}+C_7\frac{v_1\rho\delta_l^3}{12\omega_6\delta_t\omega_4\omega_8}\frac{\partial^3 v_2}{\partial x_2^3}+C_8\frac{v_1\delta_l^4}{12\delta_t\omega_5^3}\frac{\partial^4\rho}{\partial x_1^4}+C_9\frac{\rho\delta_l^4}{12\delta_t\omega_5^3}\frac{\partial^4 v_1}{\partial x_1^4}+C_{10}\frac{v_2\delta_l^4}{4\delta_t\omega_7^2\omega_4^2\omega_5^3}\frac{\partial^4\rho}{\partial x_1^3\partial x_2}+C_{11}\frac{v_2v_1\rho\delta_l^4}{4\delta_t\omega_7^2\omega_4^2\omega_5^3}\frac{\partial^4 v_1}{\partial x_1^3\partial x_2}+C_{12}\frac{\rho\delta_l^4}{12\delta_t\omega_7^2\omega_4^3\omega_5^3}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2}+$$

$$C_{13}\frac{v_1\delta_l^4}{12\delta_t\omega_7^2\omega_4^3\omega_8\omega_5^3\omega_9}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2}+C_{14}\frac{\rho\delta_l^4}{12\delta_t\omega_7^2\omega_4^3\omega_8\omega_5^3\omega_9}\frac{\partial^4 v_1}{\partial x_1^2\partial x_2^2}+C_{15}\frac{v_2v_1\rho\delta_l^4}{2\omega_6\delta_t\omega_7^2\omega_4^3\omega_8^2\omega_5^3\omega_9}\frac{\partial^4 v_2}{\partial x_1^2\partial x_2^2}+$$
$$C_{16}\frac{v_2\delta_l^4}{12\omega_6^2\delta_t\omega_7\omega_4^3\omega_8^2\omega_5\omega_9}\frac{\partial^4\rho}{\partial x_1\partial x_2^3}+C_{17}\frac{v_2v_1\rho\delta_l^4}{12\omega_6^2\delta_t\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3}+C_{18}\frac{\rho\delta_l^4}{12\omega_6^2\delta_t\omega_7\omega_4^3\omega_8^2\omega_5\omega_9}\frac{\partial^4 v_2}{\partial x_1\partial x_2^3}+C_{19}\frac{v_1\delta_l^4}{24\omega_6^2\delta_t\omega_4^2\omega_8^2}\frac{\partial^4\rho}{\partial x_2^4}$$
$$+C_{20}\frac{\rho\delta_l^4}{24\delta_t\omega_4^3\omega_8^2}\frac{\partial^4 v_1}{\partial x_2^4}+C_{21}\frac{v_2v_1\rho\delta_l^4}{12\omega_6^2\delta_t\omega_4^2\omega_8^2}\frac{\partial^4 v_2}{\partial x_2^4}=0,$$

where:

$$C_1=-144v_1^2\omega_5cs^2+\omega_5^2cs^4+7v_1^4\omega_5^2+12\omega_5cs^2-36v_1^2-12cs^2-36v_1^4\omega_5+144v_1^2cs^2-7v_1^2\omega_5^2-\omega_5^2cs^2+12cs^4-12\omega_5cs^4+36v_1^2\omega_5+36v_1^4+24v_1^2\omega_5^2cs^2$$

$$C_2=-v_1^2\omega_7\omega_4\omega_5-\omega_7\omega_5+v_1^2\omega_7\omega_5-3\omega_7\omega_4\omega_5cs^2+\omega_7\omega_4\omega_5+3\omega_4\omega_5^2cs^2-v_1^2\omega_5^2-v_1^2\omega_4\omega_5-3\omega_4\omega_5cs^2-\omega_7\omega_4+v_1^2\omega_7\omega_4+\omega_4\omega_5+3\omega_7\omega_4cs^2-3\omega_5^2cs^2-\omega_4\omega_5^2+\omega_5^2+3\omega_7\omega_5cs^2+v_1^2\omega_4\omega_5^2$$

$$C_3=-3v_1^2\omega_7\omega_4\omega_5-\omega_7\omega_5+3v_1^2\omega_7\omega_5-\omega_7\omega_4\omega_5cs^2+\omega_7\omega_4\omega_5+\omega_4\omega_5^2cs^2-3v_1^2\omega_5^2-3v_1^2\omega_4\omega_5-\omega_4\omega_5cs^2-\omega_7\omega_4+3v_1^2\omega_7\omega_4+\omega_4\omega_5+\omega_7\omega_4cs^2-\omega_5^2cs^2-\omega_4\omega_5^2+\omega_5^2+\omega_7\omega_5cs^2+3v_1^2\omega_4\omega_5^2$$

$$C_4=-6\omega_7\omega_4\omega_5^2-11\omega_7\omega_4^2\omega_5^2cs^2+12v_1^2\omega_4^2\omega_5^2-24\omega_7\omega_5^2cs^2+36\omega_7\omega_4^2cs^2-12\omega_4^2\omega_5^2-24\omega_7\omega_4\omega_5cs^2-12\omega_4^2\omega_5cs^2+12\omega_4^2\omega_5-12\omega_4\omega_5^2cs^2-12v_1^2\omega_4^2\omega_5+6v_1^2\omega_7\omega_4\omega_5^2+6\omega_7\omega_4^2\omega_5-3v_1^2\omega_7\omega_4^2\omega_5^2+12\omega_4^2\omega_5^2cs^2+12\omega_4\omega_5^2+12v_1^2\omega_7\omega_4^2+42\omega_7\omega_4\omega_5^2cs^2-6v_1^2\omega_7\omega_4^2\omega_5-12\omega_7\omega_4^2-18\omega_7\omega_4^2\omega_5cs^2+3\omega_7\omega_4^2\omega_5^2-12v_1^2\omega_4\omega_5^2$$

$$C_5=12\omega_6-6v_2^2\omega_4\omega_8+18\omega_6\omega_4cs^2+3\omega_6\omega_4\omega_8cs^2+36\omega_8cs^2+6\omega_6v_2^2\omega_4+\omega_6v_2^2\omega_4\omega_8+12v_2^2\omega_8+6\omega_4\omega_8-12\omega_8-18\omega_4\omega_8cs^2-\omega_6\omega_4\omega_8-12\omega_6v_2^2-6\omega_6\omega_4-36\omega_6cs^2$$

$$C_6=-3\omega_4^2\omega_8cs^2-6\omega_4cs^2+3v_2^2\omega_4\omega_8-6v_2^2\omega_4+3v_2^2\omega_4^2-12\omega_8cs^2+6\omega_4-3\omega_4^2+\omega_4^2\omega_8-3\omega_4\omega_8-v_2^2\omega_4^2\omega_8+15\omega_4\omega_8cs^2+3\omega_4^2cs^2$$

$$C_7=12\omega_6-18v_2^2\omega_4\omega_8+6\omega_6\omega_4cs^2+\omega_6\omega_4\omega_8cs^2+12\omega_8cs^2+18\omega_6v_2^2\omega_4+3\omega_6v_2^2\omega_4\omega_8+36v_2^2\omega_8+6\omega_4\omega_8-12\omega_8-6\omega_4\omega_8cs^2-\omega_6\omega_4\omega_8-36\omega_6v_2^2-6\omega_6\omega_4-12\omega_6cs^2$$

$$C_8=12-9v_1^4\omega_5^3-1008v_1^2\omega_5cs^2+82\omega_5^2cs^4+90v_1^4\omega_5^2+198\omega_5cs^2-156v_1^2-132cs^2-5\omega_5^3cs^4-216v_1^4\omega_5+672v_1^2cs^2-98v_1^2\omega_5^2+6\omega_5^3cs^2+10v_1^2\omega_5^3-34v_1^2\omega_5^3cs^2-18\omega_5-\omega_5^3-78\omega_5^2cs^2+8\omega_5^2+144cs^4-216\omega_5cs^4+234v_1^2\omega_5+144v_1^4+404v_1^2\omega_5^2cs^2$$

$$C_9=12-29v_1^4\omega_5^3-648v_1^2\omega_5cs^2+14\omega_5^2cs^4+310v_1^4\omega_5^2+54\omega_5cs^2-252v_1^2-36cs^2-\omega_5^3cs^4-756v_1^4\omega_5+432v_1^2cs^2-154v_1^2\omega_5^2+2\omega_5^3cs^2+14v_1^2\omega_5^3-18v_1^2\omega_5^3cs^2-18\omega_5-\omega_5^3-22\omega_5^2cs^2+8\omega_5^2+24cs^4-36\omega_5cs^4+378v_1^2\omega_5+504v_1^4+252v_1^2\omega_5^2cs^2$$

$$C_{10}=4\omega_7^2\omega_5^2cs^4-8\omega_7\omega_4^2\omega_5^2cs^2-48v_1^2\omega_7\omega_4\omega_5^2cs^2+4v_1^2\omega_4^2\omega_5^2+32v_1^4\omega_7\omega_4^2\omega_5^2-4\omega_7\omega_4^2\omega_5cs^4-36v_1^2\omega_7\omega_5^3cs^2+36v_1^2\omega_7^2\omega_4^2\omega_5-8v_1^4\omega_7\omega_5^3+4\omega_4^2\omega_5^3cs^4+4\omega_4\omega_5^3cs^2-13v_1^4\omega_7\omega_4^2\omega_5^3-20v_1^4\omega_7^2\omega_4\omega_5^2-4v_1^2\omega_4^2\omega_5^3-24v_1^2\omega_7^2\omega_4^2-72v_1^2\omega_7\omega_4^2\omega_5cs^2+8\omega_7^2\omega_4^2cs^4+51v_1^2\omega_7^2\omega_4^2\omega_5^2cs^2+8\omega_7^2\omega_4\omega_5^2cs^2+4\omega_7\omega_5^3cs^2+20v_1^4\omega_7^2\omega_4\omega_5+84v_1^2\omega_7\omega_4\omega_5^3cs^2+4\omega_7\omega_4^2\omega_5^3cs^2+8\omega_7\omega_4\omega_5^3cs^4-24v_1^2\omega_4\omega_5^3cs^2-13v_1^2\omega_7^2\omega_4^2\omega_5^2-4v_1^4\omega_4^2\omega_5^2-20v_1^2\omega_7\omega_4\omega_5^3+4\omega_7^2\omega_4^2\omega_5^2cs^4+12\omega_7^2\omega_4^2\omega_5cs^2+72v_1^2\omega_7^2\omega_4\omega_5cs^2+8v_1^2\omega_7\omega_5^3-20v_1^4\omega_7\omega_4^2\omega_5+4v_1^4\omega_4^2\omega_5^3+16v_1^2\omega_7\omega_4\omega_5^2-4\omega_4^2\omega_5^2cs^4+4\omega_7^2\omega_4\omega_5cs^4+24v_1^4\omega_7^2\omega_4^2-51v_1^2\omega_7\omega_4^2\omega_5^3cs^2-8\omega_7\omega_4\omega_5^3cs^2+96v_1^2\omega_7^2\omega_4^2cs^2-84v_1^2\omega_7^2\omega_4\omega_5^2cs^2-4\omega_7^2\omega_4^2\omega_5^2cs^2-8\omega_7^2\omega_4\omega_5^2cs^4-4\omega_7\omega_5^3cs^4-32v_1^2\omega_7\omega_4^2\omega_5^2-4v_1^4\omega_4\omega_5^3+24v_1^2\omega_4^2\omega_5^3cs^2-4\omega_7\omega_4^2\omega_5^3cs^4-36v_1^4\omega_7^2\omega_4^2\omega_5-8v_1^2\omega_7^2\omega_5^2-4\omega_7^2\omega_4\omega_5cs^2-144v_1^2\omega_7^2\omega_4^2\omega_5cs^2+4\omega_4^2\omega_5^2cs^2+36v_1^2\omega_7^2\omega_4^2cs^2+13v_1^2\omega_7\omega_4^2\omega_5^3-12\omega_7^2\omega_4^2\omega_5cs^4+20v_1^2\omega_7^2\omega_4\omega_5^2-24v_1^2\omega_4^2\omega_5^2cs^2+8\omega_7\omega_4^2\omega_5^2cs^4-20v_1^2\omega_7^2\omega_4\omega_5+4v_1^2\omega_4\omega_5^3-4\omega_7^2\omega_5^2cs^2+13v_1^4\omega_7^2\omega_4^2\omega_5^2+20v_1^4\omega_7\omega_4\omega_5^3+120v_1^2\omega_7\omega_4^2\omega_5^2cs^2-4\omega_4\omega_5^3cs^4+20v_1^2\omega_7\omega_4^2\omega_5+8v_1^4\omega_7^2\omega_5^2-8\omega_7^2\omega_4^2cs^2+4\omega_7\omega_4^2\omega_5cs^2-16v_1^4\omega_7\omega_4\omega_5^2-4\omega_4^2\omega_5^3cs^2$$

$$C_{11}=-8\omega_4^2\omega_5^3-32\omega_7^2\omega_4^2+16\omega_7\omega_4\omega_5^2+56\omega_7\omega_4^2\omega_5^2cs^2-16v_1^2\omega_4^2\omega_5^2+8\omega_4^2\omega_5^2-120v_1^2\omega_7^2\omega_4^2\omega_5-16\omega_4\omega_5^3cs^2+16v_1^2\omega_4^2\omega_5^3-28\omega_7\omega_4\omega_5^3+80v_1^2\omega_7^2\omega_4^2-17\omega_7^2\omega_4^2\omega_5^2-44\omega_7^2\omega_4\omega_5^2cs^2-20\omega_7\omega_5^3cs^2-25\omega_7\omega_4^2\omega_5^3cs^2+48\omega_7^2\omega_4^2\omega_5+43v_1^2\omega_7^2\omega_4^2\omega_5^2+12\omega_7\omega_5^3+68v_1^2\omega_7\omega_4\omega_5^3-72\omega_7^2\omega_4^2\omega_5cs^2-28v_1^2\omega_7\omega_5^3-48v_1^2\omega_7\omega_4\omega_5^2+24\omega_7\omega_4^2\omega_5+44\omega_7\omega_4\omega_5^3cs^2+25\omega_7^2\omega_4^2\omega_5^2cs^2-12\omega_7^2\omega_5^2+104v_1^2\omega_7\omega_4^2\omega_5^2+28v_1^2\omega_7^2\omega_5^2+32\omega_7^2\omega_4\omega_5cs^2-16\omega_4^2\omega_5^2cs^2-24\omega_7^2\omega_4\omega_5-43v_1^2\omega_7\omega_4^2\omega_5^3-68v_1^2\omega_7^2\omega_4\omega_5^2+64v_1^2\omega_7^2\omega_4\omega_5-16v_1^2\omega_4\omega_5^3+20\omega_7^2\omega_5^2cs^2+28\omega_7^2\omega_4\omega_5^2-16\omega_7\omega_4\omega_5^2cs^2+17\omega_7\omega_4^2\omega_5^3+8\omega_4\omega_5^3-64v_1^2\omega_7\omega_4^2\omega_5+48\omega_7^2\omega_4^2cs^2-32\omega_7\omega_4^2\omega_5cs^2-40\omega_7\omega_4^2\omega_5^2+16\omega_4^2\omega_5^3cs^2$$

$$C_{12}=-19v_1^2\omega_7^2\omega_4^3\omega_5^2+13\omega_7^2\omega_4^2\omega_5^3cs^4-12v_1^4\omega_4^3\omega_5^2-12\omega_7^2\omega_4^3\omega_5cs^4-72v_1^2\omega_7^2\omega_4^3-306v_1^2\omega_7^2\omega_4^3\omega_5cs^2-12\omega_7\omega_4^2\omega_5^2cs^2+12v_1^4\omega_7^2\omega_4\omega_5^3+6\omega_7^2\omega_4\omega_5^3cs^2-81v_1^2\omega_7^2\omega_4^2\omega_5^3cs^2-24v_1^4\omega_7\omega_4^2\omega_5^2+12v_1^2\omega_4^3\omega_5^3+6\omega_7\omega_4^3\omega_5^3cs^4+12v_1^2\omega_4^3\omega_5^3cs^2-4v_1^2\omega_7^2\omega_4^3\omega_5^3+48v_1^4\omega_7\omega_4^2\omega_5^3+12v_1^2\omega_4^2\omega_5^3-36v_1^4\omega_7\omega_4^3\omega_5-21v_1^2\omega_7\omega_4^3\omega_5^3cs^2-\omega_7^2\omega_4^3\omega_5^2cs^2+12v_1^2\omega_4^3\omega_5^2+162v_1^2\omega_7^2\omega_4^2\omega_5^2cs^2+60v_1^4\omega_7\omega_4^3\omega_5^2-12v_1^2\omega_7\omega_4\omega_5^3cs^2+18\omega_7\omega_4^2\omega_5^3cs^2+12\omega_7\omega_4\omega_5^3cs^4+72v_1^4\omega_7^2\omega_4^3+12\omega_7^2\omega_5^3cs^4-12v_1^2\omega_7^2\omega_4^2\omega_5^2+24v_1^2\omega_7\omega_4\omega_5^3+6\omega_7^2\omega_4^2\omega_5^2cs^4+12\omega_7^2\omega_4^3cs^4+12\omega_7^2\omega_4^2\omega_5cs^2-27v_1^4\omega_7\omega_4^3\omega_5^2+54v_1^2\omega_7\omega_4^3\omega_5^2cs^2-12v_1^2\omega_4^3\omega_5^3-6\omega_7\omega_4^3\omega_5^2cs^4-12v_1^4\omega_4^2\omega_5^3+90v_1^2\omega_7^2\omega_4^3\omega_5+18v_1^2\omega_7^2\omega_4^2\omega_5^3-12v_1^2\omega_4^3\omega_5^2cs^2+30v_1^2\omega_7\omega_4^2\omega_5^3cs^2-12\omega_7\omega_4\omega_5^3cs^2+19v_1^4\omega_7^2\omega_4^3\omega_5^2-36v_1^2\omega_7\omega_4^3\omega_5cs^2-48v_1^2\omega_7^2\omega_4\omega_5^2cs^2-6\omega_7^2\omega_4^2\omega_5^2cs^2-12v_1^2\omega_7^2\omega_4\omega_5^3+24v_1^2\omega_7\omega_4^2\omega_5^2-12v_1^2\omega_4^2\omega_5^3cs^2-18\omega_7\omega_4^2\omega_5^3cs^4+6\omega_7\omega_4^3\omega_5^2cs^2+4v_1^4\omega_7^2\omega_4^3\omega_5^3-108v_1^2\omega_7^2\omega_4^2\omega_5cs^2+12v_1^2\omega_7^2\omega_4^3\omega_5^3cs^2-\omega_7^2\omega_4^3\omega_5^3cs^4-12\omega_7^2\omega_4^3cs^2-48v_1^2\omega_7\omega_4^2\omega_5^3-12\omega_7^2\omega_4^2\omega_5cs^4+36v_1^2\omega_7\omega_4^3\omega_5+12\omega_7\omega_4^2\omega_5^2cs^4-24\omega_7^2\omega_4\omega_5^3cs^4-60v_1^2\omega_7\omega_4^3\omega_5^2+12v_1^4\omega_7^2\omega_4^2\omega_5^2+252v_1^2\omega_7^2\omega_4^3cs^2-5\omega_7^2\omega_4^2\omega_5^3cs^2+102v_1^2\omega_7^2\omega_4\omega_5^3cs^2-24v_1^4\omega_7\omega_4\omega_5^3-12v_1^2\omega_7\omega_4^2\omega_5^2cs^2+12\omega_7^2\omega_4^3\omega_5cs^2+27v_1^2\omega_7\omega_4^3\omega_5^3+\omega_7^2\omega_4^3\omega_5^2cs^4-48v_1^2\omega_7^2\omega_5^3cs^2+60v_1^2\omega_7^2\omega_4^3\omega_5^2cs^2-6\omega_7\omega_4^3\omega_5^3cs^2-90v_1^4\omega_7^2\omega_4^2\omega_5-18v_1^4\omega_7^2\omega_4^2\omega_5^3$$

$$C_{13}=36\omega_7^2\omega_4^2\omega_5^3cs^4+12v_2^2\omega_7\omega_4^3\omega_8\omega_5^3+18\omega_7^2\omega_4^3\omega_5^2cs^4\omega_9-36v_2^2\omega_4^2\omega_8\omega_5^3cs^2\omega_9-2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9+12\omega_7\omega_4^3\omega_8\omega_5^3cs^2+36v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5^3\omega_9+36v_2^2\omega_7^2\omega_4^3\omega_8cs^2\omega_9-12v_1^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9+6v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9+72v_2^2\omega_7^2\omega_4\omega_8\omega_5^2cs^2\omega_9+12v_1^2\omega_7^2\omega_4^2\omega_5^3cs^2-12v_2^2v_1^2\omega_4^2\omega_8\omega_5^3\omega_9+18v_1^2\omega_7\omega_4^2\omega_8\omega_5^3cs^2\omega_9+12\omega_7\omega_4\omega_8\omega_5^3cs^2\omega_9-36v_2^2\omega_7^2\omega_4^2\omega_5^2cs^2\omega_9+36v_2^2\omega_7^2\omega_4^2\omega_5^3cs^2+2\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9-6\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2-36v_2^2\omega_7\omega_4^3\omega_8\omega_5^3cs^2\omega_9+24v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9-12v_1^2\omega_7\omega_4\omega_8\omega_5^3cs^2\omega_9-12v_2^2\omega_7\omega_4^3\omega_8\omega_5^2-18\omega_7\omega_4^2\omega_8\omega_5^3cs^2\omega_9+24v_2^2\omega_7\omega_4\omega_8\omega_5^3\omega_9+12\omega_7\omega_4^3\omega_8\omega_5cs^4\omega_9+12v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^3-72v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2\omega_9+12\omega_4^3\omega_8\omega_5^2cs^4\omega_9-12v_2^2v_1^2\omega_4^3\omega_8\omega_5^2\omega_9+6v_2^2\omega_7^2\omega_4^3\omega_5^3+5\omega_7^2\omega_4^3\omega_8\omega_5^3cs^4\omega_9-$$

$$12\omega_4^3\omega_8\omega_5^3cs^2\omega_9+6v_2^2v_1^2\omega_7^2\omega_4^3\omega_5^2\omega_9-12v_2^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9+6v_1^2\omega_7^2\omega_4^3\omega_5^2cs^2\omega_9-54v_2^2\omega_7^2\omega_4^3\omega_8\omega_5cs^2\omega_9+12\omega_4^2\omega_8\omega_5^3cs^4\omega_9-24v_2^2\omega_7^2\omega_4\omega_8\omega_5^2\omega_9-18\omega_7\omega_4^3\omega_8\omega_5^2cs^2\omega_9-12v_2^2\omega_4^2\omega_7^3\omega_8\omega_5\omega_9-12\omega_7\omega_4^3\omega_8\omega_5^2cs^2-12v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9+12\omega_7^2\omega_4^2\omega_8\omega_5^3cs^2\omega_9+6v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^3+12\omega_7^2\omega_4^2\omega_8\omega_5^3cs^2+18v_2^2\omega_7^2\omega_4^3\omega_5^2cs^2\omega_9+12v_1^2\omega_7^2\omega_4\omega_8\omega_5^3cs^2\omega_9-36v_2^2\omega_7\omega_4^2\omega_8\omega_5^2cs^2\omega_9-36\omega_7^2\omega_4^3\omega_8\omega_5cs^4\omega_9+30\omega_7\omega_4^3\omega_8\omega_5^3cs^4\omega_9-12v_1^2\omega_7^2\omega_4^2\omega_5^2cs^2\omega_9+18v_2^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9+150\omega_7^2\omega_4^2\omega_8\omega_5^2cs^4\omega_9-36v_2^2\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9+36\omega_7^2\omega_4^3\omega_8cs^4\omega_9+12v_2^2\omega_7^2\omega_4^2\omega_5^2\omega_9-6v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2+12v_2^2\omega_7\omega_4^3\omega_8\omega_5\omega_9+12v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5^3+6\omega_7^2\omega_4^3\omega_5^3cs^2+12v_1^2\omega_7^2\omega_4^3\omega_8cs^2\omega_9-36v_2^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9-12v_2^2\omega_7^2\omega_4^2\omega_5^3-36\omega_7^2\omega_4^2\omega_5^2cs^4\omega_9-84\omega_7^2\omega_4\omega_8\omega_5^2cs^4\omega_9+12v_2^2v_1^2\omega_4^3\omega_8\omega_5^3\omega_9+18v_1^2\omega_7\omega_4^3\omega_8\omega_5^2cs^2\omega_9-24v_2^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2\omega_9-12v_1^2\omega_4^2\omega_8\omega_5^3cs^2\omega_9+6\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2-12v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^3\omega_9-12\omega_7\omega_4^2\omega_8\omega_5^3cs^2-12\omega_7^2\omega_4\omega_8\omega_5^3cs^2\omega_9-12v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^3cs^2\omega_9+12v_2^2v_1^2\omega_7^2\omega_4^2\omega_5^3-6\omega_7^2\omega_4^3\omega_8\omega_5^2cs^4\omega_9-24v_2^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9+12\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9-12v_1^2\omega_7\omega_4^3\omega_8\omega_5^3cs^2-24v_2^2v_1^2\omega_7\omega_4\omega_8\omega_5^3\omega_9-42\omega_7\omega_4^2\omega_8\omega_5^3cs^4\omega_9+12\omega_4^3\omega_8\omega_5^2cs^2\omega_9-12v_2^2v_1^2\omega_7^2\omega_4^2\omega_5^2\omega_9-18v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2-48\omega_7^2\omega_4^2\omega_8\omega_5cs^4\omega_9+72v_2^2\omega_7\omega_4^3\omega_8\omega_5^2cs^2\omega_9+12v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_9+36v_2^2\omega_7\omega_4^2\omega_8\omega_5^3cs^2-\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2\omega_9-18v_2^2\omega_7^2\omega_4^3\omega_5^3cs^2+36\omega_7\omega_4^3\omega_8\omega_5^2cs^4-12\omega_4^3\omega_8\omega_5^3cs^4\omega_9-6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^3+12v_2^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9-96\omega_7^2\omega_8\omega_5^3cs^4\omega_9-36\omega_7^2\omega_4^2\omega_8\omega_5^3cs^4+36v_2^2\omega_7\omega_4^3\omega_8\omega_5^2cs^2+12v_1^2\omega_4^3\omega_8\omega_5^3cs^2\omega_9+v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2\omega_9-36v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^3cs^2-6\omega_7^2\omega_4^3\omega_5^2cs^2\omega_9-12v_2^2\omega_4^3\omega_8\omega_5^3\omega_9-18\omega_7^2\omega_4^3\omega_8\omega_5^2cs^4-6v_1^2\omega_7^2\omega_4^3\omega_5^3cs^2+36\omega_7\omega_4^2\omega_8\omega_5^3cs^4+6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2-18\omega_7^2\omega_4^3\omega_5^3cs^4-12v_2^2\omega_7\omega_4^2\omega_8\omega_5^3-36v_2^2\omega_7\omega_4^2\omega_8\omega_5^3\omega_9-6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9+6v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2+12\omega_7\omega_4\omega_8\omega_5^3cs^4\omega_9-12v_1^2\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9-6v_1^2\omega_7\omega_4^3\omega_8\omega_5^3cs^2\omega_9-36\omega_7\omega_4^3\omega_8\omega_5^3cs^4-12v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9+12\omega_7^2\omega_4\omega_8\omega_5^2cs^2\omega_9+12\omega_7^2\omega_4^2\omega_5^2cs^2\omega_9+18v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2+18v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2\omega_9-72v_2^2\omega_7\omega_4\omega_8\omega_5^3cs^2\omega_9+12v_2^2\omega_4^2\omega_8\omega_5^3\omega_9+36v_2^2\omega_4^3\omega_8\omega_5^3cs^2\omega_9+12v_1^2\omega_7\omega_4^3\omega_8\omega_5^2cs^2-12\omega_7^2\omega_4^2\omega_5^3cs^2-12v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^3-12v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2+24v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^2\omega_9-6v_2^2v_1^2\omega_7^2\omega_4^3\omega_5^3+180\omega_7^2\omega_4\omega_8\omega_5^3cs^4\omega_9+12v_2^2\omega_7\omega_4^3\omega_8\omega_5^3\omega_9-12v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2\omega_9+12\omega_4^2\omega_8\omega_5^3cs^2\omega_9+24v_2^2v_1^2\omega_7^2\omega_4\omega_8\omega_5^2\omega_9-6v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2-42\omega_7\omega_4^3\omega_8\omega_5^2cs^4\omega_9+12v_1^2\omega_7\omega_4^2\omega_8\omega_5^3cs^2+36v_2^2\omega_7^2\omega_4^2\omega_8\omega_5cs^2\omega_9+12v_2^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9-6v_2^2\omega_7^2\omega_4^3\omega_5^2\omega_9+12\omega_7^2\omega_4^3\omega_8\omega_5cs^2\omega_9-88\omega_7^2\omega_4^2\omega_8\omega_5^3cs^4\omega_9+18v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9+18\omega_7^2\omega_4^3\omega_8\omega_5^3cs^4-18v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9+6\omega_7\omega_4^3\omega_8\omega_5^3cs^2\omega_9+108v_2^2\omega_7\omega_4^2\omega_8\omega_5^3cs^2\omega_9+12v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^2-12v_2^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^3-18\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2\omega_9-12v_1^2\omega_7^2\omega_4\omega_8\omega_5^2cs^2\omega_9-36v_2^2\omega_7\omega_4^3\omega_8\omega_5^2cs^2+12v_2^2\omega_4^3\omega_8\omega_5^2\omega_9-12\omega_7^2\omega_4^3\omega_8cs^2\omega_9$$

$$C_{14}=12\omega_7^2\omega_4^2\omega_5^3cs^4-108v_1^2\omega_7^2\omega_4^2\omega_8\omega_5cs^2\omega_9+12v_2^2\omega_7\omega_4^3\omega_8\omega_5^3+6\omega_7^2\omega_4^3\omega_5^2cs^4\omega_9-12v_2^2\omega_4^2\omega_8\omega_5^3cs^2\omega_9-18v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9+12\omega_7\omega_4^3\omega_8\omega_5^3cs^2+108v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5^3\omega_9+12v_2^2\omega_7^2\omega_4^3\omega_8cs^2\omega_9+24v_1^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9+18v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9+24v_2^2\omega_7^2\omega_4\omega_8\omega_5^2cs^2\omega_9+36v_1^2\omega_7^2\omega_4^2\omega_5^3cs^2-36v_2^2v_1^2\omega_4^2\omega_8\omega_5^3\omega_9-132v_1^2\omega_7\omega_4^2\omega_8\omega_5^3cs^2\omega_9-12\omega_7\omega_4\omega_8\omega_5^3cs^2\omega_9-12v_2^2\omega_7^2\omega_4^2\omega_5^2cs^2\omega_9+12v_2^2\omega_7^2\omega_4^2\omega_5^3cs^2+6\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9-6\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2-12v_2^2\omega_7\omega_4^3\omega_8\omega_5^3cs^2\omega_9+72v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9+60v_1^2\omega_7\omega_4\omega_8\omega_5^3cs^2\omega_9-12v_2^2\omega_7\omega_4^3\omega_8\omega_5^2+24\omega_7\omega_4^2\omega_8\omega_5^3cs^2\omega_9+24v_2^2\omega_7\omega_4\omega_8\omega_5^3\omega_9+12v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^3-24v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2\omega_9+18v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9+24v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2\omega_9+36v_1^2\omega_7^2\omega_4^2\omega_5^3cs^2-36v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9+6v_2^2\omega_7^2\omega_4^3\omega_5^3+\omega_7^2\omega_4^3\omega_8\omega_5^3cs^4\omega_9+12\omega_7^2\omega_4^2\omega_8\omega_5^2cs^4\omega_9+18v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^3\omega_9+18v_1^2\omega_7^2\omega_4^3\omega_5^2cs^2\omega_9-18v_2^2\omega_7^2\omega_4^3\omega_8\omega_5cs^2\omega_9+12\omega_7\omega_4^2\omega_8\omega_5^2cs^4\omega_9-24v_2^2\omega_7^2\omega_4\omega_8\omega_5^2\omega_9+12\omega_7\omega_4^3\omega_8\omega_5^2cs^2\omega_9-12v_2^2\omega_7^2\omega_4^3\omega_8\omega_9-12\omega_7\omega_4^3\omega_8\omega_5^2cs^2-18v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^3+12\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2\omega_9+6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2+84v_1^2\omega_7^2\omega_4\omega_8\omega_5^3cs^2\omega_9-12v_2^2\omega_7\omega_4^2\omega_8\omega_5^2cs^2\omega_9+6\omega_7^2\omega_4^3\omega_8\omega_5cs^4\omega_9+12\omega_7\omega_4^3\omega_8\omega_5^3cs^4\omega_9-36v_1^2\omega_7^2\omega_4^2\omega_5^2cs^2\omega_9+18v_2^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9+24\omega_7^2\omega_4^2\omega_8\omega_5^2cs^4\omega_9-12v_2^2\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9+12v_2^2\omega_7^2\omega_4^2\omega_5^2\omega_9-18v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2+12v_2^2\omega_7\omega_4^3\omega_8\omega_5\omega_9+36v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5^3+6\omega_7^2\omega_4^3\omega_5^3cs^2-12v_2^2\omega_4^3\omega_8\omega_5^3cs^2\omega_9-12v_2^2\omega_7^2\omega_4^2\omega_5^3-12\omega_7^2\omega_4^2\omega_5^2cs^4\omega_9-12\omega_7^2\omega_4\omega_8\omega_5^2cs^4\omega_9+36v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^3\omega_9-144v_1^2\omega_7\omega_4^3\omega_8\omega_5^2cs^2\omega_9-72v_2^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2\omega_9+24v_1^2\omega_4^2\omega_8\omega_5^3cs^2\omega_9+6\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2-36v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^3\omega_9-12\omega_7\omega_4^2\omega_8\omega_5^3cs^2-42v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^3cs^2\omega_9+36v_2^2v_1^2\omega_7^2\omega_4^2\omega_5^3-6\omega_7^2\omega_4^3\omega_8\omega_5^2cs^4\omega_9-24v_2^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9-36v_1^2\omega_7\omega_4^3\omega_8\omega_5^3cs^2-72v_2^2v_1^2\omega_7\omega_4\omega_8\omega_5^3\omega_9-24\omega_7\omega_4^2\omega_8\omega_5^3cs^4\omega_9-36v_2^2v_1^2\omega_7^2\omega_4^2\omega_5^2\omega_9-6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2-12\omega_7^2\omega_4^2\omega_8\omega_5cs^4\omega_9+24v_2^2\omega_7\omega_4^3\omega_8\omega_5^2cs^2\omega_9+36v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_9+12v_2^2\omega_7\omega_4^2\omega_8\omega_5^3cs^2-6v_2^2\omega_7^2\omega_4^3\omega_5^3cs^2+12\omega_7\omega_4^3\omega_8\omega_5^2cs^4-6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^3+36v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2+12\omega_7^2\omega_4^2\omega_8\omega_5^3cs^4-12\omega_7\omega_4^2\omega_8\omega_5^3cs^2\omega_9+12v_2^2\omega_7\omega_4^3\omega_8\omega_5^3cs^2-24v_1^2\omega_4^3\omega_8\omega_5^3cs^2\omega_9-12v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^3cs^2-6\omega_7^2\omega_4^3\omega_5^2cs^2\omega_9-48v_1^2\omega_7^2\omega_8\omega_5^3cs^2\omega_9-12v_2^2\omega_4^3\omega_8\omega_5^3\omega_9-6\omega_7^2\omega_4^3\omega_8\omega_5^2cs^4+60v_1^2\omega_7\omega_4^2\omega_8\omega_5^2cs^2\omega_9-18v_1^2\omega_7^2\omega_4^3\omega_5^3cs^2+12\omega_7\omega_4^2\omega_8\omega_5^3cs^4+6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2-6\omega_7^2\omega_4^3\omega_5^3cs^4-12v_2^2\omega_7\omega_4^2\omega_8\omega_5^3-36v_2^2\omega_7\omega_4^2\omega_8\omega_5^3\omega_9-6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9+18v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2+12\omega_7\omega_4\omega_8\omega_5^3cs^4\omega_9+72v_1^2\omega_7\omega_4^3\omega_8\omega_5^2cs^2\omega_9+78v_1^2\omega_7\omega_4^3\omega_8\omega_5^3cs^2\omega_9-12\omega_7\omega_4^3\omega_8\omega_5^3cs^4-36v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9+12\omega_7^2\omega_4\omega_8\omega_5^2cs^2\omega_9+12\omega_7^2\omega_4^2\omega_5^2cs^2\omega_9+6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2+180v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2\omega_9-24v_2^2\omega_7\omega_4\omega_8\omega_5^3cs^2\omega_9+12v_2^2\omega_4^2\omega_8\omega_5^3\omega_9+12v_2^2\omega_4^3\omega_8\omega_5^3cs^2\omega_9+36v_1^2\omega_7\omega_4^3\omega_8\omega_5^2cs^2-12\omega_7^2\omega_4^2\omega_5^3cs^2-36v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^3-36v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2+24v_2^2\omega_4^2\omega_7^2\omega_8\omega_5^2\omega_9-18v_2^2v_1^2\omega_7^2\omega_4^3\omega_5^3+18\omega_7^2\omega_4\omega_8\omega_5^3cs^4\omega_9+12v_2^2\omega_7\omega_4^3\omega_8\omega_5^3\omega_9+18v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9+72v_2^2v_1^2\omega_7^2\omega_4\omega_8\omega_5^2\omega_9-18v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2-12\omega_7^2\omega_4^3\omega_8\omega_5^2cs^4-6\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2\omega_9-36\omega_7^2\omega_4^2\omega_8\omega_5^3cs^4\omega_9+12\omega_7\omega_4^3\omega_8\omega_5^3cs^2\omega_9+36v_2^2\omega_7\omega_4^2\omega_8\omega_5^3cs^2+12v_2^2\omega_4^3\omega_8\omega_5^2\omega_9-12\omega_7^2\omega_4^3\omega_8cs^2\omega_9$$

$$C_{15}=2\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9-4\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^3cs^2+4\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^2cs^2+9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^3\omega_9+\omega_6v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9-\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9-9\omega_6\omega_7\omega_4^2\omega_5^2\omega_8^3\omega_9-4\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_9-8\omega_6\omega_7\omega_4^3\omega_8^2\omega_5cs^2\omega_9+4\omega_6v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_9+8\omega_6\omega_4^3\omega_8^2\omega_5^3cs^2\omega_9-7\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^2\omega_9-16\omega_6\omega_7^2\omega_8^2\omega_5^3cs^2\omega_9-4\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9+\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^3\omega_9-2\omega_6v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^3+2\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^3+4\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^3cs^2-2\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2-\omega_6v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^3\omega_9+7\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2\omega_9-24\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^3cs^2\omega_9+4\omega_7^2\omega_4^2\omega_8\omega_5^3cs^2\omega_9+2\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^2\omega_9-2\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^2\omega_9-6\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^2cs^2\omega_9+4\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^3-4\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^3-4\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^3cs^2-3\omega_6v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9-3\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^3\omega_9-\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9-5\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^3cs^2\omega_9+2\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^3cs^2-15\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5cs^2\omega_9+4\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2-4\omega_6v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^3+4\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^3+3\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^3\omega_9+12\omega_6\omega_7^2\omega_4\omega_8\omega_5^3cs^2\omega_9-4\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^2-6\omega_6\omega_7\omega_4\omega_8^2\omega_5^3cs^2\omega_9+4\omega_6\omega_4^3\omega_8^2\omega_5^2\omega_9+2\omega_6v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9-\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^3\omega_9-4\omega_6v_1^2\omega_4^3\omega_8^2\omega_5^2\omega_9+6\omega_6\omega_7\omega_4\omega_8^2\omega_5^3\omega_9-6\omega_6v_1^2\omega_7\omega_4\omega_8^2\omega_5^3\omega_9-2\omega_6\omega_7^2\omega_4^3\omega_5^3cs^2\omega_9+8\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2\omega_9+4\omega_6v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^3-8\omega_6\omega_4^3\omega_8^2\omega_5^2cs^2\omega_9-2\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2\omega_9+\omega_6v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^3\omega_9-2\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9-4\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^3-2\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^3cs^2+2\omega_6v_1^2\omega_7^2\omega_4\omega_8^2\omega_5^3\omega_9+2\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5cs^2\omega_9+4\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9+12\omega_6\omega_7^2\omega_4^3\omega_8^2cs^2\omega_9+11\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^3cs^2\omega_9-4\omega_6v_1^2\omega_4^2\omega_8^2\omega_5^3\omega_9+3\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2\omega_9-2\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^3\omega_9+2\omega_6v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^3+4\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^3cs^2-2\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^3+4\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^3cs^2\omega_9-8\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^3cs^2\omega_9+4\omega_6v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^3-2\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^3cs^2\omega_9-4\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9+13\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^2cs^2\omega_9-4\omega_6\omega_4^3\omega_8^2\omega_5^3\omega_9-4\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^3+26\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^3cs^2\omega_9+2\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2-2\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^2\omega_9-4\omega_7^2\omega_4\omega_8^2\omega_5^3cs^2\omega_9+2\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^3\omega_9-5\omega_6v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9-2\omega_6v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2+4\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^3+5\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9-2\omega_6v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^3\omega_9+2\omega_6v_1^2\omega_7^2\omega_4\omega_8^2\omega_5^2\omega_9-8\omega_6\omega_4^2\omega_8^2\omega_5^3cs^2\omega_9+4\omega_6\omega_7^2\omega_4^2\omega_5^3cs^2\omega_9+8\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2\omega_9$$

$$C_{16}=12\omega_6v_1^2\omega_4^2\omega_8^2\omega_5\omega_9+9\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9+12\omega_6v_2^2v_1^2\omega_4^3\omega_8^2\omega_5\omega_9-12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_9+12\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9+18\omega_6^2v_1^2\omega_7\omega_4^3\omega_5cs^2\omega_9+12\omega_6^2\omega_7\omega_4\omega_8\omega_5cs^4\omega_9-6v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9-12\omega_6\omega_7^2v_2^2\omega_4^3\omega_8^2cs^2\omega_9-12\omega_6^2v_2^2\omega_7\omega_4^2\omega_5^2cs^2\omega_9-6\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9+18\omega_6v_2^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9-12\omega_6^2v_2^2\omega_7^2\omega_4^2\omega_5^2cs^2+12\omega_6\omega_4^3\omega_8^2cs^2\omega_9-12\omega_6v_2^2\omega_7\omega_4\omega_8^2\omega_5cs^2\omega_9-36\omega_6v_1^2\omega_4^3\omega_8^2cs^2\omega_9-12\omega_6^2v_2^2\omega_7\omega_4\omega_8\omega_5cs^2\omega_9+24\omega_6^2v_1^2\omega_7\omega_4\omega_8\omega_5\omega_9-12\omega_6^2v_2^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2+$$

$$27\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2\omega_9 - 36\omega_6^2v_1^2\omega_4^3\omega_8^2\omega_5cs^2 - 24\omega_6v_1^2\omega_7\omega_4\omega_8^2\omega_5\omega_9 - 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_6^2\omega_7\omega_4\omega_8^2\omega_5cs^2\omega_9 + 12\omega_6v_2^2\omega_4^3\omega_8^2\omega_5cs^2\omega_9 + 48\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 + 18\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2 - 24\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 - 36\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^4 + 12\omega_6^2v_2^2v_1^2\omega_4^2\omega_8^2\omega_5 - 12\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_5\omega_9 - 42\omega_6^2\omega_7\omega_4^2\omega_8\omega_5cs^4\omega_9 + 36\omega_6^2v_1^2\omega_4^2\omega_8^2\omega_5 - 3\omega_6^2\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9 + 36\omega_6v_1^2\omega_4^3\omega_8^2\omega_5cs^2\omega_9 + 6\omega_6^2v_2^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2 - 6\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5 + 6\omega_6^2\omega_7\omega_4^3\omega_8\omega_5cs^2 - 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_5\omega_9 - 18\omega_6^2\omega_7\omega_4^3\omega_8^2cs^4 + 36\omega_6^2v_1^2\omega_4^3\omega_8^2cs^2 + 12\omega_6^2v_2^2\omega_4^3\omega_8^2cs^2 + 18\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5cs^4 - 12\omega_6\omega_4^3\omega_8^2\omega_5cs^2\omega_9 + \omega_6^2v_2^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2\omega_9 - 12\omega_6^2v_1^2\omega_4^2\omega_8^2\omega_5 - 36\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2 + 24\omega_6v_2^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 + 12\omega_6v_1^2\omega_4^3\omega_8^2\omega_9 - 15\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 - 36\omega_6\omega_7\omega_4\omega_8^2\omega_5cs^4\omega_9 - 12\omega_6^2v_1^2\omega_4^3\omega_8^2 - 12\omega_6^2\omega_4^3\omega_8^2cs^2 + 12v_2^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 - 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 - 36\omega_6^2v_1^2\omega_7\omega_4^2\omega_5cs^2\omega_9 - 12\omega_6v_2^2v_1^2\omega_4^2\omega_8^2\omega_5\omega_9 - 36\omega_6v_2^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 - 12\omega_6v_1^2\omega_4^3\omega_8^2\omega_5\omega_9 - 12\omega_6v_2^2v_1^2\omega_4^3\omega_8^2\omega_9 - 36\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5cs^2\omega_9 + 12\omega_6^2v_2^2v_1^2\omega_4^3\omega_8^2 + 54\omega_6\omega_7\omega_4^2\omega_8^2\omega_5cs^4\omega_9 + 12\omega_6^2\omega_7\omega_4^2\omega_5cs^4\omega_9 + 12\omega_6^2\omega_4^3\omega_8^2\omega_5cs^2 - 24\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 + 12\omega_6^2v_2^2\omega_4^2\omega_8^2\omega_5cs^2 + 12\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 + 6\omega_6^2v_2^2\omega_7\omega_4^3\omega_5cs^2\omega_9 + 3\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5cs^4\omega_9 - 6\omega_6\omega_7\omega_4^3\omega_8^2cs^2\omega_9 + 6\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 - 12\omega_6^2v_2^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 12\omega_6\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 6\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2 - 36\omega_6\omega_4^3\omega_8^2cs^4\omega_9 + 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5 + 6\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8^2 - 18\omega_6^2\omega_7\omega_4^3\omega_8\omega_5cs^4 + 36\omega_6^2v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_9 - 18\omega_6v_1^2\omega_7\omega_4^3\omega_8^2cs^2\omega_9 - 36\omega_6v_1^2\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 18\omega_6^2\omega_7\omega_4^2\omega_8\omega_5cs^2\omega_9 - 12\omega_6v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 + 6\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 - 60\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^4\omega_9 - 36\omega_6^2\omega_4^3\omega_8^2\omega_5cs^4 - 96\omega_6^2\omega_7\omega_4^2\omega_5cs^4\omega_9 + 12\omega_6^2\omega_7\omega_4\omega_8\omega_5cs^2\omega_9 - 24\omega_6^2v_2^2v_1^2\omega_7\omega_4\omega_8\omega_5\omega_9 + 36\omega_6^2\omega_4^3\omega_8^2cs^4 + 12\omega_6^2v_2^2\omega_7\omega_4\omega_8^2\omega_5cs^2\omega_9 - 12v_1^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 - 48\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 + 36\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 + 24\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 - 15\omega_6\omega_7\omega_4^3\omega_8^2\omega_5cs^4\omega_9 + 18\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9 - 6\omega_6^2\omega_7\omega_4^3\omega_5cs^2\omega_9 + 12\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 - 3\omega_6^2v_2^2\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9 - 18\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2cs^2 + 72\omega_6v_1^2\omega_7\omega_4\omega_8^2\omega_5cs^2\omega_9 + 36\omega_6^2\omega_4^2\omega_8^2\omega_5cs^4 - 72\omega_6^2v_1^2\omega_7\omega_4\omega_8\omega_5cs^2\omega_9 + 6\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 - 18\omega_6\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 5\omega_6v_2^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2\omega_9 + 12\omega_6^2\omega_7\omega_4^2\omega_5cs^2\omega_9 + 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 - 9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 - \omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2\omega_9 + 15\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 + 6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 + 15\omega_6^2\omega_7\omega_4^3\omega_8\omega_5cs^4\omega_9 + 12\omega_6^2v_2^2\omega_7\omega_4^2\omega_8\omega_5cs^2 + 12\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2 + 6\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8^2cs^2\omega_9 - 6\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 + 12\omega_6^2\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 72\omega_6v_1^2\omega_7\omega_4^2\omega_8^2cs^2\omega_9 + 24\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 - 15\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 + 24\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 + 36\omega_6^2\omega_7\omega_4\omega_8\omega_5^2\omega_9 + 12\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5cs^2 - 72\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5cs^2\omega_9 + 12\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 12\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 24\omega_6^2v_2^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2 + 84\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 36\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 - 12\omega_6^2v_2^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 - 42\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 + 3\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2\omega_9 - \omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 - 6v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 - 18\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 + 4\omega_6v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 + 18\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5 - 12\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2\omega_9 + 6\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2 - 72\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2cs^2\omega_9 + 12\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2 + 156\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2cs^2\omega_9 + 12\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2 - 108\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 - 6\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8^2 - 6\omega_6^2v_2^2\omega_7\omega_4^3\omega_8^2cs^2 + 36v_1^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 36\omega_6\omega_4^3\omega_8^2\omega_5cs^4\omega_9 - 18\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5cs^2 + 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_5\omega_9 + 12\omega_6\omega_7\omega_4\omega_8^2\omega_5cs^2\omega_9$$

$$C_{17} = -36\omega_6^2\omega_7^2\omega_4\omega_8\omega_5^2cs^2\omega_9 + 48\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 24\omega_6^2v_2^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 12\omega_6^2v_2^2\omega_4^2\omega_8^2\omega_5^2cs^2 - 4\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 - 18\omega_6v_2^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9 + 60\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2cs^2\omega_9 + 66\omega_6^2v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^2\omega_9 + 12v_2^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9 + 12\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9 + 12\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5cs^2\omega_9 + 6\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2cs^2\omega_9 - 24\omega_6^2v_2^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 12\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2\omega_9 + 24\omega_6^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 - 48\omega_6^2\omega_7^2\omega_4^2\omega_5^2cs^2\omega_9 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 + 90\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2cs^2\omega_9 + 12\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 24\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5 + 12\omega_6^2v_2^2\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2 + 24\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5cs^2\omega_9 + 12\omega_6^2v_2^2\omega_7^2\omega_4\omega_8^2\omega_5^2\omega_9 + 24\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 36\omega_6^2\omega_7^2\omega_4\omega_8\omega_5^2\omega_9 + 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2 - 72\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5cs^2\omega_9 + 12\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^2cs^2\omega_9 - 12\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_6^2v_2^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2 + 84\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 + 36\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 - 12\omega_6^2v_2^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 - 42\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 + 3\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2\omega_9 - \omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 - 6v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 - 18\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 + 4\omega_6v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 + 18\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2 + 156\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2cs^2\omega_9 + 12\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 + 24\omega_6^2v_2^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 12\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 + 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 66\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 + 6\omega_6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 + 12\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^2\omega_9 + 12\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5cs^2 + \omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 - 18\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2\omega_9 + 18\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 - 24\omega_6^2v_2^2\omega_7^2\omega_4^2\omega_5^2\omega_9 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2cs^2\omega_9 + 12\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2\omega_9 - 12\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 132\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 66\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2\omega_9 + 24\omega_6^2\omega_7^2\omega_4^2\omega_5^2\omega_9 - 12\omega_6^2v_2^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9 - 6\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 - 12\omega_6v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^2\omega_9 - 84\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2\omega_9 + 24\omega_6^2v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^2\omega_9 + 24\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2\omega_9 - 12\omega_6^2v_2^2\omega_7\omega_4^2\omega_8^2\omega_5^2\omega_9 - 24\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2 - 12\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2 + 72\omega_6^2\omega_7\omega_4\omega_8^2\omega_5^2cs^2\omega_9 - 24\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2 + 12\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 - 108\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 + 144\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2cs^2\omega_9 - 72\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2cs^2\omega_9 + 36\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2cs^2$$

$$C_{18} = 12\omega_6v_1^2\omega_4^2\omega_8^2\omega_5\omega_9 + 27\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 + 36\omega_6v_2^2v_1^2\omega_4^3\omega_8^2\omega_5\omega_9 - 12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 + \omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_5cs^2\omega_9 + 12\omega_6^2\omega_7\omega_4\omega_8\omega_5cs^4\omega_9 - 18v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 - 36\omega_6v_2^2\omega_4^3\omega_8^2cs^2\omega_9 + 24\omega_6^2v_2^2\omega_7\omega_4^2\omega_5cs^2\omega_9 - 6\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 + 54\omega_6v_2^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 36\omega_6^2v_2^2\omega_4^3\omega_8^2\omega_5cs^2 + 5\omega_6\omega_7\omega_4^3\omega_8^2\omega_5cs^2\omega_9 - 36\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 - 12\omega_6^2\omega_4^2\omega_8^2\omega_5cs^2 - 102\omega_6^2v_2^2\omega_7\omega_4^2\omega_8\omega_5cs^2\omega_9 - 12\omega_6\omega_4^2\omega_8^2\omega_5cs^4\omega_9 - 6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2\omega_9 - 15\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9 + 6\omega_6\omega_7\omega_4^3\omega_8^2cs^4\omega_9 - 12\omega_6^2\omega_7\omega_4^2\omega_8\omega_5cs^2 + 12\omega_6\omega_4^3\omega_8^2cs^2\omega_9 - 36\omega_6v_2^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 12\omega_6v_1^2\omega_4^3\omega_8^2cs^2\omega_9 + 60\omega_6^2v_2^2\omega_7\omega_4\omega_8\omega_5cs^2\omega_9 + 24\omega_6^2v_1^2\omega_7\omega_4\omega_8\omega_5\omega_9 - 36\omega_6^2v_2^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2 + 9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2\omega_9 - 12\omega_6^2v_1^2\omega_4^3\omega_8^2\omega_5cs^2 - 24\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 - 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5 + 36\omega_6v_2^2\omega_4^3\omega_8^2\omega_5cs^2\omega_9 + 144\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 + 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2 - 24\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 - 12\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^4 + 36\omega_6^2v_2^2v_1^2\omega_4^2\omega_8^2\omega_5 - 36\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_5\omega_9 - 18\omega_6^2\omega_7\omega_4^2\omega_8\omega_5cs^4\omega_9 + 12\omega_6^2v_1^2\omega_4^2\omega_8^2\omega_5cs^2 - 6\omega_6^2\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9 + 12\omega_6v_1^2\omega_4^3\omega_8^2\omega_5cs^2\omega_9 + 18\omega_6^2v_2^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2 - 18\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5 + 6\omega_6^2\omega_7\omega_4^3\omega_8\omega_5cs^2 - 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_5\omega_9 - 6\omega_6^2\omega_7\omega_4^3\omega_8^2cs^4 + 12\omega_6^2v_1^2\omega_4^3\omega_8^2cs^2 + 36\omega_6^2v_2^2\omega_4^3\omega_8^2cs^2 + 6\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5cs^4 - 12\omega_6\omega_4^3\omega_8^2\omega_5cs^2\omega_9 - 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 - 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2 + 72\omega_6v_2^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 + 12\omega_6v_1^2\omega_4^3\omega_8^2\omega_9 - 45\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 - 12\omega_6\omega_7\omega_4\omega_8^2\omega_5cs^4\omega_9 - 12\omega_6^2v_1^2\omega_4^3\omega_8^2 - 12\omega_6^2\omega_4^3\omega_8^2cs^2 + 36v_2^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 - 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 - 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 36\omega_6v_2^2v_1^2\omega_4^2\omega_8^2\omega_5\omega_9 - 108\omega_6v_2^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 - 12\omega_6v_1^2\omega_4^3\omega_8^2\omega_9 - 36\omega_6v_2^2v_1^2\omega_4^3\omega_8^2\omega_9 - 12\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5cs^2\omega_9 + 36\omega_6^2v_2^2v_1^2\omega_4^3\omega_8^2 + 18\omega_6\omega_7\omega_4^2\omega_8^2\omega_5cs^4\omega_9 + 12\omega_6^2\omega_4^3\omega_8^2\omega_5cs^2 - 72\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 + 36\omega_6^2v_2^2\omega_4^2\omega_8^2\omega_5cs^2 + 12\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 - 12\omega_6^2v_2^2\omega_7\omega_4^3\omega_5cs^2\omega_9 - \omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5cs^4\omega_9 - 6\omega_6\omega_7\omega_4^3\omega_8^2cs^2\omega_9 + 6\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 - 15\omega_6^2v_2^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 12\omega_6\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 6\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2 - 12\omega_6\omega_4^3\omega_8^2cs^4\omega_9 + 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5 + 18\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_5\omega_9 - 18\omega_6^2v_2^2\omega_7\omega_4^3\omega_8\omega_5cs^2 - 36\omega_6^2v_2^2v_1^2\omega_4^3\omega_8^2\omega_5 + 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5cs^2 + 18\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^4\omega_9 + 6\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2 + 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2 - 6\omega_6^2\omega_7\omega_4^3\omega_8\omega_5cs^4 + 12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_9 - 6\omega_6v_1^2\omega_7\omega_4^3\omega_8^2cs^2\omega_9 - 12\omega_6v_1^2\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 18\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 36\omega_6v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 + 18\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 - 5\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^4\omega_9 - 12\omega_6^2\omega_4^3\omega_8^2\omega_5cs^4 - 12\omega_6^2\omega_7\omega_8^2\omega_5cs^4\omega_9 - 12\omega_6^2\omega_7\omega_4\omega_8\omega_5cs^2\omega_9 - 72\omega_6^2v_2^2v_1^2\omega_7\omega_4\omega_8\omega_5\omega_9 + 12\omega_6^2\omega_4^3\omega_8^2cs^4 + 60\omega_6^2v_2^2\omega_7\omega_4\omega_8^2\omega_5cs^2\omega_9 - 12v_1^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 - 48\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 + 36\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 + 24\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 - 5\omega_6\omega_7\omega_4^3\omega_8^2\omega_5cs^4\omega_9 + 6\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9 + 36\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 + 30\omega_6^2v_2^2\omega_7\omega_4^3\omega_8\omega_5cs^2\omega_9 - 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2cs^2 + 24\omega_6v_1^2\omega_7\omega_4\omega_8^2\omega_5cs^2\omega_9 + 12\omega_6^2\omega_4^2\omega_8^2\omega_5cs^4 - 24\omega_6^2v_1^2\omega_7\omega_4\omega_8\omega_5cs^2\omega_9 - 48\omega_6^2v_2^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 18\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 - 18\omega_6\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 - 15\omega_6v_2^2\omega_7\omega_4^3\omega_8^2\omega_5cs^2\omega_9 + 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 - 9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 + 15\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 + 6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 + 6\omega_6^2\omega_7\omega_4^3\omega_8\omega_5cs^4\omega_9 + 36\omega_6^2v_2^2\omega_7\omega_4^2\omega_8\omega_5cs^2 + 12\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2 + 18\omega_6v_2^2\omega_7\omega_4^3\omega_8^2cs^2\omega_9 - 18\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 + 12\omega_6^2v_1^2\omega_4^3\omega_8^2\omega_5 - 36\omega_6v_2^2\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 36\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5 + 24\omega_6v_1^2\omega_7\omega_4^2\omega_8^2cs^2\omega_9 + 12\omega_6^2\omega_7\omega_4^2\omega_8\omega_5cs^4 + 72\omega_6v_2^2v_1^2\omega_7\omega_4\omega_8^2\omega_5\omega_9 - 24\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2cs^2\omega_9 - 36\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 48\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5cs^2\omega_9 - 18\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8^2 - 18\omega_6^2v_2^2\omega_7\omega_4^3\omega_8^2cs^2 + 12v_1^2\omega_7\omega_4^2\omega_8^2\omega_5cs^2\omega_9 + 12\omega_6\omega_4^3\omega_8^2\omega_5cs^4\omega_9 - 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5cs^2 + 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_5\omega_9 + 12\omega_6\omega_7\omega_4\omega_8^2\omega_5cs^2\omega_9$$

$$C_{19} = -126\omega_6^2v_2^2\omega_4^2\omega_8cs^2 - \omega_6^2\omega_4^2\omega_8^2cs^4 + 24\omega_6\omega_8^2cs^4 + 48\omega_6^2v_2^2\omega_8 + 72v_2^4\omega_4\omega_8^2 + 48\omega_6v_2^4\omega_8^2 - 36\omega_6v_2^2\omega_4^2\omega_8^2 - 24\omega_6^2v_2^4\omega_4 - 432\omega_6v_2^2\omega_4\omega_8^2cs^2 -$$

$96\omega_6^2v_2^2\omega_4\omega_8 - 24\omega_4\omega_8^2cs^2 + 24\omega_6v_2^4\omega_4^2\omega_8 - 24\omega_6^2\omega_8cs^4 + 48\omega_6^2\omega_4\omega_8cs^4 + 12\omega_6^2\omega_4^2\omega_8cs^2 + 72\omega_6v_2^2\omega_4^2\omega_8cs^2 - 12\omega_4^2\omega_8^2cs^4 - 14\omega_6\omega_4^2\omega_8^2cs^2 - 24\omega_6^2\omega_4cs^4 - 48\omega_6\omega_4\omega_8^2cs^4 - 72v_2^2\omega_4\omega_8^2 + 36\omega_6v_2^4\omega_4^2\omega_8^2 + 288v_2^2\omega_4\omega_8^2cs^2 + 96\omega_6^2v_2^4\omega_4\omega_8 - 24\omega_6v_2^2\omega_4^2\omega_8 + 12\omega_6^2v_2^4\omega_4^2 - 12\omega_6^2\omega_4^2cs^2 + 72\omega_6^2v_2^2\omega_4^2cs^2 + 24\omega_6^2\omega_4cs^2 + 48\omega_6\omega_4\omega_8^2cs^2 + 48\omega_6v_2^2\omega_4\omega_8 + 3\omega_6^2v_2^2\omega_4^2\omega_8^2 + 216\omega_6v_2^2\omega_8^2cs^2 - 144v_2^2\omega_4^2\omega_8^2cs^2 - 144\omega_6^2v_2^2\omega_4cs^2 + 14\omega_6\omega_4^2\omega_8^2cs^4 - 48\omega_6^2v_2^4\omega_8 - 48\omega_6v_2^2\omega_8^2 - 96\omega_6v_2^4\omega_4\omega_8^2 + 36v_2^2\omega_4^2\omega_8^2 + 24\omega_6^2v_2^2\omega_4 + 12\omega_6^2\omega_4^2cs^4 - 30\omega_6^2v_2^4\omega_4^2\omega_8 - 48\omega_6v_2^4\omega_4\omega_8 - 12\omega_6^2v_2^2\omega_4^2 + 432\omega_6^2v_2^2\omega_4\omega_8cs^2 - 3\omega_6^2v_2^4\omega_4^2\omega_8^2 + 150\omega_6v_2^2\omega_4^2\omega_8^2cs^2 + \omega_6^2\omega_4^2\omega_8^2cs^2 - 24\omega_6\omega_8^2cs^2 - 12\omega_6^2\omega_4^2\omega_8cs^4 - 12\omega_6^2v_2^2\omega_4^2\omega_8^2cs^2 - 216\omega_6^2v_2^2\omega_8cs^2 + 12\omega_4^2\omega_8^2cs^2 + 24\omega_4\omega_8^2cs^4 + 96\omega_6v_2^2\omega_4\omega_8^2 + 24\omega_6^2\omega_8cs^2 - 36v_2^4\omega_4^2\omega_8^2 + 30\omega_6^2v_2^2\omega_4^2\omega_8 - 48\omega_6^2\omega_4\omega_8cs^2 - 144\omega_6v_2^2\omega_4\omega_8cs^2$

$C_{20} = 24\omega_4^2\omega_8cs^2 + 24v_2^2\omega_4\omega_8^2 + 24\omega_4\omega_8cs^4 + 12v_2^2\omega_4^3cs^2 + 6v_2^2\omega_4^3\omega_8^2cs^2 + 12\omega_4\omega_8^2cs^2 + 48v_2^2\omega_4\omega_8 - 96v_2^2\omega_8^2cs^2 + 24\omega_4^2\omega_8^2cs^4 - 24v_2^2\omega_4^2cs^2 - 24v_2^2\omega_4\omega_8^2 + \omega_4^3\omega_8^2cs^2 + 156v_2^2\omega_4\omega_8^2cs^2 + 24v_2^2\omega_4^2 + 24\omega_8^2cs^4 - 48v_2^2\omega_4\omega_8 + 6\omega_4^3\omega_8cs^4 + 48v_2^2\omega_4^2\omega_8cs^2 - 12v_2^2\omega_4^3 + 72v_2^4\omega_4^2\omega_8 - 3\omega_4^3\omega_8^2cs^4 - 72v_2^2\omega_4^2\omega_8^2cs^2 + 18v_2^2\omega_4^3\omega_8 + 3v_2^2\omega_4^3\omega_8^2 + 24v_2^2\omega_4^2\omega_8^2 - 24v_2^2\omega_4\omega_8cs^2 - 6\omega_4^3\omega_8cs^2 - 72v_2^2\omega_4^2\omega_8 - 24\omega_4\omega_8cs^2 - 12v_2^2\omega_4^3\omega_8cs^2 + 12v_2^2\omega_4^3 - 24\omega_4^2\omega_8cs^4 - 18v_2^4\omega_4^3\omega_8 - 3v_2^2\omega_4^3\omega_8^2 - 8\omega_4^2\omega_8^2cs^2 - 48\omega_4\omega_8^2cs^4 - 24v_2^4\omega_4^2\omega_8^2 - 24v_2^4\omega_4^2$

$C_{21} = -72\omega_6^2\omega_4\omega_8 - 84\omega_6^2v_2^2\omega_8 + 24\omega_4^2\omega_8^2 + 61\omega_6v_2^2\omega_4^2\omega_8^2 - 36\omega_6\omega_8^2 + 168\omega_6^2v_2^2\omega_4\omega_8 + 72\omega_4\omega_8^2cs^2 - 12\omega_6\omega_4^2\omega_8 - 33\omega_6^2\omega_4^2\omega_8cs^2 + 24\omega_6^2\omega_4 - 12\omega_6^2\omega_4^2 + 39\omega_6\omega_4^2\omega_8^2cs^2 + 120v_2^2\omega_4\omega_8^2 - 25\omega_6\omega_4^2\omega_8^2 + 36\omega_6v_2^2\omega_4^2\omega_8 - 24\omega_6\omega_4\omega_8cs^2 + 24\omega_6^2\omega_4^2cs^2 - 48\omega_6^2\omega_4cs^2 + 36\omega_6^2\omega_8 - 120\omega_6\omega_4\omega_8^2cs^2 - 72\omega_6v_2^2\omega_4\omega_8 - 5\omega_6^2v_2^2\omega_4^2\omega_8^2 + 2\omega_6^2\omega_4^2\omega_8^2 + 12\omega_6\omega_4^2\omega_8cs^2 + 84\omega_6v_2^2\omega_8^2 - 60v_2^2\omega_4^2\omega_8^2 - 48\omega_6^2v_2^2\omega_4 + 72\omega_6\omega_4\omega_8^2 + 24\omega_6^2v_2^2\omega_4^2 + 24\omega_6\omega_4\omega_8 - 3\omega_6^2\omega_4^2\omega_8^2cs^2 + 60\omega_6\omega_8^2cs^2 + 21\omega_6^2\omega_4^2\omega_8 - 48\omega_4\omega_8^2 - 36\omega_4^2\omega_8^2cs^2 - 168\omega_6v_2^2\omega_4\omega_8^2 - 60\omega_6^2\omega_8cs^2 - 51\omega_6^2v_2^2\omega_4^2\omega_8 + 120\omega_6^2\omega_4\omega_8cs^2$

2.2.4 Conservation of momentum: ρv_2

attached text file: `output_d2q9_nse_mrt1_symbolic_pde_02.txt`

$$v_2\frac{\partial\rho}{\partial t} + \rho\frac{\partial v_2}{\partial t} + \frac{v_2v_1\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1} + \frac{v_2\rho\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{v_1\rho\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_1} + (v_2^2+cs^2)\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \frac{2v_2\rho\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-2+\omega_4)\frac{cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_1} +$$
$$(-2+\omega_4)\frac{cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_2} + (-2+6v_2^2+\omega_6-2\omega_6cs^2+4cs^2-3\omega_6v_2^2)\frac{\delta_l^2}{\omega_6\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_2} + (2-\omega_6)\frac{3v_2\rho\delta_l^2}{\omega_6\delta_t}\left(\frac{\partial v_2}{\partial x_2}\right)^2 +$$
$$(-2+\omega_4)\frac{\rho cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial^2v_2}{\partial x_1^2} + (-2+\omega_4)\frac{\rho cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial^2v_1}{\partial x_1\partial x_2} + (-2+2v_2^2+\omega_6-3\omega_6cs^2+6cs^2-\omega_6v_2^2)\frac{v_2\delta_l^2}{2\omega_6\delta_t}\frac{\partial^2\rho}{\partial x_2^2} +$$
$$(-2+6v_2^2+\omega_6-\omega_6cs^2+2cs^2-3\omega_6v_2^2)\frac{\rho\delta_l^2}{2\omega_6\delta_t}\frac{\partial^2v_2}{\partial x_2^2} + C_1\frac{v_2v_1\delta_l^3}{12\delta_t\omega_7\omega_4\omega_5}\frac{\partial^3\rho}{\partial x_1^3} + C_2\frac{v_2\rho\delta_l^3}{12\delta_t\omega_7\omega_4\omega_5}\frac{\partial^3v_1}{\partial x_1^3} + C_3\frac{v_1\rho\delta_l^3}{6\delta_t\omega_7\omega_4^2}\frac{\partial^3v_2}{\partial x_1^3} +$$
$$(-12+12\omega_4-\omega_4^2)\frac{cs^4\delta_l^3}{6\delta_t\omega_4^2}\frac{\partial^3\rho}{\partial x_1^2\partial x_2} + (-2\omega_7+2\omega_4-\omega_4^2+\omega_7\omega_4)\frac{v_1\rho cs^2\delta_l^3}{\delta_t\omega_7\omega_4^2}\frac{\partial^3v_1}{\partial x_1^2\partial x_2} +$$
$$(-\omega_6\omega_4^2\omega_8-12\omega_6\omega_8+12\omega_4^2-12\omega_4\omega_8-12\omega_6\omega_4^2+12\omega_6\omega_4\omega_8+12\omega_6\omega_4)\frac{v_2\rho cs^2\delta_l^3}{6\omega_6\delta_t\omega_4^2\omega_8}\frac{\partial^3v_2}{\partial x_1^2\partial x_2} + C_4\frac{v_2v_1\delta_l^3}{\omega_6^2\delta_t\omega_4\omega_8}\frac{\partial^3\rho}{\partial x_1\partial x_2^2} +$$
$$C_5\frac{v_2\rho\delta_l^3}{12\omega_6^2\delta_t\omega_4^2\omega_8}\frac{\partial^3v_1}{\partial x_1\partial x_2^2} + C_6\frac{v_1\rho\delta_l^3}{\omega_6^2\delta_t\omega_4\omega_8}\frac{\partial^3v_2}{\partial x_1\partial x_2^2} + C_7\frac{\delta_l^3}{12\omega_6^2\delta_t}\frac{\partial^3\rho}{\partial x_2^3} +$$
$$(-24+60v_2^2+24\omega_6+11\omega_6^2v_2^2-36\omega_6cs^2-4\omega_6^2+36cs^2+5\omega_6^2cs^2-60\omega_6v_2^2)\frac{v_2\rho\delta_l^3}{6\omega_6^2\delta_t}\frac{\partial^3v_2}{\partial x_2^3} + C_8\frac{v_2\delta_l^4}{24\delta_t\omega_7^2\omega_4^2\omega_5^2}\frac{\partial^4\rho}{\partial x_1^4} +$$
$$C_9\frac{v_2v_1\rho\delta_l^4}{12\delta_t\omega_7^2\omega_4^2\omega_5^2}\frac{\partial^4v_1}{\partial x_1^4} + C_{10}\frac{\rho\delta_l^4}{24\delta_t\omega_7^2\omega_4^3}\frac{\partial^4v_2}{\partial x_1^4} + C_{11}\frac{v_1\delta_l^4}{12\omega_6\delta_t\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9}\frac{\partial^4\rho}{\partial x_1^3\partial x_2} + C_{12}\frac{\rho\delta_l^4}{12\omega_6\delta_t\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9}\frac{\partial^4v_1}{\partial x_1^3\partial x_2} +$$
$$C_{13}\frac{v_2v_1\rho\delta_l^4}{12\omega_6^2\delta_t\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9}\frac{\partial^4v_2}{\partial x_1^3\partial x_2} + C_{14}\frac{v_2\delta_l^4}{12\omega_6^3\delta_t\omega_7\omega_4^3\omega_8^2\omega_9}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} + C_{15}\frac{v_2v_1\rho\delta_l^4}{2\omega_6^3\delta_t\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9}\frac{\partial^4v_1}{\partial x_1^2\partial x_2^2} +$$
$$C_{16}\frac{\rho\delta_l^4}{12\omega_6^3\delta_t\omega_7\omega_4^3\omega_8^2\omega_9}\frac{\partial^4v_2}{\partial x_1^2\partial x_2^2} + C_{17}\frac{v_1\delta_l^4}{4\omega_6^3\delta_t\omega_4^2\omega_8^2}\frac{\partial^4\rho}{\partial x_1\partial x_2^3} + C_{18}\frac{\rho\delta_l^4}{12\omega_6^3\delta_t\omega_4^3\omega_8^2}\frac{\partial^4v_1}{\partial x_1\partial x_2^3} + C_{19}\frac{v_2v_1\rho\delta_l^4}{4\omega_6^3\delta_t\omega_4^2\omega_8^2}\frac{\partial^4v_2}{\partial x_1\partial x_2^3} +$$
$$C_{20}\frac{v_2\delta_l^4}{12\omega_6^3\delta_t}\frac{\partial^4\rho}{\partial x_2^4} + C_{21}\frac{\rho\delta_l^4}{12\omega_6^3\delta_t}\frac{\partial^4v_2}{\partial x_2^4} = 0,$$

where:

$C_1 = v_1^2\omega_7\omega_4\omega_5 + 36\omega_7cs^2 + 18\omega_4cs^2\omega_5 + 12v_1^2\omega_7 - 12\omega_7 - 18\omega_7\omega_4cs^2 - \omega_7\omega_4\omega_5 - 36cs^2\omega_5 + 6v_1^2\omega_4\omega_5 + 3\omega_7\omega_4cs^2\omega_5 + 6\omega_7\omega_4 - 6v_1^2\omega_7\omega_4 - 6\omega_4\omega_5 + 12\omega_5 - 12v_1^2\omega_5$

$C_2 = 3v_1^2\omega_7\omega_4\omega_5 + 12\omega_7cs^2 + 6\omega_4cs^2\omega_5 + 36v_1^2\omega_7 - 12\omega_7 - 6\omega_7\omega_4cs^2 - \omega_7\omega_4\omega_5 - 12cs^2\omega_5 + 18v_1^2\omega_4\omega_5 + \omega_7\omega_4cs^2\omega_5 + 6\omega_7\omega_4 - 18v_1^2\omega_7\omega_4 - 6\omega_4\omega_5 + 12\omega_5 - 36v_1^2\omega_5$

$C_3 = -12\omega_7cs^2 + 3v_1^2\omega_4^2 + 3\omega_4^2cs^2 + 15\omega_7\omega_4cs^2 - 6v_1^2\omega_4 + 6\omega_4 - 3\omega_4^2 - 3\omega_7\omega_4^2cs^2 - 3\omega_7\omega_4 + 3v_1^2\omega_7\omega_4 - 6\omega_4cs^2 - v_1^2\omega_7\omega_4^2 + \omega_7\omega_4^2$

$C_4 = 3\omega_4cs^2\omega_8 + 3\omega_6^2\omega_4cs^2 + v_2^2\omega_4\omega_8 - \omega_6^2\omega_4 - \omega_6^2v_2^2 - \omega_6\omega_8 - \omega_6v_2^2\omega_4 - \omega_6v_2^2\omega_4\omega_8 + \omega_6^2 - \omega_4\omega_8 - 3\omega_6^2cs^2 - 3\omega_6\omega_4cs^2\omega_8 + \omega_6^2v_2^2\omega_4 + \omega_6v_2^2\omega_8 + \omega_6\omega_4\omega_8 + \omega_6\omega_4 - 3\omega_6\omega_4cs^2 + 3\omega_6cs^2\omega_8$

$C_5 = -6\omega_6^2\omega_4\omega_8 - 12\omega_6\omega_4^2cs^2 - 12\omega_6v_2^2\omega_4^2 + 6\omega_6^2v_2^2\omega_4\omega_8 - 12\omega_6^2\omega_4cs^2 + 6\omega_6\omega_4^2\omega_8 + 42\omega_6^2\omega_4cs^2\omega_8 + 12\omega_6^2\omega_4 - 24\omega_6^2cs^2\omega_8 - 12\omega_6^2\omega_4^2 - 18\omega_6\omega_4^2cs^2\omega_8 - 6\omega_6v_2^2\omega_4^2\omega_8 - 12\omega_4^2\omega_8 - 24\omega_6\omega_4cs^2\omega_8 + 12\omega_6\omega_4^2 - 12\omega_6^2v_2^2\omega_4 + 12v_2^2\omega_4^2\omega_8 + 36\omega_4^2cs^2\omega_8 + 12\omega_6^2v_2^2\omega_4^2 + 12\omega_6^2\omega_4^2cs^2 + 3\omega_6^2\omega_4^2\omega_8 - 3\omega_6^2v_2^2\omega_4^2\omega_8 - 11\omega_6^2\omega_4^2cs^2\omega_8$

$C_6 = \omega_4 cs^2\omega_8 + \omega_6^2\omega_4 cs^2 + 3v_2^2\omega_4\omega_8 - \omega_6^2\omega_4 - 3\omega_6^2 v_2^2 - \omega_6\omega_8 - 3\omega_6 v_2^2\omega_4 - 3\omega_6 v_2^2\omega_4\omega_8 + \omega_6^2 - \omega_4\omega_8 - \omega_6^2 cs^2 - \omega_6\omega_4 cs^2\omega_8 + 3\omega_6^2 v_2^2\omega_4 + 3\omega_6 v_2^2\omega_8 + \omega_6\omega_4\omega_8 + \omega_6\omega_4 - \omega_6\omega_4 cs^2 + \omega_6 cs^2\omega_8$

$C_7 = -36v_2^2 - 36\omega_6 v_2^4 + 24\omega_6^2 v_2^2 cs^2 - 7\omega_6^2 v_2^2 + 12\omega_6 cs^2 + 12cs^4 + \omega_6^2 cs^4 - 12\omega_6 cs^4 - 12cs^2 - \omega_6^2 cs^2 + 144v_2^2 cs^2 + 36v_2^4 + 36\omega_6 v_2^2 - 144\omega_6 v_2^2 cs^2 + 7\omega_6^2 v_2^4$

$C_8 = 48v_1^2\omega_7\omega_4\omega_5 - 48v_1^4\omega_7\omega_5^2 + 150v_1^2\omega_7^2\omega_4^2 cs^2\omega_5 + 48\omega_7^2\omega_4 cs^2\omega_5 + 72v_1^4\omega_7^2\omega_4 - 12v_1^2\omega_4^2\omega_5^2 - \omega_7^2\omega_4^2 cs^4\omega_5^2 - 30v_1^4\omega_7\omega_4^2\omega_5^2 + 12\omega_7\omega_4^2 cs^2\omega_5^2 + 432v_1^2\omega_7\omega_4 cs^2\omega_5^2 - 144v_1^2\omega_7^2\omega_4^2 cs^2 - 36v_1^2\omega_7^2\omega_4^2\omega_5 + 24\omega_7 cs^2\omega_5^2 + 24\omega_7^2 cs^4\omega_5 + 12\omega_4^2 cs^4\omega_5^2 + 36v_1^2\omega_7^2\omega_4^2 - 144v_1^2\omega_4 cs^2\omega_5^2 + 48v_1^2\omega_7\omega_5^2 - 96v_1^4\omega_4^2\omega_4\omega_5 - 216v_1^2\omega_7 cs^2\omega_5^2 + 48\omega_7\omega_4 cs^4\omega_5^2 + 12\omega_7^2\omega_4^2 cs^2 - 72v_1^2\omega_7^2\omega_4 - 144v_1^2\omega_7\omega_4 cs^2\omega_5 + 3v_1^2\omega_7^2\omega_4^2\omega_5^2 + 24\omega_4 cs^2\omega_5^2 + 12v_1^4\omega_4^2\omega_5^2 + 14\omega_7^2\omega_4^2 cs^4\omega_5 + 24v_1^4\omega_7\omega_4^2\omega_5 - 12v_1^2\omega_7^2\omega_4^2 cs^2\omega_5^2 - 96v_1^2\omega_7\omega_4\omega_5^2 - 36v_1^4\omega_7^2\omega_4^2 + 24\omega_7^2\omega_4 cs^4 - 12\omega_7\omega_4^2 cs^4\omega_5^2 - 48v_1^4\omega_7\omega_4\omega_5 - 24\omega_7 cs^4\omega_5^2 - 24\omega_7^2 cs^2\omega_5 + 48v_1^4\omega_7^2\omega_5 + 30v_1^2\omega_7\omega_4^2\omega_5^2 - 12\omega_4^2 cs^2\omega_5^2 + 72v_1^2\omega_7\omega_4^2 cs^2\omega_5 - 12\omega_7^2\omega_4^2 cs^4 - 48\omega_7^2\omega_4 cs^4\omega_5 + 36v_1^4\omega_7^2\omega_4^2\omega_5 - 24\omega_7^2\omega_4 cs^2 - 24v_1^4\omega_4\omega_5^2 + \omega_7^2\omega_4^2 cs^2\omega_5^2 + 96v_1^2\omega_7^2\omega_4\omega_5 + 288v_1^2\omega_7^2\omega_4 cs^2 - 432v_1^2\omega_7^2\omega_4 cs^2\omega_5 - 14\omega_7^2\omega_4^2 cs^2\omega_5 - 48v_1^2\omega_7^2\omega_5 - 3v_1^4\omega_7^2\omega_4^2\omega_5^2 - 24v_1^2\omega_7\omega_4^2\omega_5 - 48\omega_7\omega_4 cs^2\omega_5^2 - 126v_1^2\omega_7\omega_4^2 cs^2\omega_5^2 + 72v_1^2\omega_4^2 cs^2\omega_5^2 + 216v_1^2\omega_7^2 cs^2\omega_5 + 96v_1^4\omega_7\omega_4\omega_5^2 - 24\omega_4 cs^4\omega_5^2 + 24v_1^2\omega_4\omega_5^2$

$C_9 = -72v_1^2\omega_7\omega_4\omega_5 - 120\omega_7^2\omega_4 cs^2\omega_5 + 24\omega_7^2\omega_4^2 - 72\omega_7\omega_4\omega_5^2 + 24v_1^2\omega_4^2\omega_5^2 - 33\omega_7\omega_4^2 cs^2\omega_5^2 - 12\omega_4^2\omega_5^2 + 61v_1^2\omega_4^2\omega_4^2\omega_5 - 60\omega_7 cs^2\omega_5^2 - 60v_1^2\omega_7^2\omega_4^2 + 2\omega_7^2\omega_4^2\omega_5^2 - 84v_1^2\omega_7\omega_5^2 - 25\omega_7^2\omega_4^2\omega_5 - 36\omega_7^2\omega_4^2 cs^2 + 120v_1^2\omega_7^2\omega_4 + 12\omega_7\omega_4^2 cs^2\omega_5 - 5v_1^2\omega_7^2\omega_4^2\omega_5^2 - 48\omega_4 cs^2\omega_5^2 + 24\omega_7\omega_4\omega_5 + 168v_1^2\omega_7\omega_4\omega_5^2 + 36\omega_7\omega_5^2 - 48\omega_7^2\omega_4 - 12\omega_7\omega_4^2\omega_5 + 60\omega_7^2 cs^2\omega_5 - 51v_1^2\omega_7\omega_4^2\omega_5^2 + 24\omega_4^2 cs^2\omega_5^2 - 24\omega_7\omega_4 cs^2\omega_5 + 72\omega_7^2\omega_4 cs^2 + 72\omega_7^2\omega_4\omega_5 - 3\omega_7^2\omega_4^2 cs^2\omega_5^2 + 24\omega_4\omega_5^2 - 168v_1^2\omega_7^2\omega_4\omega_5 + 39\omega_7^2\omega_4^2 cs^2\omega_5 + 84v_1^2\omega_7^2\omega_5 - 36\omega_7^2\omega_5 + 36v_1^2\omega_7\omega_4^2\omega_5 + 120\omega_7\omega_4 cs^2\omega_5^2 + 21\omega_7\omega_4^2\omega_5^2 - 48v_1^2\omega_4\omega_5^2$

$C_{10} = -24v_1^2\omega_7\omega_4 cs^2 + 6\omega_7\omega_4^3 cs^4 + 24v_1^4\omega_7^2\omega_4 - 3v_1^2\omega_7^2\omega_4^3 + \omega_7^2\omega_4^3 cs^2 + 24v_1^2\omega_4^2 - 72v_1^2\omega_7^2\omega_4^2 cs^2 + 24\omega_7^2 cs^4 - 12v_1^2\omega_4^3 + 12v_1^2\omega_4^3 cs^2 + 24v_1^2\omega_7^2\omega_4^2 - 8\omega_7^2\omega_4^2 cs^2 - 24v_1^2\omega_7^2\omega_4 - 24\omega_7^2\omega_4^2 cs^4 + 3v_1^4\omega_7^2\omega_4^3 - 24\omega_7\omega_4 cs^2 - 24v_1^2\omega_4^2 cs^2 + 6v_1^2\omega_7^2\omega_4^3 cs^2 - 24v_1^4\omega_7^2\omega_4^2 - 48\omega_7^2\omega_4 cs^4 + 24\omega_7\omega_4^2 cs^2 + 12v_1^4\omega_4^3 + 72v_1^4\omega_7\omega_4^2 + 24\omega_7^2\omega_4^2 cs^4 + 12\omega_7^2\omega_4 cs^2 + 48v_1^2\omega_7\omega_4 - 18v_1^4\omega_7\omega_4^3 + 24\omega_7\omega_4 cs^4 - 24v_1^4\omega_4^2 - 12v_1^2\omega_7\omega_4^3 cs^2 - 3\omega_7^2\omega_4^3 cs^4 + 156v_1^2\omega_7^2\omega_4 cs^2 - 96v_1^2\omega_7^2 cs^2 - 6\omega_7\omega_4^3 cs^2 - 72v_1^2\omega_7\omega_4^2 + 48v_1^2\omega_7\omega_4^2 cs^2 - 48v_1^4\omega_7\omega_4 + 18v_1^2\omega_7\omega_4^3$

$C_{11} = 36\omega_6\omega_7\omega_4^2 cs^4\omega_8\omega_5^2 - 6v_1^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2 - 12\omega_6 v_1^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 - 6\omega_7^2\omega_4^3 cs^2\omega_8\omega_5\omega_9 - 12\omega_6 v_2^2\omega_7^2\omega_4^2\omega_5^2 + 5\omega_6\omega_7^2\omega_4^3 cs^2\omega_8\omega_5\omega_9 - 108\omega_6 v_2^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5\omega_9 + 6\omega_6 v_1^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2 + 72v_2^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5\omega_9 + 12\omega_6 v_2^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 - 12\omega_7^2\omega_4^3 cs^2\omega_5^2 - 12\omega_6\omega_7^2\omega_4 cs^2\omega_8\omega_5^2\omega_9 + 24\omega_6 v_2^2 v_1^2\omega_7^2\omega_4\omega_8\omega_5\omega_9 + 15\omega_6\omega_7\omega_4^3 cs^4\omega_8\omega_5^2\omega_9 - 12\omega_6 v_1^2\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 + 12v_2^2\omega_7^2\omega_4^3\omega_5\omega_9 + 12\omega_6 v_2^2\omega_4^2\omega_8\omega_5^2\omega_9 + 12\omega_6\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 - 36\omega_6 v_2^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5^2 - 6\omega_6\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2 - 12\omega_6 v_2^2\omega_7\omega_4^2\omega_8\omega_5^2 - 12v_2^2\omega_7^2\omega_4^3\omega_5^2 + 12\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_9 + 12v_2^2 v_1^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9 + 12\omega_7^2\omega_4^3 cs^2\omega_5\omega_9 + 36\omega_6 v_2^2\omega_7\omega_4^2 cs^2\omega_8\omega_5^2 + 6\omega_6\omega_7\omega_4^3 cs^2\omega_8\omega_5^2 - 15\omega_6 v_2^2 v_1^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9 + 6\omega_6 v_2^2 v_1^2\omega_4^3\omega_8\omega_5^2\omega_9 + 12\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^2\omega_5^2 + 12\omega_6 v_1^2\omega_7^2\omega_4 cs^2\omega_8\omega_5^2\omega_9 + 6v_1^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5\omega_9 - 6\omega_6 v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 36\omega_6\omega_7^2\omega_4^2 cs^4\omega_8\omega_5^2 - 6\omega_6 v_2^2\omega_7\omega_4^3 cs^2\omega_8\omega_5^2 + 72\omega_6 v_2^2\omega_7^2\omega_4 cs^2\omega_8\omega_5\omega_9 + 12\omega_6\omega_7^2\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 + 12\omega_6\omega_7^2\omega_4^2\omega_5\omega_9 + 36\omega_6 v_2^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 - 24v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^2\omega_9 - 5\omega_6 v_1^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5\omega_9 - 6\omega_6\omega_4^3 cs^4\omega_8\omega_5^2\omega_9 - 12\omega_6\omega_7\omega_4^2 cs^2\omega_8\omega_5^2 - 12\omega_6 v_1^2\omega_7^2\omega_4^3 cs^2\omega_5^2 - 18\omega_6 v_2^2\omega_7\omega_4^3 cs^2\omega_8\omega_5^2 - 96\omega_6\omega_7^2 cs^4\omega_8\omega_5^2\omega_9 - 12\omega_6 v_2^2 v_1^2\omega_4^2\omega_8\omega_5^2\omega_9 + 48\omega_6 v_2^2 v_1^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9 - 24v_2^2 v_1^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9 + 12\omega_6 v_2^2 v_1^2\omega_7\omega_4^2\omega_8\omega_5^2 + 12\omega_6\omega_7^2\omega_4^3 cs^2\omega_5^2 + 36v_2^2\omega_7\omega_4^3 cs^2\omega_8\omega_5^2\omega_9 + 6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 - 12\omega_6 v_1^2\omega_7\omega_4 cs^2\omega_8\omega_5^2\omega_9 + 54\omega_6\omega_7^2\omega_4^2 cs^4\omega_8\omega_5\omega_9 - 9\omega_6 v_2^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 + 12\omega_6 v_1^2\omega_7\omega_4^2 cs^2\omega_8\omega_5^2 - 18\omega_6\omega_7\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 - 45\omega_6 v_2^2\omega_7\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 + 18\omega_6\omega_7^2\omega_4^3 cs^4\omega_8\omega_5^2 + 12\omega_6 v_2^2\omega_7^2\omega_4^3\omega_5^2 + 36\omega_6\omega_7^2\omega_4^2 cs^4\omega_8\omega_5^2 - 6v_2^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 36\omega_7^2\omega_4^3 cs^4\omega_5\omega_9 - 36\omega_6 v_2^2\omega_7\omega_4^2 cs^2\omega_8\omega_5\omega_9 - 6\omega_6 v_2^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 + 6\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 36\omega_6\omega_7^2\omega_4 cs^4\omega_8\omega_5\omega_9 + 18\omega_6 v_1^2\omega_7\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 + 3\omega_6\omega_7^2\omega_4^3 cs^4\omega_8\omega_5^2\omega_9 - 12\omega_6 v_1^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5^2 - 18\omega_6\omega_7\omega_4^3 cs^4\omega_8\omega_5^2 - 12\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^2\omega_5\omega_9 + 12\omega_6\omega_7\omega_4 cs^2\omega_8\omega_5^2\omega_9 - 18v_2^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2 - 12\omega_6 v_2^2\omega_7^2\omega_4^2\omega_8\omega_9 - 12\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^3\omega_5^2 + 12\omega_6\omega_7^2\omega_4^2 cs^2\omega_8\omega_5^2 + 24\omega_6 v_2^2\omega_7\omega_4\omega_8\omega_5^2\omega_9 + 18\omega_6 v_2^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2 - 36\omega_6 v_2^2\omega_7^2\omega_4^3 cs^2\omega_5^2 - 36\omega_6 v_2^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 - 6\omega_6 v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 + 156\omega_6\omega_7^2\omega_4 cs^4\omega_8\omega_5^2\omega_9 + 15\omega_6 v_2^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9 - 18\omega_6 v_2^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_9 + 12\omega_6 v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12v_2^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9 + 144\omega_6 v_2^2\omega_7\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 + 3\omega_6\omega_7\omega_4^3 cs^2\omega_8\omega_5^2\omega_9 + 18\omega_7^2\omega_4^3 cs^4\omega_8\omega_5\omega_9 - 72v_2^2\omega_7\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 - 12\omega_6 v_2^2\omega_7^2\omega_4^3\omega_5\omega_9 - 36\omega_6\omega_7^2\omega_4^2 cs^4\omega_5\omega_9 - 15\omega_6\omega_7^2\omega_4^3 cs^4\omega_8\omega_5\omega_9 - 36\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 - 6\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_9 + 6\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2 + 12\omega_6\omega_4^2 cs^4\omega_8\omega_5^2\omega_9 + 24v_2^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 - 12\omega_6 v_2^2 v_1^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 - 24\omega_6 v_2^2\omega_7^2\omega_4\omega_8\omega_5\omega_9 + 18\omega_6 v_2^2\omega_4^3 cs^2\omega_8\omega_5^2\omega_9 - 36\omega_6 v_2^2\omega_7^2\omega_4^2 cs^2\omega_5\omega_9 - 12\omega_6\omega_7^2\omega_4^3 cs^2\omega_5\omega_9 + 36\omega_7^2\omega_4^3 cs^2\omega_5\omega_9 + 6\omega_6 v_2^2\omega_7^2\omega_4^3\omega_8\omega_9 + 12\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 6\omega_6\omega_4^3 cs^2\omega_8\omega_5^2\omega_9 + 12\omega_6\omega_7^2\omega_4^2 cs^2\omega_5\omega_9 + 36\omega_6 v_2^2\omega_7^2\omega_4^2 cs^2\omega_5^2 + 6\omega_6 v_2^2 v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 - 36v_2^2\omega_7^2\omega_4^3 cs^2\omega_5\omega_9 - 12\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 18v_2^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5\omega_9 + 6\omega_6 v_1^2\omega_4^3 cs^2\omega_8\omega_5^2\omega_9 - 12\omega_6 v_1^2\omega_7^2\omega_4^2 cs^2\omega_5\omega_9 - 42\omega_6\omega_7\omega_4^2 cs^4\omega_8\omega_5^2\omega_9 - 12\omega_6 v_1^2\omega_7^2\omega_4 cs^2\omega_8\omega_5\omega_9 + 12\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^3\omega_5\omega_9 + \omega_6 v_1^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2\omega_9 - 18\omega_7^2\omega_4^3 cs^4\omega_8\omega_5^2 + 27\omega_6 v_2^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5\omega_9 - 18\omega_6\omega_7^2\omega_4^2 cs^2\omega_8\omega_5\omega_9 - 24\omega_6 v_2^2 v_1^2\omega_7\omega_4\omega_8\omega_5^2\omega_9 - 12v_2^2 v_1^2\omega_7^2\omega_4^3\omega_5\omega_9 + 36\omega_6\omega_7^2\omega_4^3 cs^4\omega_5\omega_9 - \omega_6\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2\omega_9 + 18\omega_6 v_1^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5\omega_9 + 12\omega_6\omega_7\omega_4 cs^4\omega_8\omega_5^2\omega_9 + 24v_2^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9 - 36\omega_6\omega_7^2\omega_4^2 cs^4\omega_5^2 + 12\omega_6\omega_7^2\omega_4 cs^2\omega_8\omega_5\omega_9 + 36\omega_6 v_2^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_9 - 48\omega_6 v_2^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9 - 6v_2^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 + 12\omega_6 v_1^2\omega_7^2\omega_4^2 cs^2\omega_5^2 + 12v_2^2 v_1^2\omega_7^2\omega_4^3\omega_5^2 - 12\omega_6\omega_7^2\omega_4^2 cs^2\omega_5^2 - 36\omega_6 v_2^2\omega_7^2\omega_4^3\omega_5^2 + 9\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 - 6\omega_6 v_2^2 v_1^2\omega_7\omega_4^3\omega_8\omega_5^2$

$C_{12} = 12\omega_6\omega_7\omega_4^2 cs^4\omega_8\omega_5^2 - 18v_1^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2 - 15\omega_6 v_1^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 - 6\omega_7^2\omega_4^3 cs^2\omega_8\omega_5\omega_9 - 12\omega_6 v_2^2\omega_7^2\omega_4^2\omega_5^2 + 5\omega_6\omega_7^2\omega_4^3 cs^2\omega_8\omega_5\omega_9 - 36\omega_6 v_2^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5\omega_9 + 18\omega_6 v_1^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2 + 24v_2^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5\omega_9 + 12\omega_6 v_2^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 - 12\omega_7^2\omega_4^3 cs^2\omega_5^2 + 72\omega_6 v_2^2 v_1^2\omega_7^2\omega_4\omega_8\omega_5\omega_9 + 6\omega_6\omega_7\omega_4^3 cs^4\omega_8\omega_5^2\omega_9 + 24\omega_6 v_1^2\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 + 12v_2^2\omega_7^2\omega_4^3\omega_5^2\omega_9 + 12\omega_6 v_2^2\omega_4^2\omega_8\omega_5^2\omega_9 - 12\omega_6 v_2^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5^2 - 6\omega_6\omega_7^2\omega_4^3 cs^2\omega_8\omega_5^2 - 12\omega_6 v_2^2\omega_7\omega_4^2\omega_8\omega_5^2 - 12v_2^2\omega_7^2\omega_4^3\omega_5^2 + 36\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_9 + 36v_2^2 v_1^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9 + 12\omega_6 v_2^2\omega_7\omega_4^2\omega_8\omega_5^2 + 6\omega_6\omega_7\omega_4^3 cs^2\omega_8\omega_5^2 - 45\omega_6 v_2^2 v_1^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9 + 18\omega_6 v_2^2 v_1^2\omega_4^3\omega_8\omega_5^2\omega_9 + 36\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^2\omega_5^2 + 60\omega_6 v_1^2\omega_7^2\omega_4 cs^2\omega_8\omega_5^2\omega_9 + 18v_1^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5\omega_9 - 6\omega_6 v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 12\omega_6\omega_7^2\omega_4^2 cs^4\omega_8\omega_5^2 - 18\omega_6 v_1^2\omega_7\omega_4^3 cs^2\omega_8\omega_5^2 + 24\omega_6 v_2^2\omega_7^2\omega_4 cs^2\omega_8\omega_5\omega_9 + \omega_6\omega_7^2\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 + 12\omega_6 v_2^2\omega_7^2\omega_4^2\omega_5^2\omega_9 + 36\omega_6 v_2^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 - 24v_2^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 - 15\omega_6 v_1^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_5\omega_9 - 12\omega_6\omega_7\omega_4^2 cs^2\omega_8\omega_5^2 - 36\omega_6 v_1^2\omega_7^2\omega_4^3 cs^2\omega_5^2 - 6\omega_6 v_2^2\omega_7\omega_4^3 cs^2\omega_8\omega_5^2 - 12\omega_6\omega_7^2 cs^4\omega_8\omega_5^2\omega_9 - 36\omega_6 v_2^2 v_1^2\omega_4^2\omega_8\omega_5^2\omega_9 + 144\omega_6 v_2^2 v_1^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9 - 72v_2^2 v_1^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9 + 36\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_6 v_2^2\omega_7^2\omega_4^2\omega_5^2 + 36v_2^2\omega_7^2\omega_4^3\omega_5^2\omega_9 + 6\omega_6 v_2^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 - 36\omega_6 v_2^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 6\omega_6 v_2^2 v_1^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9 - 12\omega_6\omega_7^2\omega_4^2 cs^4\omega_8\omega_5^2\omega_9 - 6\omega_6 v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_6 v_2^2\omega_7^2\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 - 6\omega_6 v_2^2\omega_4^3\omega_8\omega_5^2\omega_9 + 18\omega_6\omega_7^2\omega_4 cs^4\omega_8\omega_5^2\omega_9 + 15\omega_6 v_2^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9 - 6\omega_6 v_2^2\omega_7^2\omega_4^3 cs^2\omega_8\omega_9 + 12\omega_6 v_2^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12v_2^2\omega_7\omega_4^3\omega_8\omega_5^2\omega_9 + 48\omega_6 v_2^2\omega_7\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 - 6\omega_6\omega_7\omega_4^3 cs^2\omega_8\omega_5^2\omega_9 + 6\omega_7^2\omega_4^3 cs^4\omega_8\omega_5\omega_9 - 24v_2^2\omega_7\omega_4^2 cs^2\omega_8\omega_5^2\omega_9 - 12\omega_6 v_2^2\omega_7^2\omega_4^3\omega_5\omega_9 - 12\omega_6\omega_7^2\omega_4^2 cs^4\omega_5\omega_9 -$

$$5\omega_6\omega_7^2\omega_4^3cs^4\omega_8\omega_5\omega_9 - 108\omega_6v_2^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 - 18\omega_6v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_9 + 6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 72v_2^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 - 36\omega_6v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_5\omega_9 - 24\omega_6v_2^2\omega_7^2\omega_4\omega_8\omega_5\omega_9 + 6\omega_6v_2^2\omega_4^3cs^2\omega_8\omega_5^2\omega_9 - 12\omega_6v_2^2\omega_7^2\omega_4^2cs^2\omega_5\omega_9 - 12\omega_6\omega_7^2\omega_4^3cs^2\omega_5\omega_9 + 12\omega_7^2\omega_4^3cs^4\omega_5^2 + 6\omega_6v_2^2\omega_7\omega_4^3\omega_8\omega_5^2 + 6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 5\omega_6\omega_7^2\omega_4^2cs^4\omega_8\omega_5^2\omega_9 - 24\omega_6v_2^2\omega_7\omega_4cs^2\omega_8\omega_5^2\omega_9 + 36\omega_6v_1^2\omega_7^2\omega_4^3cs^2\omega_5\omega_9 + 6\omega_6v_2^2\omega_7\omega_4^3cs^2\omega_8\omega_5\omega_9 + 30\omega_6v_1^2\omega_7\omega_4^3cs^2\omega_8\omega_5^2\omega_9 - 36v_1^2\omega_7^2\omega_4^3cs^2\omega_5\omega_9 + 6\omega_6v_2^2\omega_7^2\omega_4^3\omega_8\omega_9 + 36v_1^2\omega_7^2\omega_4^3cs^2\omega_5^2 + 12\omega_6\omega_7^2\omega_4^2cs^2\omega_5\omega_9 + 12\omega_6v_2^2\omega_7^2\omega_4^3cs^2\omega_5\omega_9 + 12\omega_6v_2^2\omega_7^2\omega_4^2cs^2\omega_5^2 + 18\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5\omega_9 - 12v_2^2\omega_7^2\omega_4^3cs^2\omega_5\omega_9 - 36\omega_6v_2^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 6v_2^2\omega_7^2\omega_4^3cs^2\omega_8\omega_5\omega_9 - 48\omega_6v_1^2\omega_7^2cs^2\omega_8\omega_5^2\omega_9 - 12\omega_6v_1^2\omega_4^3cs^2\omega_8\omega_5^2\omega_9 - 36\omega_6v_1^2\omega_7^2\omega_4^2cs^2\omega_5\omega_9 - 18\omega_6\omega_7\omega_4^2cs^4\omega_8\omega_5^2\omega_9 - 36\omega_6v_1^2\omega_7^2\omega_4cs^2\omega_8\omega_5\omega_9 + 36\omega_6v_2^2v_1^2\omega_7^2\omega_4^2\omega_5\omega_9 - 6\omega_7^2\omega_4^3cs^4\omega_8\omega_5^2 + 9\omega_6v_2^2\omega_7^2\omega_4^3cs^2\omega_8\omega_5\omega_9 - 18\omega_6\omega_7^2\omega_4^2cs^2\omega_8\omega_5\omega_9 - 72\omega_6v_2^2v_1^2\omega_7\omega_4\omega_8\omega_5^2\omega_9 - 36v_2^2v_1^2\omega_7^2\omega_4^3\omega_5\omega_9 + 12\omega_6\omega_7^2\omega_4^3cs^4\omega_5\omega_9 + 54\omega_6v_1^2\omega_7^2\omega_4^2cs^2\omega_8\omega_5\omega_9 + 12\omega_6\omega_7\omega_4cs^4\omega_8\omega_5^2\omega_9 + 24v_2^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9 - 12\omega_6\omega_7^2\omega_4^3cs^4\omega_5^2 + 12\omega_6\omega_7^2\omega_4cs^2\omega_8\omega_5\omega_9 + 12\omega_6v_2^2\omega_7^2\omega_4^2cs^2\omega_8\omega_9 - 48\omega_6v_2^2\omega_7\omega_4^2\omega_8\omega_5^2\omega_9 - 18v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 + 36\omega_6v_1^2\omega_7^2\omega_4^2cs^2\omega_5^2 + 36v_2^2v_1^2\omega_7^2\omega_4^3\omega_5^2 - 12\omega_6\omega_7^2\omega_4^2cs^2\omega_5^2 + 12v_2^2\omega_7^2\omega_4^3cs^2\omega_5^2 + 27\omega_6v_2^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 - 18\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^2$$

$$C_{13} = -36\omega_6^2v_1^2\omega_7\omega_4\omega_8^2\omega_5^2\omega_9 + 36\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8^2\omega_9 + 12\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5\omega_9 - 24\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2 + 24\omega_6v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_6^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 + 156\omega_6^2\omega_7^2\omega_4cs^2\omega_8^2\omega_5^2\omega_9 - 12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 + 24\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2 + 12\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9 + 24\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 4\omega_6^2v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9 - 12\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^2\omega_9 + 6\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_6^2v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 48\omega_6\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2\omega_9 - 66\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5^2\omega_9 + 12\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2\omega_9 - 24\omega_6^2v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_6\omega_7^2\omega_4^3cs^2\omega_5^2\omega_9 + 18\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2\omega_9 + 12\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 12\omega_6\omega_7\omega_4^3cs^2\omega_8^2\omega_5^2\omega_9 + 24\omega_6^2\omega_7^2\omega_4^2cs^2\omega_5^2\omega_9 - 18\omega_6^2v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9 + 24\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^2\omega_9 - 24\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^2\omega_9 + 90\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2\omega_5^2\omega_9 + 12\omega_6v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9 + 24\omega_6^2\omega_4^3cs^2\omega_8^2\omega_5^2\omega_9 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2\omega_9 - 12\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2\omega_9 + 6\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2\omega_5\omega_9 - 96\omega_6^2\omega_7^2cs^2\omega_8^2\omega_5^2\omega_9 - 36\omega_6^2\omega_7\omega_4cs^2\omega_8^2\omega_5^2\omega_9 - 18\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_9 - 24\omega_6^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - \omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 - 6\omega_6^2v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_9 - 12\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9 - 24\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 - 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^2\omega_9 - 24\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5^2\omega_9 - 12\omega_6^2v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 24\omega_6\omega_7\omega_4^2cs^2\omega_8^2\omega_5^2\omega_9 - 12\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_9 - 4\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9 + 12\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5^2 + 66\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^2\omega_9 - 6\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 + 24\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2\omega_5^2 - 12\omega_6^2v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2\omega_9 + 36\omega_6^2\omega_7\omega_4\omega_8^2\omega_5^2\omega_9 - 12\omega_6^2\omega_4^3\omega_8^2\omega_5^2\omega_9 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 - 48\omega_6^2\omega_4^2cs^2\omega_8^2\omega_5^2\omega_9 - 12\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2\omega_5\omega_9 + 72\omega_6^2\omega_7^2\omega_4cs^2\omega_8\omega_5^2\omega_9 - 12\omega_6v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 + \omega_6^2v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2\omega_9 - 72\omega_6\omega_7^2\omega_4cs^2\omega_8^2\omega_5^2\omega_9 + 24\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2\omega_5^2 + 12\omega_6^2v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_9 + 12\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 + 12\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5^2 + 12\omega_6^2v_1^2\omega_7^2\omega_4\omega_8^2\omega_5^2\omega_9 + 12\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 42\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5\omega_9 + 24\omega_6^2v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_6^2\omega_4^2\omega_8^2\omega_5^2\omega_9 + 12\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 + 12\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 84\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2\omega_9 + 24\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2\omega_9 + 3\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5^2\omega_9 + 12\omega_6^2\omega_7^2\omega_4cs^2\omega_8^2\omega_5\omega_9 - 12\omega_6v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 12\omega_6^2v_1^2\omega_4^3\omega_8^2\omega_5^2\omega_9 - 24\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5^2\omega_9 - 132\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2\omega_9 + 84\omega_6\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5^2\omega_9 - 18\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2\omega_9 - 24\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5^2 - 12\omega_6\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5^2 + 18\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2$$

$$C_{14} = -12v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 - 24\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 - 36\omega_6^3v_1^2\omega_7\omega_4^2\omega_8\omega_9 + 12\omega_6^3v_2^2\omega_7\omega_4cs^2\omega_8^2\omega_9 + 6\omega_6^2v_2^2v_1^2\omega_4^3\omega_8^2\omega_9 + 108\omega_6^3v_1^2\omega_7\omega_4^2cs^2\omega_8\omega_9 - 36\omega_6^3\omega_7\omega_4^2cs^4\omega_8^2 + 72\omega_6^2v_1^2\omega_7\omega_4^2cs^2\omega_8\omega_9 - 12\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 + 6\omega_6^3\omega_7\omega_4^3cs^2\omega_8\omega_9 - 48\omega_6\omega_7\omega_4^2cs^4\omega_8^2\omega_9 + 6\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_8^2 - 6\omega_6^3v_2^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 12\omega_6^2\omega_7\omega_4^3cs^2\omega_9 + 36\omega_6^2\omega_7\omega_4^3cs^4\omega_8 - 12\omega_6^3v_2^2v_1^2\omega_7\omega_4^2\omega_8^2 + 36\omega_6^3v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 + 12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8^2 + 72\omega_6^2v_1^2\omega_7\omega_4cs^2\omega_8^2\omega_9 - 6\omega_6^2\omega_7\omega_4^3cs^4\omega_8^2\omega_9 - 12\omega_6^3\omega_7\omega_4cs^2\omega_8^2\omega_9 - 6\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2 + 36v_1^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 54\omega_6v_1^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 + 6\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 - 42\omega_6^3\omega_7\omega_4^2cs^4\omega_8\omega_9 - 12\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_9 - 96\omega_6^3\omega_7cs^4\omega_8^2\omega_9 + 18\omega_6^3v_1^2\omega_7\omega_4^3cs^2\omega_8^2 + 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 + 6\omega_6^3v_1^2\omega_4^3\omega_8^2 - 18\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 12\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 + 12\omega_6\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 12\omega_6^3v_2^2v_1^2\omega_7\omega_4^3\omega_8 - 6\omega_6^3v_1^2\omega_7\omega_4^3\omega_8^2 + 36\omega_6^3\omega_4^2cs^4\omega_8^2 + 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 + 30\omega_6^3\omega_7\omega_4^3cs^4\omega_8\omega_9 + 36\omega_6v_1^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 36\omega_6^3v_1^2\omega_7\omega_4^2cs^2\omega_9 + 6\omega_6^3v_2^2v_1^2\omega_7\omega_4^3\omega_8^2 + 12v_2^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 + 6\omega_6^3\omega_4^3cs^2\omega_8^2 + 24\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 - 12\omega_6\omega_7^2\omega_4^2cs^2\omega_8^2\omega_9 + 2\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 12\omega_6^3v_2^2\omega_7\omega_4^3cs^2\omega_8^2 + 12\omega_6^3v_2^2\omega_4^2cs^2\omega_8^2 - 18\omega_6^3\omega_7\omega_4^2cs^2\omega_8\omega_9 - 36\omega_6^3v_1^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 12\omega_6^3v_2^2v_1^2\omega_7\omega_4^2\omega_8 - 36\omega_6^2v_1^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 18\omega_6^2\omega_7\omega_4^2cs^4\omega_8^2 + 12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 + 6\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8 + 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2\omega_9 + 12\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_9 - 12\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 24\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 - 12\omega_6^3\omega_7\omega_4^3cs^4\omega_8\omega_9 + 12\omega_6^3\omega_7\omega_4^3cs^2\omega_8 - 12\omega_6^3v_2^2\omega_7\omega_4^3cs^2\omega_9 - 12\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 + 150\omega_6^2\omega_7\omega_4^2cs^4\omega_8^2\omega_9 + 12\omega_6^3\omega_7\omega_4^2cs^2\omega_9 + 18\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_8\omega_9 + 36\omega_6^3\omega_7\omega_4^2cs^4\omega_8 + 18\omega_6^2v_2^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 36\omega_6^3v_1^2\omega_4^2cs^2\omega_8^2 - 36\omega_6\omega_7\omega_4^3cs^4\omega_8^2\omega_9 - 72\omega_6^2v_1^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 + 18\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 + 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 36\omega_6^2\omega_4^2cs^4\omega_8^2\omega_9 + 12\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8 - 24\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 - 72\omega_6^3v_1^2\omega_7\omega_4cs^2\omega_8\omega_9 - 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_9 + 6\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_8^2 + 12\omega_6\omega_7\omega_4^3cs^4\omega_8\omega_9 - 36\omega_6^2v_1^2\omega_4^2cs^2\omega_8^2\omega_9 - 2\omega_6^2v_2^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 18\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_8^2 - 36\omega_6^3v_1^2\omega_7\omega_4^2cs^2\omega_8^2 - 24\omega_6^2v_1^2\omega_7\omega_4\omega_8^2\omega_9 + 12\omega_6^3v_2^2v_1^2\omega_7\omega_4^3\omega_9 - 12\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 12\omega_6^2v_2^2\omega_4^2cs^2\omega_8^2\omega_9 - 6\omega_6^2v_2^2\omega_7\omega_4^3cs^2\omega_8^2 - 12\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_8^2 + 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2\omega_9 + 12\omega_6^2\omega_7\omega_4cs^2\omega_8^2\omega_9 + 5\omega_6^3\omega_7\omega_4^3cs^4\omega_8^2\omega_9 - 6\omega_6^2\omega_4^3cs^2\omega_8^2\omega_9 - 12\omega_6^3v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 - 12\omega_6v_2^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 + 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_8\omega_9 - 6\omega_6^3v_2^2v_1^2\omega_4^3\omega_8^2 - 12\omega_6^2\omega_7\omega_4^3cs^2\omega_8 + 12\omega_6^2\omega_7\omega_4^3cs^2\omega_9 - 18\omega_6^2\omega_7\omega_4^3cs^2\omega_8\omega_9 - 12\omega_7\omega_4^3cs^2\omega_8^2\omega_9 + 18\omega_6^3\omega_7\omega_4^3cs^4\omega_8^2 - 12\omega_6^2v_2^2v_1^2\omega_4^2\omega_8^2\omega_9 + 12\omega_6^3\omega_7\omega_4cs^4\omega_8\omega_9 - 36\omega_6v_1^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 24\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 - 88\omega_6^3\omega_7\omega_4^2cs^4\omega_8^2\omega_9 + 12\omega_6^3v_2^2\omega_7\omega_4^3cs^2\omega_9 + 12\omega_6^2\omega_4^2cs^2\omega_8^2\omega_9 - 12\omega_6^3v_2^2v_1^2\omega_7\omega_4^2\omega_9 + 6\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2 + 12\omega_6^3v_1^2\omega_7\omega_4^2\omega_9 - 18\omega_6^3v_1^2\omega_4^3cs^2\omega_8^2 + 24\omega_6^3v_1^2\omega_7\omega_4\omega_8\omega_9 - 36\omega_6^3\omega_7\omega_4^3cs^4\omega_8 - 12\omega_6^3\omega_7\omega_4^3cs^2\omega_9 + 6\omega_6^2v_2^2\omega_4^3cs^2\omega_8^2\omega_9 - 24\omega_6^3v_2^2v_1^2\omega_7\omega_4\omega_8\omega_9 - 6\omega_6^3v_2^2\omega_4^3cs^2\omega_8^2 + 12\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_8 + 12\omega_6^2v_2^2\omega_7\omega_4^3cs^2\omega_8 - 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2 - \omega_6^3\omega_7\omega_4^3cs^2\omega_8^2\omega_9 + 12v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 + 18\omega_6^2\omega_4^3cs^4\omega_8^2\omega_9 - 12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8 + 18\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 18\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 + 36\omega_6^3v_1^2\omega_7\omega_4^2cs^2\omega_8 + 12\omega_6^3v_2^2v_1^2\omega_4^2\omega_8^2 - 84\omega_6^2\omega_7\omega_4cs^4\omega_8^2\omega_9 + 36\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_8 + 18\omega_6^2v_2^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 + \omega_6^3v_2^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 18\omega_6^3\omega_4^3cs^4\omega_8^2 + 18\omega_6^2v_1^2\omega_4^3cs^2\omega_8^2\omega_9 - 6\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8^2 + 36\omega_6^3v_1^2\omega_7\omega_4^3cs^2\omega_9 + 12\omega_6^3\omega_7\omega_4cs^2\omega_8\omega_9 - 42\omega_6^2\omega_7\omega_4^3cs^4\omega_8\omega_9 + 36\omega_7\omega_4^3cs^4\omega_8^2\omega_9$$

$$C_{15} = 3\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5\omega_9 + 4\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2\omega_5 - 8\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5\omega_9 - 6\omega_6^3v_2^2\omega_7^2\omega_4\omega_8\omega_5\omega_9 + 8\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2\omega_5\omega_9 + 4\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + \omega_6^3v_2^2\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 + 2\omega_6\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5\omega_9 + 2\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8\omega_5\omega_9 - \omega_6^3\omega_7\omega_4^3\omega_8^2\omega_5\omega_9 - 8\omega_6^3\omega_7^2\omega_4^2cs^2\omega_5\omega_9 + 6\omega_6^3\omega_7^2\omega_4\omega_8\omega_5\omega_9 + 4\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8\omega_5 + 4\omega_6^3v_2^2\omega_7^2\omega_4^2\omega_8\omega_5 - 4\omega_6^3\omega_7^2\omega_4^2\omega_8\omega_5 - 4\omega_6^3\omega_7^2\omega_4cs^2\omega_8^2\omega_9 - 2\omega_6^3\omega_4^3cs^2\omega_8^2\omega_5\omega_9 - 4\omega_6^3\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5 + 2\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 - 16\omega_6^3\omega_7^2cs^2\omega_8^2\omega_5\omega_9 + 4\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2\omega_9 - 3\omega_6^2v_2^2\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9 - 4\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5 - 6\omega_6^3\omega_7^2\omega_4cs^2\omega_8\omega_5\omega_9 + \omega_6^3\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9 + \omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9 - \omega_6^3v_2^2\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9 - 4\omega_6^3\omega_7^2\omega_4^3\omega_5\omega_9 - 4\omega_6v_2^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 - 4\omega_6^3\omega_7\omega_4^2\omega_8^2\omega_5 + 4\omega_6^3v_2^2\omega_7\omega_4^2\omega_8^2\omega_5 + 2\omega_6^3\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5 + 4\omega_6^3v_2^2\omega_7^2\omega_4^3\omega_5\omega_9 - 7\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 - 2\omega_6^3v_2^2\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 - 2\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5\omega_9 - 4\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2\omega_5\omega_9 - 2\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2\omega_5 - 4\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9 + 2\omega_6^3v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5 + 8\omega_6^3\omega_7^2\omega_4^3cs^2\omega_5\omega_9 - 2\omega_6^3\omega_7^2\omega_4^3\omega_8^2\omega_5 + 11\omega_6^3\omega_7^2\omega_4^2cs^2\omega_8\omega_5\omega_9 + 2\omega_6^3\omega_7\omega_4^2\omega_8^2\omega_5\omega_9 + 4\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 9\omega_6^3\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 + 26\omega_6^3\omega_7^2\omega_4cs^2\omega_8^2\omega_5\omega_9 + 4\omega_6^2\omega_7^2\omega_4^3\omega_5\omega_9 - 4\omega_6^3v_2^2\omega_7^2\omega_4^3\omega_8\omega_5 - \omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9 - 5\omega_6v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9 - 2\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9 + 4v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9 + 7\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 + 4\omega_6^3\omega_7^2\omega_4^3\omega_8\omega_5 + 9\omega_6^3v_2^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 - 5\omega_6^3\omega_7^2\omega_4^3cs^2\omega_8\omega_5\omega_9 + 2\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5 + 2\omega_6^2v_2^2\omega_7^2\omega_4\omega_8^2\omega_5\omega_9 + 2\omega_6^3\omega_7^2\omega_4^2cs^2\omega_8^2\omega_9 - 8\omega_6^3\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5\omega_9 - 4\omega_6^3\omega_7^2\omega_4^3cs^2\omega_8\omega_5 + 8\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2\omega_5\omega_9 - 8\omega_6^2\omega_7^2\omega_4^3cs^2\omega_5\omega_9 - 2\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 4\omega_6^3v_2^2\omega_7^2\omega_4^2\omega_8^2\omega_5 - 15\omega_6\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5\omega_9 + 2\omega_6^3v_2^2\omega_7^2\omega_4\omega_8^2\omega_5\omega_9 + 13\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8\omega_5\omega_9 + 12\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5\omega_9 + 4\omega_6^3\omega_7^2\omega_4^2\omega_8^2\omega_5 - 2\omega_6^3\omega_7^2\omega_4\omega_8^2\omega_5\omega_9 - 24\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2\omega_5\omega_9 + 4\omega_6^3\omega_7^2\omega_4^2cs^2\omega_8\omega_5 - \omega_6^2\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5\omega_9 + 12\omega_6^3\omega_7\omega_4cs^2\omega_8^2\omega_5\omega_9 + 2\omega_6^3\omega_7\omega_4^3\omega_8^2\omega_5 + 4\omega_6^3\omega_7^2\omega_4^2\omega_5\omega_9 +$$

$$3\omega_6^3\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 - 4\omega_6^3v_2^2\omega_7^2\omega_4^2\omega_5\omega_9 - 4\omega_6^2v_2^2\omega_7^2\omega_4^3\omega_5\omega_9 - 2\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 2\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5 + 4\omega_6^3\omega_4^2cs^2\omega_8^2\omega_5\omega_9 - 6\omega_6^2\omega_7^2\omega_4cs^2\omega_8^2\omega_5\omega_9 - 2\omega_6^3v_2^2\omega_7\omega_4^3\omega_8^2\omega_5 - 2\omega_6^2v_2^2\omega_7^2\omega_4^2\omega_8\omega_5\omega_9 - 3\omega_6^3v_2^2\omega_7^2\omega_4^3\omega_8\omega_5\omega_9 + 5\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5\omega_9 + 2\omega_6v_2^2\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9 + 3\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5\omega_9$$

$$C_{16} = -12v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 - 24\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 - 36\omega_6^3v_1^2\omega_7\omega_4^2\omega_8\omega_9 + 84\omega_6^3v_2^2\omega_7\omega_4cs^2\omega_8^2\omega_9 + 18\omega_6^2v_2^2v_1^2\omega_4^3\omega_8^2\omega_9 + 36\omega_6^3v_1^2\omega_7\omega_4^2cs^2\omega_8\omega_9 - 12\omega_6^3\omega_7\omega_4^2cs^4\omega_8^2 + 24\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_8\omega_9 - 36\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 - 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 12\omega_6\omega_7\omega_4^2cs^4\omega_8^2\omega_9 + 18\omega_6^3v_2^2v_1^2\omega_7\omega_4^3\omega_8^2 + 78\omega_6^2v_2^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 12\omega_6^2\omega_7\omega_4^3cs^4\omega_8 - 36\omega_6^3v_2^2v_1^2\omega_7\omega_4^2\omega_8^2 + 60\omega_6^2v_2^2\omega_7\omega_4^2cs^2\omega_8\omega_9 + 108\omega_6^3v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 + 12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8^2 + 24\omega_6^2v_1^2\omega_7\omega_4cs^2\omega_8^2\omega_9 - 6\omega_6^2\omega_7\omega_4^3cs^4\omega_8^2\omega_9 - 6\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2 + 12v_1^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 18\omega_6v_1^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 + 18\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 - 24\omega_6^3\omega_7\omega_4^2cs^4\omega_8\omega_9 - 36\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_9 - 12\omega_6^3\omega_7cs^4\omega_8^2\omega_9 + 6\omega_6^3v_1^2\omega_7\omega_4^3cs^2\omega_8^2 + 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 + 6\omega_6^3v_1^2\omega_4^3\omega_8^2 - 24\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 12\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 - 108\omega_6v_2^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 6\omega_6\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 36\omega_6^3v_2^2v_1^2\omega_7\omega_4^3\omega_8 - 6\omega_6^3v_1^2\omega_7\omega_4^3\omega_8^2 + 12\omega_6^3\omega_4^2cs^4\omega_8^2 + 12\omega_6^2v_1^2\omega_7\omega_4^3\omega_9 + 12\omega_6^3\omega_7\omega_4^3cs^4\omega_8\omega_9 + 12\omega_6v_1^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 12\omega_6^3v_1^2\omega_7\omega_4^2cs^2\omega_9 - 12\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_9 + 18\omega_6^3v_2^2v_1^2\omega_7\omega_4^3\omega_8^2 + 6\omega_6^3\omega_4^3cs^2\omega_8^2 + 24\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 + 12\omega_6\omega_7\omega_4^2cs^2\omega_8^2\omega_9 + 18\omega_6v_2^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 12\omega_6^3v_1^2\omega_7\omega_4^3cs^2\omega_8 + 18\omega_6^3\omega_7\omega_4cs^4\omega_8^2\omega_9 + 36\omega_6v_2^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 + 72\omega_6^2v_2^2v_1^2\omega_7\omega_4\omega_8^2\omega_9 + 6\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 36\omega_6^3v_2^2\omega_7\omega_4^3cs^2\omega_8 + 36\omega_6^3v_2^2\omega_4^2cs^2\omega_8^2 + 24\omega_6^3\omega_7\omega_4^2cs^2\omega_8\omega_9 - 48\omega_6^3v_2^2\omega_7cs^2\omega_8^2\omega_9 - 12\omega_6^3v_1^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 36\omega_6^3v_2^2v_1^2\omega_7\omega_4^2\omega_8 - 12\omega_6^2v_1^2\omega_7\omega_4^2cs^2\omega_8\omega_9 - 6\omega_6^2\omega_7\omega_4^3cs^4\omega_8^2 + 12\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_9 - 12\omega_6^3v_1^2\omega_4^2\omega_8^2 - 84\omega_6^2v_2^2\omega_7\omega_4cs^2\omega_8^2\omega_9 - 6\omega_6^2v_1^2\omega_4^3\omega_8^2\omega_9 - 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8 + 12\omega_6^3\omega_7\omega_4^3cs^2\omega_8 + 24\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_9 + 24\omega_6^2v_2^2\omega_7\omega_4^3cs^2\omega_9 - 36\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 + 24\omega_6^2\omega_7\omega_4^2cs^4\omega_8^2\omega_9 - 132\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_8\omega_9 + 12\omega_6^3\omega_7\omega_4^2cs^4\omega_8 - 144\omega_6^2v_2^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 12\omega_6^3v_1^2\omega_4^2cs^2\omega_8^2 + 6\omega_6\omega_7\omega_4^3cs^4\omega_8^2\omega_9 - 24\omega_6^2v_1^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 + 18\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 - 12\omega_6^2\omega_4^2cs^4\omega_8^2\omega_9 + 36\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8 - 72\omega_6^2v_2^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_9 + 12\omega_6^2\omega_7\omega_4^2cs^4\omega_8\omega_9 - 24\omega_6^3v_1^2\omega_7\omega_4cs^2\omega_8\omega_9 - 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_9 + 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2 - 12\omega_6^2v_1^2\omega_4^2cs^2\omega_8^2\omega_9 - 18\omega_6^2v_2^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 6\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_8^2 - 12\omega_6^3v_1^2\omega_7\omega_4^2cs^2\omega_8^2 - 24\omega_6^2v_1^2\omega_7\omega_4\omega_8^2\omega_9 + 36\omega_6^3v_2^2v_1^2\omega_7\omega_4^3\omega_9 - 42\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 36\omega_6^2v_2^2\omega_4^2cs^2\omega_8^2\omega_9 - 18\omega_6^2v_2^2\omega_7\omega_4^3cs^2\omega_8^2 - 36\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_8^2 + 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2 + 12\omega_6^2\omega_7\omega_4cs^2\omega_8^2\omega_9 - \omega_6^3\omega_7\omega_4^3cs^4\omega_8^2\omega_9 - 6\omega_6^2\omega_4^3cs^2\omega_8^2\omega_9 - 36\omega_6^3v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 + 72\omega_6v_2^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_9 + 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_8\omega_9 - 18\omega_6^3v_2^2v_1^2\omega_4^3\omega_8^2 - 12\omega_6^2\omega_7\omega_4^3cs^2\omega_8 + 12\omega_6^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 6\omega_6^3\omega_7\omega_4^3cs^4\omega_8^2 - 36\omega_6^2v_2^2v_1^2\omega_4^2\omega_8^2\omega_9 + 12\omega_6^3\omega_7\omega_4cs^4\omega_8\omega_9 - 12\omega_6v_1^2\omega_7\omega_4^3cs^2\omega_8\omega_9 + 72\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8\omega_9 - 4\omega_6^3\omega_7\omega_4^2cs^4\omega_8^2\omega_9 - 24\omega_6^3v_2^2\omega_7\omega_4^3cs^2\omega_9 + 12\omega_6^2\omega_4^2cs^2\omega_8^2\omega_9 - 36\omega_6^3v_2^2v_1^2\omega_7\omega_4^2\omega_9 + 6\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2 + 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_9 - 6\omega_6^3v_1^2\omega_4^3cs^2\omega_8^2 + 24\omega_6^3v_1^2\omega_7\omega_4\omega_8\omega_9 - 12\omega_6^3\omega_7\omega_4^3cs^4\omega_8 + 18\omega_6^2v_2^2\omega_4^3cs^2\omega_8^2\omega_9 - 72\omega_6^3v_2^2v_1^2\omega_7\omega_4\omega_8\omega_9 - 12\omega_6^2\omega_7\omega_4^2cs^2\omega_8\omega_9 - 18\omega_6^3v_2^2\omega_4^3cs^2\omega_8^2 + 36\omega_6^3v_2^2\omega_7\omega_4^2cs^2\omega_8 + 36\omega_6^2v_2^2\omega_7\omega_4^3cs^2\omega_8 - 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8 + 12\omega_6^2v_1^2\omega_4^2\omega_8^2\omega_9 + 60\omega_6^3v_2^2\omega_7\omega_4cs^2\omega_8\omega_9 - 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 - 12\omega_6^3\omega_4^2cs^2\omega_8^2 + 36v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 + 6\omega_6^2\omega_4^3cs^4\omega_8^2\omega_9 - 12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8 + 6\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_8^2\omega_9 - 54\omega_6v_2^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_9 + 12\omega_6^3v_1^2\omega_7\omega_4^2cs^2\omega_8 + 36\omega_6^3v_2^2v_1^2\omega_4^2\omega_8^2 - 12\omega_6^2\omega_7\omega_4cs^4\omega_8^2\omega_9 + 12\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_8 + 180\omega_6^2v_2^2\omega_7\omega_4^2cs^2\omega_8^2\omega_9 - 6\omega_6^3\omega_4^3cs^4\omega_8^2 + 6\omega_6^2v_1^2\omega_4^3cs^2\omega_8^2\omega_9 - 18\omega_6^2v_2^2v_1^2\omega_7\omega_4^3\omega_8^2 + 12\omega_6^3v_1^2\omega_7\omega_4^3cs^2\omega_9 - 12\omega_6^3\omega_7\omega_4cs^2\omega_8\omega_9 - 12\omega_6^2\omega_7\omega_4^3cs^4\omega_8\omega_9$$

$$C_{17} = 4\omega_6^3v_2^2\omega_4 - 48\omega_6^2v_2^2\omega_4cs^2\omega_8 + 8\omega_6^2cs^4\omega_8^2 + 12\omega_6\omega_4^2cs^2\omega_8^2 + 36\omega_6v_2^2\omega_4^2\omega_8^2 - 51\omega_6^3v_2^2\omega_4^2cs^2\omega_8 - 4\omega_6^2\omega_4^2cs^4 - 8\omega_6^3v_2^4\omega_8 + 16\omega_6^2v_2^2\omega_4\omega_8 - 20\omega_6v_2^4\omega_4^2\omega_8 - 20\omega_6^2v_2^2\omega_4\omega_8^2 + 4\omega_6^2\omega_4^2cs^4\omega_8^2 - 4\omega_6^3cs^4\omega_8 + 20\omega_6^3v_2^4\omega_4\omega_8 - 4\omega_6^3\omega_4^2cs^4\omega_8 + 72\omega_6v_2^2\omega_4cs^2\omega_8^2 - 4\omega_6^3\omega_4cs^4 + 8\omega_6^2\omega_4cs^2\omega_8^2 - 36\omega_6^3v_2^2cs^2\omega_8 - 4\omega_6^2cs^2\omega_8^2 + 36\omega_6^2v_2^2cs^2\omega_8^2 - 24\omega_6^3v_2^2\omega_4cs^2 - 36\omega_6v_2^4\omega_4^2\omega_8^2 - 8\omega_6^3\omega_4cs^2\omega_8 + 8\omega_6^2\omega_4^2cs^4\omega_8 - 16\omega_6^2v_2^4\omega_4\omega_8 + 4\omega_6\omega_4^2cs^2\omega_8 + 20\omega_6v_2^2\omega_4^2\omega_8 - 4\omega_6^2v_2^4\omega_4^2 + 20\omega_6^2v_2^2\omega_4\omega_8^2 - 4\omega_6^3\omega_4^2cs^2 - 4\omega_6^3v_2^2\omega_4^2 - 20\omega_6^3v_2^2\omega_4\omega_8 - 84\omega_6^2v_2^2\omega_4cs^2\omega_8^2 - 8\omega_6^2v_2^2\omega_8^2 + 4\omega_6\omega_4cs^4\omega_8^2 - 144\omega_6v_2^2\omega_4^2cs^2\omega_8^2 + 4\omega_6^3cs^2\omega_8 - 13\omega_6^2v_2^2\omega_4^2\omega_8^2 - 4\omega_6^2\omega_4^2cs^2\omega_8^2 + 4\omega_6^3\omega_4^2cs^2\omega_8 + 13\omega_6^3v_2^2\omega_4^2\omega_8 + 4\omega_6^3\omega_4cs^2 - 4\omega_6^3v_2^4\omega_4 + 4\omega_6^3\omega_4^2cs^4 - 12\omega_6\omega_4^2cs^4\omega_8^2 + 20\omega_6v_2^4\omega_4\omega_8^2 - 24v_2^2\omega_4^2\omega_8^2 - 8\omega_4^2cs^2\omega_8^2 + 24\omega_6^3v_2^2\omega_4^2cs^2 + 8\omega_6^3v_2^2\omega_8 + 51\omega_6^2v_2^2\omega_4^2cs^2\omega_8^2 + 32\omega_6^2v_2^4\omega_4^2\omega_8 - 4\omega_6\omega_4^2cs^4\omega_8 + 4\omega_6^2v_2^2\omega_4^2 + 4\omega_6^2\omega_4^2cs^2 + 120\omega_6^2v_2^2\omega_4^2cs^2\omega_8 + 96v_2^2\omega_4^2cs^2\omega_8^2 + 13\omega_6^2v_2^4\omega_4^2\omega_8^2 - 13\omega_6^3v_2^4\omega_4^2\omega_8 + 4\omega_6^3v_2^4\omega_4^2 - 4\omega_6\omega_4cs^2\omega_8^2 + 8\omega_6^2v_2^4\omega_8^2 + 84\omega_6^3v_2^2\omega_4cs^2\omega_8 - 24\omega_6^2v_2^2\omega_4^2cs^2 - 8\omega_6^2\omega_4cs^4\omega_8^2 + 4\omega_6^2cs^4\omega_8^2 - 20\omega_6v_2^2\omega_4\omega_8^2 + 24v_2^4\omega_4^2\omega_8^2 - 32\omega_6^2v_2^2\omega_4^2\omega_8 - 8\omega_6^2\omega_4^2cs^2\omega_8 - 72\omega_6v_2^2\omega_4^2cs^2\omega_8 + 8\omega_6^3\omega_4cs^4\omega_8$$

$$C_{18} = -12\omega_6^3v_2^2\omega_4\omega_8^2 - 12\omega_6^3cs^2\omega_8^2 - 12\omega_6\omega_4^3cs^4\omega_8^2 - 90\omega_6v_2^4\omega_4^3\omega_8^2 + 60\omega_6^2v_2^2\omega_4^3cs^2\omega_8^2 + 12\omega_6\omega_4^2cs^2\omega_8^2 + 30\omega_6^3v_2^2\omega_4^2cs^2\omega_8 - 6\omega_6^3\omega_4^3cs^2\omega_8 + 6\omega_6^2\omega_4^2cs^4\omega_8^2 + 6\omega_6^3\omega_4cs^2\omega_8^2 - 24\omega_6^3v_2^4\omega_4\omega_8 - 18\omega_6^3\omega_4^2cs^4\omega_8 - 48\omega_6^3v_2^2cs^2\omega_8^2 + 36\omega_6v_2^2\omega_4^3\omega_8 - \omega_6^2\omega_4^3cs^2\omega_8^2 - 306\omega_6v_2^2\omega_4^3cs^2\omega_8^2 + 13\omega_6^3\omega_4^2cs^4\omega_8^2 + 12\omega_6^3v_2^2\omega_4\omega_8^2 - 12\omega_6^2v_2^2\omega_4^3 + 90\omega_6v_2^2\omega_4^3\omega_8^2 - 36\omega_6v_2^2\omega_4^3cs^2\omega_8 + 6\omega_6^2\omega_4^3cs^2\omega_8 + 12\omega_6^3cs^4\omega_8^2 - 12\omega_6^3\omega_4cs^2\omega_8 + 12\omega_6^2\omega_4^2cs^4\omega_8 - 12\omega_6^3v_2^2\omega_4^3 - 81\omega_6^3v_2^2\omega_4^2cs^2\omega_8^2 + 12\omega_6^3v_2^2\omega_4^2 + 24\omega_6^3v_2^2\omega_4\omega_8 - 48\omega_6^2v_2^2\omega_4cs^2\omega_8^2 + 252v_2^2\omega_4^3cs^2\omega_8^2 + 54\omega_6^2v_2^2\omega_4^2cs^2\omega_8 - 36\omega_6v_2^4\omega_4^3\omega_8 + 6\omega_6^3\omega_4^3cs^4\omega_8 - 12\omega_6^2v_2^2\omega_4^3cs^2 - 24\omega_6^3\omega_4cs^4\omega_8^2 - 108\omega_6v_2^2\omega_4^2cs^2\omega_8^2 - 27\omega_6^3v_2^4\omega_4^3\omega_8 - 12\omega_6^2v_2^2\omega_4^2\omega_8^2 - 6\omega_6^2\omega_4^2cs^2\omega_8^2 + 18\omega_6^3\omega_4^2cs^2\omega_8 - 48\omega_6^3v_2^2\omega_4^2\omega_8 + 19\omega_6^2v_2^4\omega_4^3\omega_8^2 + \omega_6^2\omega_4^3cs^4\omega_8^2 - 60\omega_6^2v_2^2\omega_4^3\omega_8 - 18\omega_6^3v_2^4\omega_4^2\omega_8^2 + 12\omega_6\omega_4^3cs^2\omega_8^2 - 21\omega_6^3v_2^2\omega_4^3cs^2\omega_8 + 12\omega_6^3\omega_4^2cs^4\omega_8^2 + 102\omega_6^3v_2^2\omega_4cs^2\omega_8^2 + 72v_2^4\omega_4^3\omega_8^2 - 12\omega_6\omega_4^2cs^4\omega_8^2 - 12\omega_6^3v_2^2\omega_4^2cs^2 + 162\omega_6^2v_2^2\omega_4^2cs^2\omega_8^2 - 24\omega_6^2v_2^4\omega_4^2\omega_8 - 4\omega_6^3v_2^2\omega_4^3\omega_8^2 - 12\omega_6^2v_2^2\omega_4^2cs^2\omega_8 + 27\omega_6^3v_2^2\omega_4^3\omega_8 + 12\omega_6^2v_2^4\omega_4^2\omega_8^2 + 48\omega_6^3v_2^4\omega_4^2\omega_8 - 19\omega_6^2v_2^2\omega_4^3\omega_8^2 - 12\omega_6^3v_2^4\omega_4^2 + 12\omega_6^3v_2^2\omega_4^3cs^2\omega_8^2 - 12\omega_6^3v_2^2\omega_4cs^2\omega_8 - 5\omega_6^3\omega_4^2cs^2\omega_8^2 + 60\omega_6^2v_2^4\omega_4^3\omega_8 + 18\omega_6^3v_2^2\omega_4^2\omega_8^2 - 72v_2^2\omega_4^3\omega_8^2 + 12\omega_6^3v_2^2\omega_4^3cs^2 + 12\omega_6^2v_2^2\omega_4^3 - 6\omega_6^2\omega_4^3cs^4\omega_8 - \omega_6^3\omega_4^3cs^4\omega_8^2 + 24\omega_6^2v_2^2\omega_4^2\omega_8 + 4\omega_6^3v_2^4\omega_4^3\omega_8^2 - 12\omega_6^2\omega_4^2cs^2\omega_8 + 12\omega_6^3\omega_4cs^4\omega_8 + 12\omega_6^3v_2^4\omega_4^3$$

$$C_{19} = -16\omega_6^3v_2^2\omega_4 + 16\omega_6^2\omega_4\omega_8 - 32\omega_4^2\omega_8^2 - 8\omega_6^3\omega_4^2 - 72\omega_6\omega_4^2cs^2\omega_8^2 - 120\omega_6v_2^2\omega_4^2\omega_8^2 - 48\omega_6^2v_2^2\omega_4\omega_8 + 24\omega_6\omega_4^2\omega_8 - 16\omega_6^2\omega_4cs^2\omega_8 - 44\omega_6^2\omega_4cs^2\omega_8^2 + 8\omega_6^2\omega_4^2 + 20\omega_6^2cs^2\omega_8^2 + 17\omega_6^3\omega_4^2\omega_8 + 44\omega_6^3\omega_4cs^2\omega_8 + 48\omega_6\omega_4^2\omega_8^2 - 32\omega_6\omega_4^2cs^2\omega_8 - 64\omega_6v_2^2\omega_4^2\omega_8 + 8\omega_6^3\omega_4 - 68\omega_6^2v_2^2\omega_4\omega_8^2 + 16\omega_6^3\omega_4^2cs^2 + 16\omega_6^3v_2^2\omega_4^2 + 68\omega_6^3v_2^2\omega_4\omega_8 + 28\omega_6^2\omega_4\omega_8^2 + 28\omega_6^2v_2^2\omega_8^2 - 20\omega_6^3cs^2\omega_8 + 43\omega_6^2v_2^2\omega_4^2\omega_8^2 + 25\omega_6^2\omega_4^2cs^2\omega_8^2 - 17\omega_6^2\omega_4^2\omega_8^2 - 25\omega_6^3\omega_4^2cs^2\omega_8 - 43\omega_6^3v_2^2\omega_4^2\omega_8 - 16\omega_6^3\omega_4cs^2 - 28\omega_6^3\omega_4\omega_8 + 80v_2^2\omega_4^2\omega_8^2 + 48\omega_4^2cs^2\omega_8^2 - 24\omega_6\omega_4\omega_8^2 - 28\omega_6^3v_2^2\omega_8 - 16\omega_6^2v_2^2\omega_4^2 - 16\omega_6^2\omega_4^2cs^2 + 12\omega_6^3\omega_8 + 32\omega_6\omega_4cs^2\omega_8^2 - 40\omega_6^2\omega_4^2\omega_8 - 12\omega_6^2\omega_8^2 + 64\omega_6v_2^2\omega_4\omega_8^2 + 104\omega_6^2v_2^2\omega_4^2\omega_8 + 56\omega_6^2\omega_4^2cs^2\omega_8$$

$$C_{20} = 12 - 156v_2^2 - 216\omega_6v_2^4 - 18\omega_6 + 404\omega_6^2v_2^2cs^2 - 5\omega_6^3cs^4 - 98\omega_6^2v_2^2 + 198\omega_6cs^2 + 144cs^4 + 10\omega_6^3v_2^2 + 82\omega_6^2cs^4 + 8\omega_6^2 - 216\omega_6cs^4 - 132cs^2 - 34\omega_6^3v_2^2cs^2 - \omega_6^3 - 78\omega_6^2cs^2 + 672v_2^2cs^2 - 9\omega_6^3v_2^4 + 144v_2^4 + 234\omega_6v_2^2 - 1008\omega_6v_2^2cs^2 + 90\omega_6^2v_2^4 + 6\omega_6^3cs^2$$

$$C_{21} = 12 - 252v_2^2 - 756\omega_6v_2^4 - 18\omega_6 + 252\omega_6^2v_2^2cs^2 - \omega_6^3cs^4 - 154\omega_6^2v_2^2 + 54\omega_6cs^2 + 24cs^4 + 14\omega_6^3v_2^2 + 14\omega_6^2cs^4 + 8\omega_6^2 - 36\omega_6cs^4 - 36cs^2 - 18\omega_6^3v_2^2cs^2 - \omega_6^3 - 22\omega_6^2cs^2 + 432v_2^2cs^2 - 29\omega_6^3v_2^4 + 504v_2^4 + 378\omega_6v_2^2 - 648\omega_6v_2^2cs^2 + 310\omega_6^2v_2^4 + 2\omega_6^3cs^2$$

2.3 MRT2

2.3.1 Definitions

Collision operator $\boldsymbol{C}$:

$$\boldsymbol{C}\left(\boldsymbol{f}\right) = \mathbf{M}_2^{-1}\mathbf{S}\left(\boldsymbol{\mu}_2^{(eq)} - \mathbf{M}_2\boldsymbol{f}\right),$$

where

$$\mathbf{S} = \mathrm{diag}(\omega_1, \omega_2, \omega_3, \omega_4, \omega_5, \omega_6, \omega_7, \omega_8, \omega_9),$$

$\omega_1, \omega_2, \ldots, \omega_9 \in (0, 2)$.
Matrix $\mathbf{M}_2$ corresponds to the transformation matrix to the raw moment basis defined by

$$\boldsymbol{\mu}_2 = \begin{pmatrix} m_{(0,0)} \\ m_{(1,0)} \\ m_{(0,1)} \\ m_{(1,1)} \\ m_{(2,0)} + m_{(0,2)} \\ m_{(2,0)} - m_{(0,2)} \\ m_{(2,1)} \\ m_{(1,2)} \\ m_{(2,2)} \end{pmatrix},$$

and is given by

$$\mathbf{M}_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & -1 & 0 & 1 & 1 & -1 & -1 \\ 0 & 0 & 1 & 0 & -1 & 1 & -1 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 & 1 & -1 & -1 & 1 \\ 0 & 1 & 1 & 1 & 1 & 2 & 2 & 2 & 2 \\ 0 & 1 & -1 & 1 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & -1 & -1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 1 \end{pmatrix}.$$

The equilibrium moments $\boldsymbol{\mu}_2^{(eq)}$ are defined by

$$\boldsymbol{\mu}_2^{(eq)} = \mathbf{M}_2\mathbf{M}^{-1}\boldsymbol{\mu}^{(eq)},$$

i.e.,

$$\boldsymbol{\mu}_2^{(eq)} = \begin{pmatrix} \rho \\ \rho v_1 \\ \rho v_2 \\ \rho v_1 v_2 \\ \rho(v_2^2 + v_1^2 + 2c_s^2) \\ \rho(v_1^2 - v_2^2) \\ \rho v_2(v_1^2 + c_s^2) \\ \rho v_1(v_2^2 + c_s^2) \\ \rho(v_1^2 v_2^2 + c_s^2 v_2^2 + c_s^2 v_1^2 + c_s^4) \end{pmatrix}.$$

2.3.2 Conservation of mass: ρ

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$$\frac{\partial \rho}{\partial t} + \frac{\delta_l v_1}{\delta_t}\frac{\partial \rho}{\partial x_1} + \frac{\delta_l \rho}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\delta_l v_2}{\delta_t}\frac{\partial \rho}{\partial x_2} + \frac{\delta_l \rho}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-1+v_1^2+3cs^2)\frac{\delta_l^3 v_1}{12\delta_t}\frac{\partial^3 \rho}{\partial x_1^3} + (-1+3v_1^2+cs^2)\frac{\delta_l^3 \rho}{12\delta_t}\frac{\partial^3 v_1}{\partial x_1^3} - \frac{\delta_l^3 \rho cs^2}{6\delta_t}\frac{\partial^3 v_2}{\partial x_1^2 \partial x_2} - \frac{\delta_l^3 \rho cs^2}{6\delta_t}\frac{\partial^3 v_1}{\partial x_1 \partial x_2^2} + (-1+v_2^2+3cs^2)\frac{\delta_l^3 v_2}{12\delta_t}\frac{\partial^3 \rho}{\partial x_2^3} + (-1+3v_2^2+cs^2)\frac{\delta_l^3 \rho}{12\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} + (-3v_1^4\omega_5 + 2cs^4 - 6v_1^2 - cs^4\omega_5 - 12cs^2v_1^2\omega_5 + 3v_1^2\omega_5 + 6v_1^4 + 24cs^2v_1^2 + cs^2\omega_5 - 2cs^2)\frac{\delta_l^4}{24\delta_t\omega_5}\frac{\partial^4 \rho}{\partial x_1^4} + (-4+10v_1^2-5v_1^2\omega_5-3cs^2\omega_5+6cs^2+2\omega_5)\frac{\delta_l^4 \rho v_1}{12\delta_t\omega_5}\frac{\partial^4 v_1}{\partial x_1^4} + (3\omega_7 cs^2+\omega_7 v_1^2-\omega_7-v_1^2\omega_5-3cs^2\omega_5+\omega_5)\frac{\delta_l^4 v_1 v_2}{4\delta_t\omega_7\omega_5}\frac{\partial^4 \rho}{\partial x_1^3 \partial x_2} + (\omega_7 cs^2+3\omega_7 v_1^2-\omega_7-3v_1^2\omega_5-cs^2\omega_5+\omega_5)\frac{\delta_l^4 \rho v_2}{4\delta_t\omega_7\omega_5}\frac{\partial^4 v_1}{\partial x_1^3 \partial x_2} + (3\omega_7\omega_4 cs^2-\omega_7\omega_4-3\omega_4 cs^2\omega_5-3\omega_4 v_1^2\omega_5+\omega_7\omega_4 v_1^2-6\omega_7 cs^2\omega_5+\omega_7\omega_4 v_1^2\omega_5+3\omega_4\omega_5-\omega_7\omega_4\omega_5+3\omega_7\omega_4 cs^2\omega_5)\frac{\delta_l^4 \rho v_1}{12\delta_t\omega_7\omega_4\omega_5}\frac{\partial^4 v_2}{\partial x_1^3 \partial x_2} + (-2+\omega_4)\frac{\delta_l^4 cs^4}{6\delta_t\omega_4}\frac{\partial^4 \rho}{\partial x_1^2 \partial x_2^2} + (-\omega_7+\omega_4)\frac{\delta_l^4 \rho cs^2 v_1}{2\delta_t\omega_7\omega_4}\frac{\partial^4 v_1}{\partial x_1^2 \partial x_2^2} + (\omega_4-\omega_8)\frac{\delta_l^4 \rho cs^2 v_2}{2\delta_t\omega_4\omega_8}\frac{\partial^4 v_2}{\partial x_1^2 \partial x_2^2} + (\omega_6-\omega_6 v_2^2+3cs^2\omega_8-\omega_8-3\omega_6 cs^2+\omega_8 v_2^2)\frac{\delta_l^4 v_1 v_2}{4\omega_6\delta_t\omega_8}\frac{\partial^4 \rho}{\partial x_1 \partial x_2^3} + (\omega_4\omega_8 v_2^2-3\omega_6\omega_4 v_2^2-\omega_6\omega_4\omega_8-6\omega_6 cs^2\omega_8+3\omega_4 cs^2\omega_8-3\omega_6\omega_4 cs^2+3\omega_6\omega_4 cs^2\omega_8+\omega_6\omega_4\omega_8 v_2^2+3\omega_6\omega_4-\omega_4\omega_8)\frac{\delta_l^4 \rho v_2}{12\omega_6\delta_t\omega_4\omega_8}\frac{\partial^4 v_1}{\partial x_1 \partial x_2^3} + (\omega_6-3\omega_6 v_2^2+cs^2\omega_8-\omega_8-\omega_6 cs^2+3\omega_8 v_2^2)\frac{\delta_l^4 \rho v_1}{4\omega_6\delta_t\omega_8}\frac{\partial^4 v_2}{\partial x_1 \partial x_2^3} + (2cs^4-\omega_6 cs^4+3\omega_6 v_2^2-6v_2^2-12\omega_6 cs^2 v_2^2+24cs^2 v_2^2-3\omega_6 v_2^4+6v_2^4-2cs^2+\omega_6 cs^2)\frac{\delta_l^4}{24\omega_6\delta_t}\frac{\partial^4 \rho}{\partial x_2^4} + (-4+2\omega_6-5\omega_6 v_2^2+10v_2^2+6cs^2-3\omega_6 cs^2)\frac{\delta_l^4 \rho v_2}{12\omega_6\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0.$$

2.3.3 Conservation of momentum: ρv_1

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$$v_1\frac{\partial \rho}{\partial t} + \rho\frac{\partial v_1}{\partial t} + (v_1^2+cs^2)\frac{\delta_l}{\delta_t}\frac{\partial \rho}{\partial x_1} + \frac{2\delta_l \rho v_1}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\delta_l v_1 v_2}{\delta_t}\frac{\partial \rho}{\partial x_2} + \frac{\delta_l \rho v_2}{\delta_t}\frac{\partial v_1}{\partial x_2} + \frac{\delta_l \rho v_1}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-2-2cs^2\omega_5+6v_1^2-3v_1^2\omega_5+4cs^2+\omega_5)\frac{\delta_l^2}{\delta_t\omega_5}\frac{\partial \rho}{\partial x_1}\frac{\partial v_1}{\partial x_1} + (2-\omega_5)\frac{3\delta_l^2 \rho v_1}{\delta_t\omega_5}\left(\frac{\partial v_1}{\partial x_1}\right)^2 + (-2+\omega_4)\frac{cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial \rho}{\partial x_2}\frac{\partial v_2}{\partial x_1} + (-2+\omega_4)\frac{cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial \rho}{\partial x_2}\frac{\partial v_1}{\partial x_2} + (-2-cs^2\omega_5+6v_1^2-3v_1^2\omega_5+2cs^2+\omega_5)\frac{\delta_l^2 \rho}{2\delta_t\omega_5}\frac{\partial^2 v_1}{\partial x_1^2} + (-2+\omega_4)\frac{cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial^2 v_2}{\partial x_1 \partial x_2} + (-2+\omega_4)\frac{cs^2\delta_l^2 \rho}{2\delta_t\omega_4}\frac{\partial^2 v_1}{\partial x_2^2} + C_1\frac{\delta_l^3}{12\delta_t\omega_5^2}\frac{\partial^3 \rho}{\partial x_1^3} + (-24-36cs^2\omega_5+5cs^2\omega_5^2+60v_1^2-4\omega_5^2-60v_1^2\omega_5+36cs^2+11v_1^2\omega_5^2+24\omega_5)\frac{\delta_l^3 \rho v_1}{6\delta_t\omega_5^2}\frac{\partial^3 v_1}{\partial x_1^3} + C_2\frac{\delta_l^3 v_1 v_2}{\delta_t\omega_7\omega_4\omega_5^2}\frac{\partial^3 \rho}{\partial x_1^2 \partial x_2} + C_3\frac{\delta_l^3 \rho v_2}{\delta_t\omega_7\omega_4\omega_5^2}\frac{\partial^3 v_1}{\partial x_1^2 \partial x_2} + C_4\frac{\delta_l^3 \rho v_1}{12\delta_t\omega_7\omega_4^2\omega_5^2}\frac{\partial^3 v_2}{\partial x_1^2 \partial x_2} + (-12+12\omega_4-\omega_4^2)\frac{cs^4\delta_l^3}{6\delta_t\omega_4^2}\frac{\partial^3 \rho}{\partial x_1 \partial x_2^2} + (-12\omega_7\omega_4-\omega_7\omega_4^2\omega_5-12\omega_4^2\omega_5+12\omega_4^2+12\omega_4\omega_5+12\omega_7\omega_4\omega_5-12\omega_7\omega_5)\frac{cs^2\delta_l^3 \rho v_1}{6\delta_t\omega_7\omega_4^2\omega_5}\frac{\partial^3 v_1}{\partial x_1 \partial x_2^2} + (2\omega_4-\omega_4^2+\omega_4\omega_8-2\omega_8)\frac{cs^2\delta_l^3 \rho v_2}{\delta_t\omega_4^2\omega_8}\frac{\partial^3 v_2}{\partial x_1 \partial x_2^2} + C_5\frac{\delta_l^3 v_1 v_2}{12\omega_6\delta_t\omega_4\omega_8}\frac{\partial^3 \rho}{\partial x_2^3} + C_6\frac{\delta_l^3 \rho v_2}{6\delta_t\omega_4^2\omega_8}\frac{\partial^3 v_1}{\partial x_2^3} + C_7\frac{\delta_l^3 \rho v_1}{12\omega_6\delta_t\omega_4\omega_8}\frac{\partial^3 v_2}{\partial x_2^3} + C_8\frac{\delta_l^4 v_1}{12\delta_t\omega_5^3}\frac{\partial^4 \rho}{\partial x_1^4} + C_9\frac{\delta_l^4 \rho}{12\delta_t\omega_5^3}\frac{\partial^4 v_1}{\partial x_1^4} + C_{10}\frac{\delta_l^4 v_2}{4\delta_t\omega_7^2\omega_4^2\omega_5^3}\frac{\partial^4 \rho}{\partial x_1^3 \partial x_2} + C_{11}\frac{\delta_l^4 \rho v_1 v_2}{4\delta_t\omega_7^2\omega_4^2\omega_5^3}\frac{\partial^4 v_1}{\partial x_1^3 \partial x_2} + C_{12}\frac{\delta_l^4 \rho}{12\delta_t\omega_7^2\omega_4^3\omega_5^3}\frac{\partial^4 v_2}{\partial x_1^3 \partial x_2} + C_{13}\frac{\delta_l^4 v_1}{12\omega_9\delta_t\omega_7^2\omega_4^3\omega_8\omega_5^3}\frac{\partial^4 \rho}{\partial x_1^2 \partial x_2^2} + C_{14}\frac{\delta_l^4 \rho}{12\omega_9\delta_t\omega_7^2\omega_4^3\omega_8\omega_5^3}\frac{\partial^4 v_1}{\partial x_1^2 \partial x_2^2} + C_{15}\frac{\delta_l^4 \rho v_1 v_2}{2\omega_9\omega_6\delta_t\omega_7^2\omega_4^3\omega_8^2\omega_5^3}\frac{\partial^4 v_2}{\partial x_1^2 \partial x_2^2} + C_{16}\frac{\delta_l^4 v_2}{12\omega_9\omega_6^2\delta_t\omega_7\omega_4^3\omega_8^2\omega_5}\frac{\partial^4 \rho}{\partial x_1 \partial x_2^3} + C_{17}\frac{\delta_l^4 \rho v_1 v_2}{12\omega_9\omega_6^2\delta_t\omega_7^2\omega_4^3\omega_8^2\omega_5^2}\frac{\partial^4 v_1}{\partial x_1 \partial x_2^3} + C_{18}\frac{\delta_l^4 \rho}{12\omega_9\omega_6^2\delta_t\omega_7\omega_4^3\omega_8^2\omega_5}\frac{\partial^4 v_2}{\partial x_1 \partial x_2^3} + C_{19}\frac{\delta_l^4 v_1}{24\omega_6^2\delta_t\omega_4^2\omega_8^2}\frac{\partial^4 \rho}{\partial x_2^4} + C_{20}\frac{\delta_l^4 \rho}{24\delta_t\omega_4^3\omega_8^2}\frac{\partial^4 v_1}{\partial x_2^4} + C_{21}\frac{\delta_l^4 \rho v_1 v_2}{12\omega_6^2\delta_t\omega_4^2\omega_8^2}\frac{\partial^4 v_2}{\partial x_2^4} = 0,$$

where:

$$C_1 = 24cs^2v_1^2\omega_5^2 - 36v_1^4\omega_5 + 12cs^2\omega_5 - cs^2\omega_5^2 + 7v_1^4\omega_5^2 + 144cs^2v_1^2 - 36v_1^2 + 12cs^4 - 144cs^2v_1^2\omega_5 + 36v_1^2\omega_5 - 12cs^4\omega_5 + 36v_1^4 - 12cs^2 + cs^4\omega_5^2 - 7v_1^2\omega_5^2$$

$$C_2 = -3cs^2\omega_7\omega_4\omega_5 + \omega_4 v_1^2\omega_5^2 - \omega_7\omega_4 + 3cs^2\omega_7\omega_5 + 3cs^2\omega_4\omega_5^2 - 3cs^2\omega_5^2 + \omega_5^2 - 3cs^2\omega_4\omega_5 - \omega_4 v_1^2\omega_5 + \omega_7\omega_4 v_1^2 - \omega_7\omega_4 v_1^2\omega_5 + \omega_4\omega_5 - \omega_4\omega_5^2 + \omega_7\omega_4\omega_5 - v_1^2\omega_5^2 - \omega_7\omega_5 + 3cs^2\omega_7\omega_4 + \omega_7 v_1^2\omega_5$$

$$C_3 = -cs^2\omega_7\omega_4\omega_5 + 3\omega_4 v_1^2\omega_5^2 - \omega_7\omega_4 + cs^2\omega_7\omega_5 + cs^2\omega_4\omega_5^2 - cs^2\omega_5^2 + \omega_5^2 - cs^2\omega_4\omega_5 - 3\omega_4 v_1^2\omega_5 + 3\omega_7\omega_4 v_1^2 - 3\omega_7\omega_4 v_1^2\omega_5 + \omega_4\omega_5 - \omega_4\omega_5^2 + \omega_7\omega_4\omega_5 - 3v_1^2\omega_5^2 - \omega_7\omega_5 + cs^2\omega_7\omega_4 + 3\omega_7 v_1^2\omega_5$$

$$C_4 = -3\omega_7\omega_4^2 v_1^2\omega_5^2 - 24cs^2\omega_7\omega_4\omega_5 - 12\omega_4 v_1^2\omega_5^2 - 12cs^2\omega_4\omega_5^2 - 12\omega_4^2\omega_5^2 + 6\omega_7\omega_4^2\omega_5 + 12\omega_7\omega_4^2 v_1^2 + 3\omega_7\omega_4^2\omega_5^2 + 12\omega_4^2\omega_5 - 12\omega_7\omega_4^2 - 24cs^2\omega_7\omega_5^2 - 6\omega_7\omega_4^2 v_1^2\omega_5 + 42cs^2\omega_7\omega_4\omega_5^2 + 36cs^2\omega_7\omega_4^2 - 11cs^2\omega_7\omega_4^2\omega_5^2 - 6\omega_7\omega_4\omega_5^2 - 12\omega_4^2 v_1^2\omega_5 - 12cs^2\omega_4^2\omega_5 + 12cs^2\omega_4^2\omega_5^2 + 6\omega_7\omega_4 v_1^2\omega_5^2 + 12\omega_4\omega_5^2 + 12\omega_4^2 v_1^2\omega_5^2 - 18cs^2\omega_7\omega_4^2\omega_5$$

$$C_5 = -6\omega_4\omega_8 v_2^2 + 6\omega_6\omega_4 v_2^2 - \omega_6\omega_4\omega_8 - 18cs^2\omega_4\omega_8 + 12\omega_6 + 18cs^2\omega_6\omega_4 + 36cs^2\omega_8 - 12\omega_6 v_2^2 - 36cs^2\omega_6 + \omega_6\omega_4\omega_8 v_2^2 - 6\omega_6\omega_4 + 6\omega_4\omega_8 - 12\omega_8 + 3cs^2\omega_6\omega_4\omega_8 + 12\omega_8 v_2^2$$

$$C_6 = 3\omega_4\omega_8 v_2^2 + 3\omega_4^2 v_2^2 + \omega_4^2\omega_8 + 15cs^2\omega_4\omega_8 - 12cs^2\omega_8 + 6\omega_4 + 3cs^2\omega_4^2 - 3\omega_4^2 - \omega_4^2\omega_8 v_2^2 - 6cs^2\omega_4 - 3\omega_4\omega_8 - 3cs^2\omega_4^2\omega_8 - 6\omega_4 v_2^2$$

$$C_7 = -18\omega_4\omega_8 v_2^2 + 18\omega_6\omega_4 v_2^2 - \omega_6\omega_4\omega_8 - 6cs^2\omega_4\omega_8 + 12\omega_6 + 6cs^2\omega_6\omega_4 + 12cs^2\omega_8 - 36\omega_6 v_2^2 - 12cs^2\omega_6 + 3\omega_6\omega_4\omega_8 v_2^2 - 6\omega_6\omega_4 + 6\omega_4\omega_8 - 12\omega_8 + cs^2\omega_6\omega_4\omega_8 + 36\omega_8 v_2^2$$

$$C_8 = 12 + 404cs^2 v_1^2\omega_5^2 - 34cs^2 v_1^2\omega_5^3 - 216v_1^4\omega_5 + 198cs^2\omega_5 - 78cs^2\omega_5^2 + 90v_1^4\omega_5^2 + 672cs^2 v_1^2 - 156v_1^2 + 144cs^4 + 8\omega_5^2 - \omega_5^3 - 9v_1^4\omega_5^3 + 6cs^2\omega_5^3 - 1008cs^2 v_1^2\omega_5 + 234v_1^2\omega_5 - 216cs^4\omega_5 + 144v_1^4 - 132cs^2 + 10v_1^2\omega_5^3 - 5cs^4\omega_5^3 + 82cs^4\omega_5^2 - 98v_1^2\omega_5^2 - 18\omega_5$$

$$C_9 = 12 + 252cs^2 v_1^2\omega_5^2 - 18cs^2 v_1^2\omega_5^3 - 756v_1^4\omega_5 + 54cs^2\omega_5 - 22cs^2\omega_5^2 + 310v_1^4\omega_5^2 + 432cs^2 v_1^2 - 252v_1^2 + 24cs^4 + 8\omega_5^2 - \omega_5^3 - 29v_1^4\omega_5^3 + 2cs^2\omega_5^3 - 648cs^2 v_1^2\omega_5 + 378v_1^2\omega_5 - 36cs^4\omega_5 + 504v_1^4 - 36cs^2 + 14v_1^2\omega_5^3 - cs^4\omega_5^3 + 14cs^4\omega_5^2 - 154v_1^2\omega_5^2 - 18\omega_5$$

$$C_{10} = -8\omega_7 v_1^4\omega_5^3 - 4cs^4\omega_7\omega_5^3 - 32\omega_7\omega_4^2 v_1^2\omega_5^2 + 4cs^2\omega_4\omega_5^3 - 24cs^2\omega_4^2 v_1^2\omega_5^2 + 8cs^4\omega_7\omega_4^2\omega_5^2 + 24cs^2\omega_4^2 v_1^2\omega_5^3 - 20\omega_7^2\omega_4 v_1^2\omega_5 + 8cs^4\omega_4^2\omega_4^2 + 12cs^2\omega_7^2\omega_4^2\omega_5 + 13\omega_7\omega_4^2 v_1^2\omega_5^3 + 51cs^2\omega_7^2\omega_4^2 v_1^2\omega_5^2 - 8cs^4\omega_7^2\omega_4\omega_5^2 - 4cs^4\omega_7\omega_4^2\omega_5^3 + 13\omega_7^2\omega_4^2 v_1^4\omega_5^2 + 4\omega_4 v_1^2\omega_5^3 + 20\omega_7\omega_4 v_1^4\omega_5^3 + 4cs^4\omega_7^2\omega_4\omega_5 - 144cs^2\omega_7^2\omega_4^2 v_1^2\omega_5 - 8\omega_7^2 v_1^2\omega_5^2 + 4cs^2\omega_7\omega_5^3 + 84cs^2\omega_7\omega_4 v_1^2\omega_5^3 - 36\omega_7^2\omega_4^2 v_1^4\omega_5 - 4cs^4\omega_4\omega_5^3 + 4\omega_4^2 v_1^4\omega_5^3 + 20\omega_7^2\omega_4 v_1^2\omega_5^2 + 96cs^2\omega_7^2\omega_4^2 v_1^2 - 8cs^2\omega_7\omega_4\omega_5^3 + 24\omega_7^2\omega_4^2 v_1^4 - 4cs^2\omega_7^2\omega_4^2\omega_5^2 - 48cs^2\omega_7\omega_4 v_1^2\omega_5^2 - 4cs^4\omega_7\omega_4^2\omega_5 - 16\omega_7\omega_4 v_1^4\omega_5^2 - 8cs^2\omega_7^2\omega_4^2 + 20\omega_7\omega_4^2 v_1^2\omega_5 - 36cs^2\omega_7 v_1^2\omega_5^3 - 4\omega_4^2 v_1^4\omega_5^2 - 51cs^2\omega_7\omega_4^2 v_1^2\omega_5^3 - 4cs^4\omega_4^2\omega_5^2 + 20\omega_7^2\omega_4 v_1^4\omega_5 - 24\omega_7^2\omega_4^2 v_1^2 - 13\omega_7\omega_4^2 v_1^4\omega_5^3 - 4cs^2\omega_7^2\omega_5^2 + 72cs^2\omega_7^2\omega_4 v_1^2\omega_5 - 8cs^2\omega_7\omega_4^2\omega_5^2 + 36cs^2\omega_7^2 v_1^2\omega_5^2 - 13\omega_7^2\omega_4^2 v_1^2\omega_5^2 - 4\omega_4 v_1^4\omega_5^3 + 32\omega_7\omega_4^2 v_1^4\omega_5^2 + 8\omega_7 v_1^2\omega_5^3 - 12cs^4\omega_7^2\omega_4^2\omega_5 + 4cs^4\omega_4^2\omega_5^3 + 120cs^2\omega_7\omega_4^2 v_1^2\omega_5^2 + 8cs^2\omega_7^2\omega_4\omega_5^2 + 4cs^2\omega_7\omega_4^2\omega_5^3 + 4cs^2\omega_4^2\omega_5^2 + 4cs^4\omega_7^2\omega_5^2 - 4cs^2\omega_7^2\omega_4\omega_5 + 16\omega_7\omega_4 v_1^2\omega_5^2 - 20\omega_7\omega_4^2 v_1^4\omega_5 + 8cs^4\omega_7\omega_4\omega_5^2 + 4cs^4\omega_7^2\omega_4^2\omega_5^2 - 72cs^2\omega_7\omega_4^2 v_1^2\omega_5 + 4\omega_4^2 v_1^2\omega_5^2 + 8\omega_7^2 v_1^4\omega_5^2 + 4cs^2\omega_7\omega_4^2\omega_5 - 20\omega_7\omega_4 v_1^2\omega_5^3 - 24cs^2\omega_4 v_1^2\omega_5^3 + 36\omega_7^2\omega_4^2 v_1^2\omega_5 - 4cs^2\omega_4^2\omega_5^3 - 4\omega_4^2 v_1^2\omega_5^3 - 20\omega_7^2\omega_4 v_1^4\omega_5^2 - 84cs^2\omega_7^2\omega_4 v_1^2\omega_5^2$$

$$C_{11} = 104\omega_7\omega_4^2 v_1^2\omega_5^2 - 8\omega_4^2\omega_5^3 - 16cs^2\omega_4\omega_5^3 - 24\omega_7^2\omega_4\omega_5 + 64\omega_7^2\omega_4 v_1^2\omega_5 + 8\omega_4^2\omega_5^2 - 72cs^2\omega_7^2\omega_4^2\omega_5 - 43\omega_7\omega_4^2 v_1^2\omega_5^3 + 24\omega_7\omega_4^2\omega_5 - 16\omega_4 v_1^2\omega_5^3 + 28\omega_7^2 v_1^2\omega_5^2 - 40\omega_7\omega_4^2\omega_5^2 - 20cs^2\omega_7\omega_5^3 - 68\omega_7^2\omega_4 v_1^2\omega_5^2 + 44cs^2\omega_7\omega_4\omega_5^3 + 25cs^2\omega_7^2\omega_4^2\omega_5^2 - 12\omega_7^2\omega_5^2 + 17\omega_7\omega_4^2\omega_5^3 + 28\omega_7^2\omega_4\omega_5^2 + 48cs^2\omega_7^2\omega_4^2 - 64\omega_7\omega_4^2 v_1^2\omega_5 - 16cs^2\omega_7\omega_4\omega_5^2 - 32\omega_7^2\omega_4^2 - 17\omega_7^2\omega_4^2\omega_5^2 + 80\omega_7^2\omega_4^2 v_1^2 + 20cs^2\omega_7^2\omega_5^2 - 28\omega_7\omega_4\omega_5^3 + 56cs^2\omega_7\omega_4^2\omega_5^2 + 43\omega_7^2\omega_4^2 v_1^2\omega_5^2 + 16\omega_7\omega_4\omega_5^2 - 28\omega_7 v_1^2\omega_5^3 + 12\omega_7\omega_5^3 - 44cs^2\omega_7^2\omega_4\omega_5^2 - 25cs^2\omega_7\omega_4^2\omega_5^3 - 16cs^2\omega_4^2\omega_5^2 + 32cs^2\omega_7^2\omega_4\omega_5 - 48\omega_7\omega_4 v_1^2\omega_5^2 - 16\omega_4^2 v_1^2\omega_5^2 - 32cs^2\omega_7\omega_4^2\omega_5 + 8\omega_4\omega_5^3 + 68\omega_7\omega_4 v_1^2\omega_5^3 - 120\omega_7^2\omega_4^2 v_1^2\omega_5 + 16cs^2\omega_4^2\omega_5^3 + 16\omega_4^2 v_1^2\omega_5^3 + 48\omega_7^2\omega_4^2\omega_5$$

$$C_{12} = -4\omega_7^2\omega_4^3 v_1^2\omega_5^3 + 24\omega_7\omega_4^2 v_1^2\omega_5^2 + 252cs^2\omega_7^2\omega_4^3 v_1^2 - cs^2\omega_7^2\omega_4^3\omega_5^2 + 12cs^4\omega_7^2\omega_4^3 + 72\omega_7^2\omega_4^3 v_1^4 - 18\omega_7^2\omega_4^2 v_1^4\omega_5^3 + 60\omega_7\omega_4^3 v_1^4\omega_5^2 + 12cs^4\omega_7\omega_4^2\omega_5^2 + 54cs^2\omega_7\omega_4^3 v_1^2\omega_5^2 - 24cs^4\omega_7^2\omega_4\omega_5^3 - 81cs^2\omega_7^2\omega_4^2 v_1^2\omega_5^3 - 12cs^2\omega_4^2 v_1^2\omega_5^3 - 19\omega_7^2\omega_4^3 v_1^2\omega_5^2 + 12cs^2\omega_7^2\omega_4^2\omega_5 - 48\omega_7\omega_4^2 v_1^2\omega_5^3 - 21cs^2\omega_7\omega_4^3 v_1^2\omega_5^3 + 162cs^2\omega_7^2\omega_4^2 v_1^2\omega_5^2 - 18cs^4\omega_7\omega_4^2\omega_5^3 + 12\omega_7^2\omega_4^2 v_1^4\omega_5^2 - 27\omega_7\omega_4^3 v_1^4\omega_5^3 - 24\omega_7\omega_4 v_1^4\omega_5^3 - 108cs^2\omega_7^2\omega_4^2 v_1^2\omega_5 - 6cs^4\omega_7\omega_4^3\omega_5^2 - 12cs^2\omega_7^2\omega_4^3 - 12\omega_4^3 v_1^2\omega_5^3 - 12cs^2\omega_7\omega_4 v_1^2\omega_5^3 - 12\omega_4^2 v_1^4\omega_5^3 - 12cs^2\omega_7\omega_4\omega_5^3 - 6cs^2\omega_7^2\omega_4^2\omega_5^2 + 90\omega_7^2\omega_4^3 v_1^2\omega_5 - 36\omega_7\omega_4^3 v_1^4\omega_5 + 12\omega_4^3 v_1^2\omega_5^2 - 36cs^2\omega_7\omega_4^3 v_1^2\omega_5 + 6cs^4\omega_7\omega_4^3\omega_5^2 - 5cs^2\omega_7^2\omega_4^2\omega_5^3 + 12cs^2\omega_7^2\omega_4^3\omega_5 - 12\omega_7^2\omega_4 v_1^2\omega_5^3 + 60cs^2\omega_7^2\omega_4^3 v_1^2\omega_5^2 + 30cs^2\omega_7\omega_4^2 v_1^2\omega_5^3 + 48\omega_7\omega_4^2 v_1^4\omega_5^3 + cs^4\omega_7^2\omega_4^3\omega_5^2 + 19\omega_7^2\omega_4^3 v_1^4\omega_5^2 - 12cs^2\omega_7\omega_4^2\omega_5^2 + 12cs^2\omega_4^3 v_1^2\omega_5^3 + 6cs^2\omega_7^2\omega_4\omega_5^3 + 27\omega_7\omega_4^3 v_1^2\omega_5^3 - 12\omega_7^2\omega_4^2 v_1^2\omega_5^2 - 24\omega_7\omega_4^2 v_1^4\omega_5^2 + 4\omega_7^2\omega_4^3 v_1^4\omega_5^3 - cs^4\omega_7^2\omega_4^3\omega_5^3 - 12cs^4\omega_7^2\omega_4^2\omega_5 + 12cs^2\omega_7^2\omega_4^3 v_1^2\omega_5^3 - 12cs^2\omega_7\omega_4^2 v_1^2\omega_5^2 - 60\omega_7\omega_4^3 v_1^2\omega_5^2 + 18\omega_7^2\omega_4^2 v_1^2\omega_5^3 - 48cs^2\omega_7^2 v_1^2\omega_5^3 + 18cs^2\omega_7\omega_4^2\omega_5^3 - 12cs^2\omega_4^3 v_1^2\omega_5^2 + 36\omega_7\omega_4^3 v_1^2\omega_5 - 12\omega_4^3 v_1^4\omega_5^2 + 6cs^2\omega_7\omega_4^3\omega_5^2 + 12cs^4\omega_7\omega_4\omega_5^3 + 102cs^2\omega_7^2\omega_4 v_1^2\omega_5^3 + 6cs^4\omega_7^2\omega_4^2\omega_5^2 - 72\omega_7^2\omega_4^3 v_1^2 + 12\omega_7^2\omega_4 v_1^4\omega_5^3 + 24\omega_7\omega_4 v_1^2\omega_5^3 + 12\omega_4^3 v_1^4\omega_5^3 + 12cs^4\omega_7^2\omega_5^3 - 6cs^2\omega_7\omega_4^3\omega_5^3 + 12\omega_4^2 v_1^2\omega_5^3 - 306cs^2\omega_7^2\omega_4^3 v_1^2\omega_5 + 13cs^4\omega_7^2\omega_4^2\omega_5^3 - 90\omega_7^2\omega_4^3 v_1^4\omega_5 - 12cs^4\omega_7^2\omega_4^3\omega_5 - 48cs^2\omega_7^2\omega_4 v_1^2\omega_5^2$$

$$C_{13} = 12\omega_9\omega_7\omega_4^3\omega_8\omega_5^3 v_2^2 + 24\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2 v_2^2 - 12cs^2\omega_9\omega_4^3\omega_8 v_1^2\omega_5^2 - 12\omega_9\omega_4^3\omega_8 v_1^2\omega_5^2 v_2^2 + 6cs^2\omega_9\omega_7^2\omega_4^3 v_1^2\omega_5^2 - 12cs^2\omega_9\omega_7\omega_4\omega_8 v_1^2\omega_5^3 + 12cs^2\omega_7\omega_4^3\omega_8\omega_5^3 + 6\omega_9\omega_7^2\omega_4^3 v_1^2\omega_5^2 v_2^2 + 36cs^2\omega_9\omega_7^2\omega_4^3\omega_8 v_2^2 - 12cs^2\omega_9\omega_7^2\omega_4\omega_8 v_1^2\omega_5^2 - 42cs^4\omega_9\omega_7\omega_4^2\omega_8\omega_5^3 - 36cs^2\omega_9\omega_4^2\omega_8\omega_5^3 v_2^2 + 12\omega_9\omega_7^2\omega_4^2\omega_8 v_1^2\omega_5 v_2^2 - 36cs^4\omega_7\omega_4^3\omega_8\omega_5^3 - cs^2\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^3 - 12\omega_9\omega_7\omega_4^3\omega_8 v_1^2\omega_5^3 v_2^2 - 6cs^4\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^2 - 36cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5 v_2^2 + 12cs^2\omega_7^2\omega_4^2 v_1^2\omega_5^3 + 12\omega_7\omega_4^2\omega_8 v_1^2\omega_5^3 v_2^2 - 12cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 18cs^2\omega_9\omega_7^2\omega_4^3\omega_5^2 v_2^2 + 12cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 + 6\omega_9\omega_7^2\omega_4^3\omega_8 v_1^2\omega_5^2 v_2^2 + 12\omega_9\omega_4^3\omega_8\omega_5^3 v_2^2 + 6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3 + 12cs^2\omega_9\omega_4^3\omega_8 v_1^2\omega_5^3 - 36cs^2\omega_9\omega_4^3\omega_8\omega_5^2 v_2^2 - 54cs^2\omega_9\omega_7^2\omega_4^3\omega_8\omega_5 v_2^2 + 12cs^2\omega_9\omega_7^2\omega_4^3\omega_8 v_1^2 - 36cs^4\omega_7^2\omega_4^2\omega_8\omega_5^3 - 18cs^2\omega_9\omega_7\omega_4^2\omega_8\omega_5^3 + 5cs^4\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^3 + 36cs^4\omega_7\omega_4^3\omega_8\omega_5^2 + 2cs^2\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_7\omega_4^2\omega_8\omega_5^2 v_2^2 + 12cs^2\omega_9\omega_7^2\omega_4\omega_8 v_1^2\omega_5^3 + 72cs^2\omega_9\omega_7^2\omega_4\omega_8\omega_5^2 v_2^2 + 36cs^2\omega_7^2\omega_4^2\omega_5^3 v_2^2 + 24\omega_9\omega_7\omega_4^3\omega_8 v_1^2\omega_5^2 v_2^2 + 36cs^2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5 v_2^2 - 12\omega_9\omega_7^2\omega_4^3\omega_8 v_2^2 + 12cs^2\omega_9\omega_4^3\omega_8\omega_5^2 + 12cs^2\omega_9\omega_7^2\omega_4^3\omega_8\omega_5 - 12cs^2\omega_9\omega_4^3\omega_8 v_1^2\omega_5^3 + 12\omega_9\omega_4^3\omega_8\omega_5^3 v_2^2 + 180cs^4\omega_9\omega_7^2\omega_4\omega_8\omega_5^3 + 12cs^2\omega_9\omega_7^2\omega_4\omega_8\omega_5^2 + 12\omega_9\omega_4^3\omega_8 v_1^2\omega_5^3 v_2^2 + 12cs^4\omega_9\omega_4^3\omega_8\omega_5^2 - 72cs^2\omega_9\omega_7\omega_4\omega_8\omega_5^3 v_2^2 - 96cs^4\omega_9\omega_7^2\omega_8\omega_5^3 - 24\omega_9\omega_7\omega_4^3\omega_8\omega_5^2 v_2^2 + 6\omega_7^2\omega_4^3\omega_5^3 v_2^2 - 12cs^2\omega_9\omega_7^2\omega_4\omega_8\omega_5^3 - 84cs^4\omega_9\omega_7^2\omega_4\omega_8\omega_5^2 + 12\omega_9\omega_7^2\omega_4^3\omega_8 v_1^2 v_2^2 - 36cs^4\omega_9\omega_7^2\omega_4^3\omega_8\omega_5 - 6\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^2 v_2^2 - 12cs^2\omega_9\omega_4^3\omega_8\omega_5^3 - 36\omega_9\omega_7\omega_4^2\omega_8\omega_5^3 v_2^2 - 6\omega_9\omega_7^2\omega_4^3\omega_5^2 v_2^2 - 12cs^2\omega_7^2\omega_4^2\omega_5^3 + 36cs^2\omega_9\omega_4^3\omega_8\omega_5^3 v_2^2 - 12\omega_7^2\omega_4^2\omega_8 v_1^2\omega_5^3 v_2^2 - 12\omega_9\omega_7^2\omega_4^2 v_1^2\omega_5^2 v_2^2 - 12cs^4\omega_9\omega_4^3\omega_8\omega_5^3 + 12\omega_9\omega_4^3\omega_8\omega_5^2 v_2^2 - 88cs^4\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^3 - 18cs^2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2 - 42cs^4\omega_9\omega_7\omega_4^3\omega_8\omega_5^2 + 6cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5^3 + 18cs^4\omega_7^2\omega_4^3\omega_8\omega_5^3 - 12\omega_7\omega_4^2\omega_8\omega_5^3 v_2^2 + 6\omega_7^2\omega_4^3\omega_8\omega_5^2 v_2^2 - 12\omega_9\omega_4^2\omega_8 v_1^2\omega_5^3 v_2^2 + 12cs^2\omega_7\omega_4^2\omega_8 v_1^2\omega_5^3 + 18cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3 v_2^2 + 18cs^2\omega_9\omega_7^2\omega_4^2\omega_8 v_1^2\omega_5^2 + 18\omega_9\omega_7^2\omega_4^3\omega_8\omega_5 v_2^2 - 36cs^4\omega_9\omega_7^2\omega_4^2\omega_5^2 + 18cs^2\omega_9\omega_7\omega_4^2\omega_8 v_1^2\omega_5^3 - 12cs^2\omega_9\omega_7^2\omega_4^3\omega_8 v_1^2\omega_5 - 36cs^2\omega_9\omega_7^2\omega_4^2\omega_5^2 v_2^2 - 6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3 - 36cs^2\omega_9\omega_7\omega_4^2\omega_8\omega_5^2 v_2^2 + 12cs^2\omega_9\omega_7^2\omega_4^2\omega_5^3 - 12\omega_9\omega_7\omega_4^2\omega_8 v_1^2\omega_5^2 v_2^2 - 24\omega_9\omega_7^2\omega_4\omega_8\omega_5^2 v_2^2 + 12\omega_7\omega_4^3\omega_8 v_1^2\omega_5^2 v_2^2 - 12cs^2\omega_9\omega_7^2\omega_4^2\omega_8 v_1^2\omega_5^3 - 36cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5^3 v_2^2 - 12cs^2\omega_9\omega_7\omega_4^3\omega_8 v_1^2\omega_5 + 6\omega_7^2\omega_4^3\omega_8 v_1^2\omega_5^3 v_2^2 - 18cs^4\omega_7^2\omega_4^3\omega_5^3 - 72cs^2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2 v_2^2 - 6\omega_7^2\omega_4^3 v_1^2\omega_5^3 v_2^2 - 12\omega_9\omega_7\omega_4^3\omega_8 v_1^2\omega_5 v_2^2 - 6cs^2\omega_7^2\omega_4^3 v_1^2\omega_5^3 + 12cs^2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^3 + 36cs^4\omega_7\omega_4^2\omega_8\omega_5^3 + 150cs^4\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2 - 18cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5^2 - 18cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2 + 30cs^4\omega_9\omega_7\omega_4^3\omega_8\omega_5^3 + 12\omega_7^2\omega_4^2\omega_8\omega_5^3 v_2^2 - 12\omega_7\omega_4^3\omega_8\omega_5^2 v_2^2 + 6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 12cs^2\omega_7\omega_4^2\omega_8\omega_5^3 + 12\omega_9\omega_7\omega_4^3\omega_8\omega_5 v_2^2 - 12cs^2\omega_9\omega_7^2\omega_4^2 v_1^2\omega_5^2 - 12cs^2\omega_7^2\omega_4^2\omega_8 v_1^2\omega_5^3 - 36cs^2\omega_7\omega_4^3\omega_8\omega_5^3 v_2^2 + 36\omega_9\omega_7\omega_4^2\omega_8 v_1^2\omega_5^3 v_2^2 - 18\omega_9\omega_7^2\omega_4^3\omega_8 v_1^2\omega_5 v_2^2 - 6cs^2\omega_9\omega_7^2\omega_4^3\omega_5^2 - 12\omega_7\omega_4^3\omega_8 v_1^2\omega_5^3 v_2^2 + 12\omega_9\omega_7^2\omega_4^2\omega_5^2 v_2^2 + 12\omega_7^2\omega_4^2 v_1^2\omega_5^3 v_2^2 + 12cs^4\omega_9\omega_4^2\omega_8\omega_5^3 + 18cs^2\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^2 v_2^2 + 12cs^2\omega_7\omega_4^3\omega_8 v_1^2\omega_5^2 + 36cs^4\omega_9\omega_7^2\omega_4^3\omega_8 +$$

$$24\omega_9\omega_7^2\omega_4\omega_8v_1^2\omega_5^2v_2^2+cs^2\omega_9\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^3+108cs^2\omega_9\omega_7\omega_4^2\omega_8\omega_5^3v_2^2+18cs^2\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5^2+6cs^2\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^3+36cs^2\omega_7\omega_4^2\omega_8\omega_5^3v_2^2+18cs^4\omega_9\omega_7^2\omega_4^3\omega_5^2+12cs^4\omega_9\omega_7\omega_4\omega_8\omega_5^3-18cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2-12cs^2\omega_9\omega_7^2\omega_4^3\omega_8-6\omega_7^2\omega_4^3\omega_8\omega_5^3v_2^2+12cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5-48cs^4\omega_9\omega_7^2\omega_4^2\omega_8\omega_5+12cs^2\omega_9\omega_4^2\omega_8\omega_5^3-2cs^2\omega_9\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2-12cs^2\omega_7\omega_4^3\omega_8v_1^2\omega_5^3-36cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3v_2^2-12\omega_9\omega_7^2\omega_4^2\omega_8\omega_5v_2^2+36cs^2\omega_7\omega_4^3\omega_8\omega_5^2v_2^2-12\omega_7^2\omega_4^2\omega_5^3v_2^2+12\omega_7\omega_4^3\omega_8\omega_5^3v_2^2+12cs^4\omega_9\omega_7\omega_4^3\omega_8\omega_5-24\omega_9\omega_7\omega_4\omega_8v_1^2\omega_5^3v_2^2+24\omega_9\omega_7\omega_4\omega_8\omega_5^3v_2^2-18cs^2\omega_7^2\omega_4^3\omega_5^3v_2^2+36cs^4\omega_7^2\omega_4^2\omega_5^3+12cs^2\omega_9\omega_7\omega_4\omega_8\omega_5^3-6\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2v_2^2+72cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5^2v_2^2-6cs^2\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2-6cs^2\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5^3-24\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2v_2^2$$

$$C_{14}=12\omega_9\omega_7\omega_4^3\omega_8\omega_5^3v_2^2+24\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2v_2^2+24cs^2\omega_9\omega_4^3\omega_8v_1^2\omega_5^2-36\omega_9\omega_4^3\omega_8v_1^2\omega_5^2v_2^2+18cs^2\omega_9\omega_7^2\omega_4^3v_1^2\omega_5^2+60cs^2\omega_9\omega_7\omega_4\omega_8v_1^2\omega_5^3+12cs^2\omega_7\omega_4^3\omega_8\omega_5^3+18\omega_9\omega_7^2\omega_4^3v_1^2\omega_5^2v_2^2+12cs^2\omega_9\omega_7^2\omega_4^3\omega_8v_2^2-84cs^2\omega_9\omega_7^2\omega_4\omega_8v_1^2\omega_5^2-12cs^2\omega_9\omega_7\omega_4^2\omega_8\omega_5^2-24cs^4\omega_9\omega_7\omega_4^2\omega_8\omega_5^3-12cs^2\omega_9\omega_4^2\omega_8\omega_5^3v_2^2+36\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^3v_2^2+36\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^3-36\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5^3v_2^2-6cs^4\omega_9\omega_7^2\omega_4^3\omega_5^2-12cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5^2v_2^2+36cs^2\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^3+36\omega_7\omega_4^2\omega_8v_1^2\omega_5^3v_2^2-12cs^2\omega_7\omega_4^3\omega_8\omega_5^2+6cs^2\omega_9\omega_7^2\omega_4^3\omega_5^2v_2^2+12cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3+18\omega_9\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2v_2^2-12\omega_9\omega_4^3\omega_8\omega_5^3v_2^2+6cs^2\omega_7^2\omega_4^3\omega_5^3-24cs^2\omega_9\omega_4^3\omega_8v_1^2\omega_5^3-12cs^2\omega_9\omega_4^3\omega_8\omega_5^2v_2^2-18cs^2\omega_9\omega_7^2\omega_4^3\omega_8\omega_5v_2^2+12cs^4\omega_9\omega_7\omega_4^2\omega_8\omega_5^2-12cs^4\omega_7^2\omega_4^2\omega_8\omega_5^3+24cs^2\omega_9\omega_7\omega_4^2\omega_8\omega_5^3-cs^4\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^3+12cs^4\omega_7\omega_4^3\omega_8\omega_5^2+6cs^2\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^2+12\omega_9\omega_7\omega_4^2\omega_8\omega_5^2v_2^2+84cs^2\omega_9\omega_7^2\omega_4\omega_8v_1^2\omega_5^3+24cs^2\omega_9\omega_7^2\omega_4\omega_8\omega_5^2v_2^2+12cs^2\omega_7^2\omega_4^2\omega_5^3v_2^2+72\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5^2v_2^2+12cs^2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5v_2^2-12\omega_9\omega_7^2\omega_4^3\omega_8v_2^2-6cs^2\omega_9\omega_7^2\omega_4^3\omega_8\omega_5+24cs^2\omega_9\omega_4^2\omega_8v_1^2\omega_5^3+12\omega_9\omega_4^2\omega_8\omega_5^3v_2^2+18cs^4\omega_9\omega_7^2\omega_4\omega_8\omega_5^3+12cs^2\omega_9\omega_7^2\omega_4\omega_8\omega_5^2+36\omega_9\omega_4^3\omega_8v_1^2\omega_5^3v_2^2-24cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5^3v_2^2-12cs^4\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^2+36\omega_9\omega_7^2\omega_4^3\omega_8v_1^2v_2^2+6cs^4\omega_9\omega_7^2\omega_4^3\omega_8\omega_5-6\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2-36\omega_9\omega_7\omega_4^2\omega_8\omega_5^3v_2^2-6\omega_9\omega_7^2\omega_4^3\omega_5^2v_2^2-12cs^2\omega_7^2\omega_4^2\omega_4^3\omega_5^3+12cs^2\omega_9\omega_4^3\omega_8\omega_5^3v_2^2-48cs^2\omega_9\omega_7^2\omega_8v_1^2\omega_5^3-36\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^3v_2^2-36\omega_9\omega_7^2\omega_4^2v_1^2\omega_5^2v_2^2+12\omega_9\omega_4^3\omega_8\omega_5^2v_2^2-4cs^4\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^3-24cs^2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2-12cs^4\omega_9\omega_7\omega_4^3\omega_8\omega_5^3+6cs^4\omega_7^2\omega_4^3\omega_8\omega_5^3-12\omega_7\omega_4^2\omega_8\omega_5^3v_2^2+6\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2-36\omega_9\omega_4^2\omega_8v_1^2\omega_5^3v_2^2+36cs^2\omega_7\omega_4^2\omega_8v_1^2\omega_5^3+6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3v_2^2+180cs^2\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2+18\omega_9\omega_7^2\omega_4^3\omega_8\omega_5v_2^2-12cs^4\omega_9\omega_7^2\omega_4^2\omega_5^2-132cs^2\omega_9\omega_7\omega_4^2\omega_8v_1^2\omega_5^3+18cs^2\omega_9\omega_7^2\omega_4^3\omega_8v_1^2\omega_5-12cs^2\omega_9\omega_7^2\omega_4^2\omega_5^2v_2^2-6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3-12cs^2\omega_9\omega_7\omega_4^2\omega_8\omega_5^2v_2^2+12cs^2\omega_9\omega_7^2\omega_4^2\omega_5^2-36\omega_9\omega_7\omega_4^2\omega_8v_1^2\omega_5^2v_2^2-24\omega_9\omega_7\omega_4\omega_8\omega_5^2v_2^2+36\omega_7\omega_4^3\omega_8v_1^2\omega_5^2v_2^2-42cs^2\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^3-12cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5^3v_2^2+72cs^2\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5+18\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^3v_2^2-6cs^4\omega_7^2\omega_4^3\omega_5^3-24cs^2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2v_2^2-18\omega_7^2\omega_4^3v_1^2\omega_5^3v_2^2-36\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5v_2^2-18cs^2\omega_7^2\omega_4^3v_1^2\omega_5^3+12cs^4\omega_7\omega_4^2\omega_8\omega_5^3+24cs^4\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2+12cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5^2-6cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2+12cs^4\omega_9\omega_7\omega_4^3\omega_8\omega_5^3+12\omega_7^2\omega_4^2\omega_8\omega_5^3v_2^2-12\omega_7\omega_4^3\omega_9\omega_5^2v_2^2+6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2-12cs^2\omega_7\omega_4^2\omega_8\omega_5^3+12\omega_9\omega_7\omega_4^3\omega_8\omega_5v_2^2-36cs^2\omega_9\omega_7^2\omega_4^2v_1^2\omega_5^2-36cs^2\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^3-12cs^2\omega_7\omega_4^3\omega_8\omega_5^3v_2^2+60cs^2\omega_9\omega_7\omega_4^2\omega_8v_1^2\omega_5^2+108\omega_9\omega_7\omega_4^2\omega_8v_1^2\omega_5^3v_2^2-54\omega_9\omega_7^2\omega_4^3\omega_8v_1^2\omega_5v_2^2-6cs^2\omega_9\omega_7^2\omega_4^3\omega_5^2-36\omega_7\omega_4^3\omega_8v_1^2\omega_5^3v_2^2+12\omega_9\omega_7^2\omega_4^2\omega_5^2v_2^2+36\omega_7^2\omega_4^2v_1^2\omega_5^3v_2^2+6cs^2\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2+36cs^2\omega_7\omega_4^3\omega_8v_1^2\omega_5^2+72\omega_9\omega_7^2\omega_4\omega_8v_1^2\omega_5^2v_2^2+36cs^2\omega_9\omega_7\omega_4^2\omega_8\omega_5^3v_2^2-144cs^2\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5^2+18cs^2\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^3+12cs^2\omega_7\omega_4^2\omega_8\omega_5^3v_2^2+6cs^4\omega_9\omega_7^2\omega_4^3\omega_5^2+12cs^4\omega_9\omega_7\omega_4\omega_8\omega_5^3-6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2-6\omega_7^2\omega_4^3\omega_8\omega_5^3v_2^2-12cs^4\omega_9\omega_7^2\omega_4^2\omega_8\omega_5-18cs^2\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2-36cs^2\omega_7\omega_4^3\omega_8v_1^2\omega_5^3-12cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3v_2^2-12\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^3v_2^2+12cs^2\omega_7\omega_4^3\omega_8\omega_5^2v_2^2-12\omega_7^2\omega_4^2\omega_5^3v_2^2+12\omega_7\omega_4^3\omega_8\omega_5^3v_2^2+12cs^2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5-72\omega_9\omega_7\omega_4\omega_8v_1^2\omega_5^3v_2^2+24\omega_9\omega_7\omega_4\omega_8\omega_5^3v_2^2-6cs^2\omega_7^2\omega_4^3\omega_5^3v_2^2+12cs^4\omega_7^2\omega_4^2\omega_5^3-12cs^2\omega_9\omega_7\omega_4\omega_8\omega_5^3-18\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2v_2^2+24cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5^2v_2^2-108cs^2\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5-18cs^2\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2+78cs^2\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5^3-72\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2v_2^2$$

$$C_{15}=-4\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2-2\omega_9\omega_6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^3+4\omega_9\omega_6\omega_4^3\omega_8^2\omega_5^2+2cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^2-4\omega_6\omega_7^2\omega_4^2\omega_8^2v_1^2\omega_5^3+2cs^2\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^3-4\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^3-2cs^2\omega_9\omega_6\omega_7^2\omega_4^3\omega_5^3-7\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^2-2cs^2\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^3+\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^3+3cs^2\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2+11cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^3+4\omega_6\omega_7\omega_4^2\omega_8^2v_1^2\omega_5^3-4\omega_9\omega_6\omega_4^3\omega_8^2\omega_5^3+3\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^3+3\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2+4cs^2\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^3-2cs^2\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2-2\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^3+4cs^2\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^3-2\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5+2cs^2\omega_9\omega_7^2\omega_4^2\omega_8^2\omega_5^3-\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^3+4cs^2\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^3-6cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^3+6\omega_9\omega_6\omega_7\omega_4\omega_8^2\omega_5^3-144cs^2\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5^2+18cs^2\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^3+12cs^2\omega_7\omega_4^2\omega_8\omega_5^3v_2^2+6cs^4\omega_9\omega_7^2\omega_4^3\omega_5^2+12cs^4\omega_9\omega_7\omega_4\omega_8\omega_5^3-6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2-6\omega_7^2\omega_4^3\omega_8\omega_5^3v_2^2-12cs^4\omega_9\omega_7^2\omega_4^2\omega_8\omega_5-18cs^2\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2-36cs^2\omega_7\omega_4^3\omega_8v_1^2\omega_5^3-12cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3v_2^2-12\omega_9\omega_7^2\omega_4^3\omega_8\omega_5v_2^2+12cs^2\omega_7\omega_4^3\omega_8\omega_5^2v_2^2-12\omega_7^2\omega_4^2\omega_5^3v_2^2+12\omega_7\omega_4^3\omega_8\omega_5^3v_2^2+12cs^2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5-72\omega_9\omega_7\omega_4\omega_8v_1^2\omega_5^3v_2^2+24\omega_9\omega_7\omega_4\omega_8\omega_5^3v_2^2-6cs^2\omega_7^2\omega_4^3\omega_5^3v_2^2+12cs^4\omega_7^2\omega_4^2\omega_5^3-12cs^2\omega_9\omega_7\omega_4\omega_8\omega_5^3-18\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2v_2^2+24cs^2\omega_9\omega_7\omega_4^3\omega_8\omega_5^2v_2^2-108cs^2\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5-18cs^2\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2+78cs^2\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5^3-72\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2v_2^2$$

$$C_{16}=36cs^2\omega_9\omega_7\omega_4^2\omega_8^2v_1^2\omega_5+6cs^2\omega_6^2\omega_7\omega_4^3\omega_8\omega_5-6\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5+36cs^4\omega_9\omega_6\omega_4^3\omega_8^2\omega_5-12cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5v_2^2+36cs^2\omega_6^2\omega_4^2\omega_8^2v_1^2\omega_5+72cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2-48\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5+12\omega_9\omega_6\omega_4^3\omega_8^2v_1^2+12\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5v_2^2-60cs^4\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5+12\omega_6^2\omega_4^2\omega_8^2v_1^2\omega_5v_2^2-18cs^2\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5+12\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2\omega_5-6cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_5+6\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2+3cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8\omega_5+18cs^2\omega_9\omega_6^2\omega_7\omega_4^3v_1^2\omega_5-6\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2v_2^2-36cs^2\omega_9\omega_6\omega_4^2\omega_8^2v_1^2\omega_5+54cs^4\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5-45cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5-12cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_5v_2^2-12cs^2\omega_9\omega_6\omega_4^3\omega_8^2\omega_5-36cs^4\omega_6^2\omega_4^3\omega_8^2\omega_5-36cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5-18cs^4\omega_6^2\omega_7\omega_4^3\omega_8\omega_5-6cs^4\omega_9\omega_6^2\omega_7\omega_4^3\omega_5-5cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5v_2^2+12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2v_2^2+12\omega_9\omega_6^2\omega_7\omega_4^2v_1^2\omega_5+12\omega_6^2\omega_4^3\omega_8^2v_1^2\omega_5-12cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5v_2^2+9\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2\omega_5v_2^2-24\omega_9\omega_6\omega_7\omega_4\omega_8^2v_1^2\omega_5+12cs^4\omega_9\omega_6^2\omega_7\omega_4\omega_8\omega_5-6\omega_9\omega_7\omega_4^3\omega_8^2v_1^2\omega_5v_2^2+12cs^2\omega_6^2\omega_4^3\omega_8^2\omega_5+18cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5+15cs^4\omega_9\omega_6^2\omega_7\omega_4^3\omega_8\omega_5+12cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_5+144cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5+36cs^2\omega_9\omega_6\omega_4^3\omega_8^2v_1^2\omega_5+36cs^2\omega_6^2\omega_4^3\omega_8^2v_1^2+6\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2\omega_5v_2^2+12cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5+12cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5+cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5v_2^2-12\omega_6^2\omega_4^2\omega_8^2v_1^2\omega_5-24\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2v_2^2-36cs^2\omega_9\omega_6\omega_4^3\omega_8^2v_1^2+18cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5v_2^2+12\omega_6^2\omega_4^3\omega_8^2v_1^2v_2^2+12cs^2\omega_9\omega_6^2\omega_7\omega_4\omega_8\omega_5-36cs^2\omega_6^2\omega_4^3\omega_8^2v_1^2\omega_5+15\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5+6cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5v_2^2-15\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5v_2^2+12cs^2\omega_6^2\omega_4^3\omega_8^2v_2^2+36cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2+12cs^4\omega_9\omega_6^2\omega_7\omega_4^2\omega_5+36cs^4\omega_6^2\omega_4^3\omega_8^2-12cs^2\omega_9\omega_6^2\omega_7\omega_4\omega_8\omega_5v_2^2-18cs^2\omega_9\omega_7\omega_4^3\omega_8^2v_1^2\omega_5+12\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5-6\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2\omega_5+36cs^2\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5+12\omega_9\omega_6\omega_4^3\omega_8^2v_1^2\omega_5v_2^2-12\omega_9\omega_6\omega_7\omega_4\omega_8^2v_1^2\omega_5v_2^2+72cs^2\omega_9\omega_6\omega_7\omega_4\omega_8^2v_1^2\omega_5-96cs^4\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5-36cs^4\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5+24\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2-18cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5-12cs^2\omega_9\omega_6\omega_4^3\omega_8^2v_2^2-24\omega_9\omega_6^2\omega_7\omega_4\omega_8v_1^2\omega_5v_2^2-6\omega_9\omega_6^2\omega_7\omega_4^3v_1^2\omega_5-12cs^2\omega_9\omega_6^2\omega_7\omega_4\omega_8^2\omega_5+12\omega_9\omega_6\omega_7^2\omega_4^2v_1^2\omega_5-12cs^2\omega_6^2\omega_7^2\omega_4^2\omega_5+6cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2+27cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2\omega_5-15cs^4\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5-18cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2+24\omega_9\omega_6^2\omega_7\omega_4\omega_8v_1^2\omega_5-36cs^2\omega_9\omega_6^2\omega_7\omega_4^2v_1^2\omega_5-12\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2\omega_5v_2^2-12cs^2\omega_9\omega_6\omega_4^3\omega_8^2\omega_5v_2^2-6\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2v_2^2-3cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8\omega_5v_2^2+36cs^4\omega_6^2\omega_7\omega_4^2\omega_8\omega_5-18cs^4\omega_6^2\omega_7\omega_4^3\omega_8^2-6cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2+6cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_2^2+36cs^4\omega_6^2\omega_4^2\omega_8^2\omega_5+12cs^2\omega_9\omega_6\omega_4^2\omega_8^2\omega_5+6cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_5v_2^2+3cs^4\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5-12\omega_9\omega_7\omega_4^2\omega_8^2v_1^2\omega_5+12cs^2\omega_9\omega_6^2\omega_7\omega_4\omega_8^2\omega_5v_2^2+6\omega_9\omega_6^2\omega_7\omega_4^3v_1^2\omega_5v_2^2+36\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2\omega_5+6\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5v_2^2-6cs^2\omega_6^2\omega_7\omega_4^3\omega_8\omega_5v_2^2-18cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8\omega_5-24\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2-12\omega_9\omega_6\omega_4^3\omega_8^2v_1^2\omega_5v_2^2+12cs^2\omega_9\omega_6\omega_7\omega_4\omega_8^2\omega_5+18cs^4\omega_9\omega_6\omega_7\omega_4^3\omega_8^2-6cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2v_2^2+48\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5v_2^2-36cs^4\omega_9\omega_6\omega_4^2\omega_8^2\omega_5+12cs^2\omega_6^2\omega_4^2\omega_8^2\omega_5v_2^2-12cs^2\omega_6^2\omega_7\omega_4^2\omega_8\omega_5+6\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5-36cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2\omega_5-12\omega_9\omega_6\omega_4^3\omega_8^2v_1^2v_2^2-18cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2+6\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2-12cs^2\omega_9\omega_6\omega_7\omega_4\omega_8^2\omega_5v_2^2+$$

$$12cs^2\omega_6^2\omega_7\omega_4^2\omega_8\omega_5v_2^2+5cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5-12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2+18cs^4\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5+6\omega_9\omega_7\omega_4^3\omega_8^2v_1^2\omega_5-12\omega_6^2\omega_4^3\omega_8^2v_1^2\omega_5v_2^2-9\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2\omega_5-12\omega_9\omega_6^2\omega_7\omega_4^2v_1^2\omega_5v_2^2-72cs^2\omega_9\omega_6^2\omega_7\omega_4\omega_8v_1^2\omega_5+24\omega_9\omega_6\omega_7\omega_4\omega_8^2v_1^2\omega_5v_2^2+18cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2\omega_5-12\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5-6\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5v_2^2-12cs^2\omega_6^2\omega_4^3\omega_8^2\omega_5v_2^2+156cs^4\omega_9\omega_6^2\omega_7\omega_4\omega_8^2\omega_5-72cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2-36\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2\omega_5v_2^2-108cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2\omega_5-12\omega_6^2\omega_4^3\omega_8^2v_1^2+12\omega_9\omega_7\omega_4^2\omega_8^2v_1^2\omega_5v_2^2-6cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5-12cs^2\omega_6^2\omega_4^3\omega_8^2-36cs^4\omega_9\omega_6\omega_7\omega_4\omega_8^2\omega_5-12\omega_9\omega_6\omega_4^3\omega_8^2v_1^2\omega_5+12cs^2\omega_9\omega_6\omega_4^3\omega_8^2-42cs^4\omega_9\omega_6^2\omega_7\omega_4^2\omega_8\omega_5+18cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8\omega_5v_2^2+24\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2v_2^2+12cs^2\omega_9\omega_6\omega_4^3\omega_8^2\omega_5v_2^2-cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5-36cs^4\omega_9\omega_6\omega_4^3\omega_8^2$$

$$C_{17}=12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2+24cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2-12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^2v_2^2-24\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2+12cs^2\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2-18\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2+3cs^2\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2-12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5v_2^2-72cs^2\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5+12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2v_2^2+12cs^2\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2+24cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2-12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5-12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2+36\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2-24\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2v_2^2-24cs^2\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5+18\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2+12\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2v_2^2-12\omega_9\omega_7^2\omega_4^2\omega_8^2\omega_5^2-132cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2+12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_5^2v_2^2+24\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2v_2^2+90cs^2\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2+12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5v_2^2+48cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5+12\omega_9\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^2v_2^2+18\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2+12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5+12cs^2\omega_9\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^2+24cs^2\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2-12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2+66\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2v_2^2-6\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2+36cs^2\omega_9\omega_7^2\omega_4^2\omega_8^2\omega_5^2+156cs^2\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2+6\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2-24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2v_2^2-12cs^2\omega_9\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^2-24\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2+24cs^2\omega_9\omega_6^2\omega_4^2\omega_8^2\omega_5^2-12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5-12cs^2\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5-4\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2+6\omega_9\omega_7^2\omega_4^3\omega_8^2\omega_5^2-24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5v_2^2+12cs^2\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5+60cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2-36cs^2\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2+24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5-24cs^2\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2-24cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2-42cs^2\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2-12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2v_2^2+12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2+24cs^2\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_5^2-6\omega_9\omega_7^2\omega_4^3\omega_8^2\omega_5^2v_2^2-66cs^2\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2+4\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2v_2^2+24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2-12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2v_2^2+24cs^2\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5-\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2-24\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5-24cs^2\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2+12\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2+24\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2v_2^2-24cs^2\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2+\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2v_2^2+24\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2+6cs^2\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2-12\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2+24\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2v_2^2+12\omega_9\omega_7^2\omega_4^2\omega_8^2\omega_5^2v_2^2-18\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2v_2^2+12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2+18\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2-12\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2+84cs^2\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5-66\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2+24cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5+12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5v_2^2-96cs^2\omega_9\omega_6^2\omega_7^2\omega_8^2\omega_5^2+24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2-12cs^2\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2+72cs^2\omega_9\omega_6^2\omega_7\omega_4\omega_8^2\omega_5^2+12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2v_2^2-12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_5^2-24cs^2\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2-24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_5^2v_2^2-48cs^2\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_5^2-84cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5-12\omega_9\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^2-12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5v_2^2-36\omega_9\omega_6^2\omega_7^2\omega_4\omega_8\omega_5^2v_2^2$$

$$C_{18}=12cs^2\omega_9\omega_7\omega_4^2\omega_8^2v_1^2\omega_5+6cs^2\omega_6^2\omega_7\omega_4^3\omega_8\omega_5-6\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5+12cs^4\omega_9\omega_6\omega_4^3\omega_8^2\omega_5-36cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5v_2^2+12cs^2\omega_6^2\omega_4^2\omega_8^2v_1^2\omega_5+24cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2-48\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2\omega_5+12\omega_9\omega_6\omega_4^3\omega_8^2v_1^2-48cs^2\omega_9\omega_6^2\omega_7\omega_8^2\omega_5v_2^2+36\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5v_2^2-5cs^4\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5+36\omega_6^2\omega_4^2\omega_8^2v_1^2\omega_5v_2^2-6cs^2\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5+12\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2\omega_5+6\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2-6cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8\omega_5+6cs^2\omega_9\omega_6^2\omega_7\omega_4^3v_1^2\omega_5-18\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2v_2^2-12cs^2\omega_9\omega_6\omega_4^2\omega_8^2v_1^2\omega_5+18cs^4\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5-15cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5+24cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_5v_2^2-12cs^2\omega_9\omega_6\omega_4^3\omega_8^2\omega_5-12cs^4\omega_6^2\omega_4^3\omega_8^2\omega_5-12cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5-6cs^4\omega_6^2\omega_7\omega_4^3\omega_8\omega_5-15cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5v_2^2+36\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2v_2^2+12\omega_9\omega_6^2\omega_7\omega_4^2v_1^2\omega_5+12\omega_6^2\omega_4^3\omega_8^2v_1^2\omega_5-15cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5v_2^2+27\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2\omega_5v_2^2-24\omega_9\omega_6\omega_7\omega_4\omega_8^2v_1^2\omega_5+12cs^4\omega_9\omega_6^2\omega_7\omega_4\omega_8\omega_5-18\omega_9\omega_7\omega_4^3\omega_8^2v_1^2\omega_5v_2^2+12cs^2\omega_6^2\omega_4^3\omega_8^2\omega_5+6cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5+6cs^4\omega_9\omega_6^2\omega_7\omega_4^3\omega_8\omega_5+48cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5+12cs^2\omega_9\omega_6\omega_4^3\omega_8^2v_1^2\omega_5+12cs^2\omega_6^2\omega_4^3\omega_8^2v_1^2+18\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2\omega_5v_2^2+cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5+12cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5-12\omega_6^2\omega_4^2\omega_8^2v_1^2\omega_5-72\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2v_2^2-12cs^2\omega_9\omega_6\omega_4^3\omega_8^2v_1^2+54cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5v_2^2+36\omega_6^2\omega_4^3\omega_8^2v_1^2v_2^2-12cs^2\omega_9\omega_6^2\omega_7\omega_4\omega_8\omega_5-12cs^2\omega_6^2\omega_4^3\omega_8^2v_1^2\omega_5+15\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5+18cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5v_2^2-45\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5v_2^2+36cs^2\omega_6^2\omega_4^3\omega_8^2v_1^2v_2^2+12cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2+12cs^4\omega_6^2\omega_4^3\omega_8^2+60cs^2\omega_9\omega_6^2\omega_7\omega_4\omega_8\omega_5v_2^2-6cs^2\omega_9\omega_7\omega_4^3\omega_8^2v_1^2\omega_5+12\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5-6\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2\omega_5+12cs^2\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5+36\omega_9\omega_6\omega_4^3\omega_8^2v_1^2\omega_5v_2^2-36\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5v_2^2+24cs^2\omega_9\omega_6\omega_7\omega_4\omega_8^2v_1^2\omega_5-12cs^4\omega_9\omega_6^2\omega_7\omega_8^2\omega_5-12cs^4\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5+24\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2-18cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5-36cs^2\omega_9\omega_6\omega_4^3\omega_8^2v_1^2-72\omega_9\omega_6^2\omega_7\omega_4\omega_8v_1^2\omega_5v_2^2-6\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2\omega_5+12\omega_9\omega_6\omega_4^3\omega_8^2v_1^2\omega_5-12cs^2\omega_6^2\omega_4^3\omega_8^2\omega_5+6cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2+9cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2\omega_5-5cs^4\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5-6cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2+24\omega_9\omega_6^2\omega_7\omega_4\omega_8v_1^2\omega_5-12cs^2\omega_9\omega_6^2\omega_7\omega_4^2v_1^2\omega_5-36\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2\omega_5v_2^2-36cs^2\omega_9\omega_6\omega_4^2\omega_8^2\omega_5v_2^2-18\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2v_2^2+30cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_8\omega_5v_2^2+12cs^4\omega_6^2\omega_7\omega_4^2\omega_8\omega_5-6cs^4\omega_6^2\omega_7\omega_4^3\omega_8^2-6cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2+18cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_2^2+12cs^4\omega_6^2\omega_4^2\omega_8^2\omega_5+12cs^2\omega_9\omega_6\omega_4^2\omega_8^2\omega_5-12cs^2\omega_9\omega_6^2\omega_7\omega_4^3\omega_5v_2^2-cs^4\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5-12\omega_9\omega_7\omega_4^2\omega_8^2v_1^2\omega_5+60cs^2\omega_9\omega_6^2\omega_7\omega_4\omega_8^2\omega_5v_2^2+18\omega_9\omega_6^2\omega_7\omega_4^3v_1^2\omega_5v_2^2+36\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2\omega_5+18\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5v_2^2-18cs^2\omega_6^2\omega_7\omega_4^3\omega_8\omega_5v_2^2+18cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8\omega_5-24\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2-36\omega_9\omega_6\omega_4^2\omega_8^2v_1^2\omega_5v_2^2+12cs^2\omega_9\omega_6\omega_7\omega_4\omega_8^2\omega_5+6cs^4\omega_9\omega_6\omega_7\omega_4^3\omega_8^2-18cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2v_2^2+144\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5v_2^2-12cs^4\omega_9\omega_6\omega_4^2\omega_8^2\omega_5+36cs^2\omega_6^2\omega_4^2\omega_8^2\omega_5v_2^2-12cs^2\omega_6^2\omega_7\omega_4^2\omega_8\omega_5+6\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5-12cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2\omega_5-36\omega_9\omega_6\omega_4^3\omega_8^2v_1^2v_2^2-6cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2+6\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2-36cs^2\omega_9\omega_6\omega_7\omega_4\omega_8^2\omega_5v_2^2+36cs^2\omega_6^2\omega_7\omega_4^2\omega_8\omega_5v_2^2+5cs^2\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5-12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2+6cs^4\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5+6\omega_9\omega_7\omega_4^3\omega_8^2v_1^2\omega_5-36\omega_6^2\omega_4^3\omega_8^2v_1^2\omega_5v_2^2-9\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2\omega_5-36\omega_9\omega_6^2\omega_7\omega_4^2v_1^2\omega_5v_2^2-24cs^2\omega_9\omega_6^2\omega_7\omega_4\omega_8v_1^2\omega_5+72\omega_9\omega_6\omega_7\omega_4\omega_8^2v_1^2\omega_5v_2^2+6cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2\omega_5-12\omega_6^2\omega_7\omega_4^2\omega_8v_1^2\omega_5-18\omega_6^2\omega_7\omega_4^3\omega_8v_1^2\omega_5v_2^2-36cs^2\omega_6^2\omega_4^3\omega_8^2\omega_5v_2^2+18cs^4\omega_9\omega_6^2\omega_7\omega_4\omega_8^2\omega_5-24cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2-108\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2\omega_5v_2^2-36cs^2\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2\omega_5-12\omega_6^2\omega_4^3\omega_8^2v_1^2+36\omega_9\omega_7\omega_4^2\omega_8^2v_1^2\omega_5v_2^2-6cs^2\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5-12cs^2\omega_6^2\omega_4^3\omega_8^2-12cs^4\omega_9\omega_6\omega_7\omega_4\omega_8^2\omega_5-12\omega_9\omega_6\omega_4^3\omega_8^2v_1^2\omega_5+12cs^2\omega_9\omega_6\omega_4^3\omega_8^2-18cs^4\omega_9\omega_6^2\omega_7\omega_4^2\omega_8\omega_5-102cs^2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8\omega_5v_2^2+72\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2v_2^2+36cs^2\omega_9\omega_6\omega_4^3\omega_8^2\omega_5v_2^2-12cs^4\omega_9\omega_6\omega_4^3\omega_8^2$$

$$C_{19}=-48\omega_6^2\omega_8v_2^4-216cs^2\omega_6^2\omega_8v_2^2-24\omega_6\omega_4^2\omega_8v_2^2+24cs^4\omega_4\omega_8^2-24\omega_6^2\omega_4v_2^4-144cs^2\omega_6^2\omega_4v_2^2-48\omega_6\omega_4\omega_8v_2^4-24cs^4\omega_6^2\omega_8-48cs^4\omega_6\omega_4\omega_8^2+36\omega_4^2\omega_8^2v_2^2+96\omega_6\omega_4\omega_8^2v_2^2-12\omega_6^2\omega_4^2v_2^2-48cs^2\omega_6^2\omega_4\omega_8+48\omega_6\omega_8^2v_2^4+216cs^2\omega_6\omega_8^2v_2^2-cs^4\omega_6^2\omega_4^2\omega_8^2-126cs^2\omega_6^2\omega_4^2\omega_8v_2^2+288cs^2\omega_4\omega_8^2v_2^2+36\omega_6\omega_4^2\omega_8^2v_2^4+72\omega_4\omega_8^2v_2^4-30\omega_6^2\omega_4^2\omega_8v_2^4-12cs^4\omega_6^2\omega_4^2\omega_8+150cs^2\omega_6\omega_4^2\omega_8^2v_2^2-24cs^2\omega_4\omega_8^2+24cs^2\omega_6^2\omega_8-96\omega_6^2\omega_4\omega_8v_2^2-144cs^2\omega_6\omega_4\omega_8v_2^2-14cs^2\omega_6\omega_4^2\omega_8^2+3\omega_6^2\omega_4^2\omega_8^2v_2^2+24cs^4\omega_6\omega_8^2-432cs^2\omega_6\omega_4\omega_8^2v_2^2+96\omega_6^2\omega_4\omega_8v_2^4+30\omega_6^2\omega_4^2\omega_8v_2^2+48cs^2\omega_6\omega_4\omega_8^2-24cs^4\omega_6^2\omega_4+72cs^2\omega_6\omega_4^2\omega_8v_2^2+48cs^4\omega_6^2\omega_4\omega_8-3\omega_6^2\omega_4^2\omega_8^2v_2^2+12cs^2\omega_4^2\omega_8^2-12cs^2\omega_6^2\omega_4^2+cs^2\omega_6^2\omega_4^2\omega_8^2+24\omega_6^2\omega_4v_2^2+48\omega_6\omega_4\omega_8v_2^2-24cs^2\omega_6\omega_8^2+12cs^2\omega_6^2\omega_4^2\omega_8+48\omega_6^2\omega_8v_2^2+24cs^2\omega_6^2\omega_4+24\omega_6\omega_4^2\omega_8v_2^4-12cs^2\omega_6^2\omega_4^2\omega_8^2v_2^2-12cs^4\omega_4^2\omega_8^2-72\omega_4\omega_8^2v_2^2-36\omega_6\omega_4^2\omega_8^2v_2^2+12cs^4\omega_6^2\omega_4^2+72cs^2\omega_6^2\omega_4^2v_2^2-96\omega_6\omega_4\omega_8^2v_2^4-36\omega_4^2\omega_8^2v_2^4+432cs^2\omega_6^2\omega_4\omega_8v_2^2-144cs^2\omega_4^2\omega_8^2v_2^2+12\omega_6^2\omega_4^2v_2^4-48\omega_6\omega_8^2v_2^2+14cs^4\omega_6\omega_4^2\omega_8^2$$

$$C_{20}=48\omega_4\omega_8v_2^2-48cs^4\omega_4\omega_8^2+24\omega_4^2v_2^2+48cs^2\omega_4^2\omega_8v_2^2+72\omega_4^2\omega_8v_2^4+24\omega_4^2\omega_8^2v_2^2+156cs^2\omega_4\omega_8^2v_2^2-24cs^2\omega_4\omega_8+24\omega_4\omega_8^2v_2^4+6cs^2\omega_4^3\omega_8^2v_2^2+3\omega_4^3\omega_8^2v_2^4+12cs^2\omega_4\omega_8^2-12\omega_4^3v_2^2+18\omega_4^3\omega_8v_2^2+24cs^4\omega_4\omega_8-6cs^2\omega_4^3\omega_8+12\omega_4^3v_2^4+24cs^4\omega_8^2-3\omega_4^3\omega_8^2v_2^2-24cs^4\omega_4^2\omega_8+18\omega_4^3\omega_8v_2^4-12cs^2\omega_4^3\omega_8v_2^2-8cs^2\omega_4^2\omega_8^2-3cs^4\omega_4^3\omega_8^2+12cs^2\omega_4^3v_2^2-72\omega_4^2\omega_8v_2^2+6cs^4\omega_4^3\omega_8-48\omega_4\omega_8v_2^4+24cs^2\omega_4^2\omega_8-24cs^2\omega_4\omega_8v_2^2-24\omega_4^2v_2^4-24cs^2\omega_4^2v_2^2+24cs^4\omega_4^2\omega_8^2-24\omega_4\omega_8^2v_2^2+cs^2\omega_4^3\omega_8^2-24\omega_4^2\omega_8^2v_2^2-96cs^2\omega_8^2v_2^2-72cs^2\omega_4^2\omega_8^2v_2^2$$

$$C_{21}=12cs^2\omega_6\omega_4^2\omega_8+36\omega_6\omega_4^2\omega_8v_2^2+21\omega_6^2\omega_4^2\omega_8-60\omega_4^2\omega_8^2v_2^2-168\omega_6\omega_4\omega_8^2v_2^2+24\omega_6^2\omega_4^2v_2^2+120cs^2\omega_6^2\omega_4\omega_8-36\omega_6\omega_8^2+24\omega_6\omega_4\omega_8+24\omega_6^2\omega_4-12\omega_6^2\omega_4^2+72\omega_6\omega_4\omega_8^2+24\omega_4^2\omega_8^2+72cs^2\omega_4\omega_8^2-60cs^2\omega_6^2\omega_8+168\omega_6^2\omega_4\omega_8v_2^2+2\omega_6^2\omega_4^2\omega_8^2+39cs^2\omega_6\omega_4^2\omega_8^2-5\omega_6^2\omega_4^2\omega_8^2v_2^2-51\omega_6^2\omega_4^2\omega_8v_2^2-120cs^2\omega_6\omega_4\omega_8^2-25\omega_6\omega_4^2\omega_8^2-48\omega_4\omega_8^2-36cs^2\omega_4^2\omega_8^2+24cs^2\omega_6^2\omega_4^2+36\omega_6^2\omega_8-3cs^2\omega_6^2\omega_4^2\omega_8^2-48\omega_6^2\omega_4v_2^2-72\omega_6\omega_4\omega_8v_2^2+$$

$60cs^2\omega_6\omega_8^2 - 33cs^2\omega_6^2\omega_4^2\omega_8 - 84\omega_6^2\omega_8\omega_2^2 - 12\omega_6\omega_4^2\omega_8 - 48cs^2\omega_6^2\omega_4 - 24cs^2\omega_6\omega_4\omega_8 + 120\omega_4\omega_8^2\omega_2^2 + 61\omega_6\omega_4^2\omega_8^2\omega_2^2 + 84\omega_6\omega_8^2\omega_2^2 - 72\omega_6^2\omega_4\omega_8$

2.3.4 Conservation of momentum: ρv_2

attached text file: `output_d2q9_nse_mrt2_symbolic_pde_02.txt`

$$v_2\frac{\partial\rho}{\partial t} + \rho\frac{\partial v_2}{\partial t} + \frac{\delta_l v_1 v_2}{\delta_t}\frac{\partial\rho}{\partial x_1} + \frac{\delta_l\rho v_2}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\delta_l\rho v_1}{\delta_t}\frac{\partial v_2}{\partial x_1} + (v_2^2+cs^2)\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \frac{2\delta_l\rho v_2}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-2+\omega_4)\frac{\delta_l^2cs^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_1} +$$
$$(-2+\omega_4)\frac{\delta_l^2cs^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_2} + (-2+\omega_6-3\omega_6v_2^2+6v_2^2-2\omega_6cs^2+4cs^2)\frac{\delta_l^2}{\omega_6\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_2} + (2-\omega_6)\frac{3\delta_l^2\rho v_2}{\omega_6\delta_t}\left(\frac{\partial v_2}{\partial x_2}\right)^2 +$$
$$(-2+\omega_4)\frac{\delta_l^2\rho cs^2}{2\delta_t\omega_4}\frac{\partial^2 v_2}{\partial x_1^2} + (-2+\omega_4)\frac{\delta_l^2\rho cs^2}{2\delta_t\omega_4}\frac{\partial^2 v_1}{\partial x_1\partial x_2} + (-2+\omega_6-\omega_6v_2^2+2v_2^2-3\omega_6cs^2+6cs^2)\frac{\delta_l^2v_2}{2\omega_6\delta_t}\frac{\partial^2\rho}{\partial x_2^2} +$$
$$(-2+\omega_6-3\omega_6v_2^2+6v_2^2-\omega_6cs^2+2cs^2)\frac{\delta_l^2\rho}{2\omega_6\delta_t}\frac{\partial^2 v_2}{\partial x_2^2} + C_1\frac{\delta_l^3v_1v_2}{12\delta_t\omega_7\omega_4\omega_5}\frac{\partial^3\rho}{\partial x_1^3} + C_2\frac{\delta_l^3\rho v_2}{12\delta_t\omega_7\omega_4\omega_5}\frac{\partial^3 v_1}{\partial x_1^3} + C_3\frac{\delta_l^3\rho v_1}{6\delta_t\omega_7\omega_4^2}\frac{\partial^3 v_2}{\partial x_1^3} +$$
$$(-12+12\omega_4-\omega_4^2)\frac{\delta_l^3cs^4}{6\delta_t\omega_4^2}\frac{\partial^3\rho}{\partial x_1^2\partial x_2} + (\omega_7\omega_4-2\omega_7+2\omega_4-\omega_4^2)\frac{\delta_l^3\rho cs^2v_1}{\delta_t\omega_7\omega_4^2}\frac{\partial^3 v_1}{\partial x_1^2\partial x_2} +$$
$$(12\omega_6\omega_4\omega_8-12\omega_6\omega_8-12\omega_6\omega_4^2+12\omega_4^2+12\omega_6\omega_4-12\omega_4\omega_8-\omega_6\omega_4^2\omega_8)\frac{\delta_l^3\rho cs^2v_2}{6\omega_6\delta_t\omega_4^2\omega_8}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2} + C_4\frac{\delta_l^3v_1v_2}{\omega_6^2\delta_t\omega_4\omega_8}\frac{\partial^3\rho}{\partial x_1\partial x_2^2} +$$
$$C_5\frac{\delta_l^3\rho v_2}{12\omega_6^2\delta_t\omega_4^2\omega_8}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2} + C_6\frac{\delta_l^3\rho v_1}{\omega_6^2\delta_t\omega_4\omega_8}\frac{\partial^3 v_2}{\partial x_1\partial x_2^2} + C_7\frac{\delta_l^3}{12\omega_6^2\delta_t}\frac{\partial^3\rho}{\partial x_2^3} +$$
$$(-24+5\omega_6^2cs^2+24\omega_6-60\omega_6v_2^2+60v_2^2+11\omega_6^2v_2^2-4\omega_6^2-36\omega_6cs^2+36cs^2)\frac{\delta_l^3\rho v_2}{6\omega_6^2\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} + C_8\frac{\delta_l^4v_2}{24\delta_t\omega_7^2\omega_4^2\omega_5^2}\frac{\partial^4\rho}{\partial x_1^4} +$$
$$C_9\frac{\delta_l^4\rho v_1v_2}{12\delta_t\omega_7^2\omega_4^2\omega_5^2}\frac{\partial^4 v_1}{\partial x_1^4} + C_{10}\frac{\delta_l^4\rho}{24\delta_t\omega_7^2\omega_4^3}\frac{\partial^4 v_2}{\partial x_1^4} + C_{11}\frac{\delta_l^4v_1}{12\omega_9\omega_6\delta_t\omega_7^2\omega_4^3\omega_8\omega_5^2}\frac{\partial^4\rho}{\partial x_1^3\partial x_2} + C_{12}\frac{\delta_l^4\rho}{12\omega_9\omega_6\delta_t\omega_7^2\omega_4^3\omega_8\omega_5^2}\frac{\partial^4 v_1}{\partial x_1^3\partial x_2} +$$
$$C_{13}\frac{\delta_l^4\rho v_1v_2}{12\omega_9\omega_6^2\delta_t\omega_7^2\omega_4^3\omega_8^2\omega_5^2}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2} + C_{14}\frac{\delta_l^4v_2}{12\omega_9\omega_6^3\delta_t\omega_7\omega_4^3\omega_8^2}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} + C_{15}\frac{\delta_l^4\rho v_1v_2}{2\omega_9\omega_6^3\delta_t\omega_7^2\omega_4^3\omega_8^2\omega_5}\frac{\partial^4 v_1}{\partial x_1^2\partial x_2^2} +$$
$$C_{16}\frac{\delta_l^4\rho}{12\omega_9\omega_6^3\delta_t\omega_7\omega_4^3\omega_8^2}\frac{\partial^4 v_2}{\partial x_1^2\partial x_2^2} + C_{17}\frac{\delta_l^4v_1}{4\omega_6^3\delta_t\omega_4^2\omega_8^2}\frac{\partial^4\rho}{\partial x_1\partial x_2^3} + C_{18}\frac{\delta_l^4\rho}{12\omega_6^3\delta_t\omega_4^3\omega_8^2}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3} + C_{19}\frac{\delta_l^4\rho v_1v_2}{4\omega_6^3\delta_t\omega_4^2\omega_8^2}\frac{\partial^4 v_2}{\partial x_1\partial x_2^3} +$$
$$C_{20}\frac{\delta_l^4v_2}{12\omega_6^3\delta_t}\frac{\partial^4\rho}{\partial x_2^4} + C_{21}\frac{\delta_l^4\rho}{12\omega_6^3\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0,$$

where:

$C_1 = 18\omega_4cs^2\omega_5 + 6\omega_7\omega_4 - 18\omega_7\omega_4cs^2 + 36\omega_7cs^2 + 6\omega_4v_1^2\omega_5 + 12\omega_7v_1^2 - 12\omega_7 - 12v_1^2\omega_5 - 6\omega_7\omega_4v_1^2 + \omega_7\omega_4v_1^2\omega_5 - 6\omega_4\omega_5 - \omega_7\omega_4\omega_5 + 3\omega_7\omega_4cs^2\omega_5 + 12\omega_5 - 36cs^2\omega_5$

$C_2 = 6\omega_4cs^2\omega_5 + 6\omega_7\omega_4 - 6\omega_7\omega_4cs^2 + 12\omega_7cs^2 + 18\omega_4v_1^2\omega_5 + 36\omega_7v_1^2 - 12\omega_7 - 36v_1^2\omega_5 - 18\omega_7\omega_4v_1^2 + 3\omega_7\omega_4v_1^2\omega_5 - 6\omega_4\omega_5 - \omega_7\omega_4\omega_5 + \omega_7\omega_4cs^2\omega_5 + 12\omega_5 - 12cs^2\omega_5$

$C_3 = -3\omega_7\omega_4 + 15\omega_7\omega_4cs^2 + 3\omega_4^2v_1^2 - 12\omega_7cs^2 - \omega_7\omega_4^2v_1^2 + \omega_7\omega_4^2 - 6\omega_4cs^2 + 3\omega_4^2cs^2 + 6\omega_4 + 3\omega_7\omega_4v_1^2 - 3\omega_4^2 - 6\omega_4v_1^2 - 3\omega_7\omega_4^2cs^2$

$C_4 = \omega_4\omega_8v_2^2 - \omega_6\omega_4v_2^2 - 3\omega_6^2cs^2 + \omega_6\omega_8v_2^2 + \omega_6\omega_4\omega_8 - \omega_6^2\omega_4 + 3\omega_6^2\omega_4cs^2 - \omega_6\omega_8 + 3\omega_4cs^2\omega_8 + 3\omega_6cs^2\omega_8 - \omega_6^2v_2^2 - 3\omega_6\omega_4cs^2 - 3\omega_6\omega_4cs^2\omega_8 + \omega_6^2\omega_4v_2^2 - \omega_6\omega_4\omega_8v_2^2 + \omega_6\omega_4 - \omega_4\omega_8 + \omega_6^2$

$C_5 = -6\omega_6\omega_4^2\omega_8v_2^2 + 3\omega_6^2\omega_4^2\omega_8 + 12\omega_6^2\omega_4^2v_2^2 - 12\omega_4^2\omega_8 + 12\omega_6^2\omega_4 + 42\omega_6^2\omega_4cs^2\omega_8 - 12\omega_6^2\omega_4^2 - 12\omega_6^2\omega_4cs^2 + 6\omega_6^2\omega_4\omega_8v_2^2 - 18\omega_6\omega_4^2cs^2\omega_8 - 12\omega_6\omega_4^2cs^2 - 3\omega_6^2\omega_4^2\omega_8v_2^2 - 24\omega_6\omega_4cs^2\omega_8 + 36\omega_4^2cs^2\omega_8 + 12\omega_6\omega_4^2 - 24\omega_6^2cs^2\omega_8 + 12\omega_6^2\omega_4^2cs^2 - 12\omega_6^2\omega_4v_2^2 + 12\omega_4^2\omega_8v_2^2 + 6\omega_6\omega_4^2\omega_8 - 12\omega_6\omega_4^2v_2^2 - 11\omega_6^2\omega_4^2cs^2\omega_8 - 6\omega_6^2\omega_4\omega_8$

$C_6 = 3\omega_4\omega_8v_2^2 - 3\omega_6\omega_4v_2^2 - \omega_6^2cs^2 + 3\omega_6\omega_8v_2^2 + \omega_6\omega_4\omega_8 - \omega_6^2\omega_4 + \omega_6^2\omega_4cs^2 - \omega_6\omega_8 + \omega_4cs^2\omega_8 + \omega_6cs^2\omega_8 - 3\omega_6^2v_2^2 - \omega_6\omega_4cs^2 - \omega_6\omega_4cs^2\omega_8 + 3\omega_6^2\omega_4v_2^2 - 3\omega_6\omega_4\omega_8v_2^2 + \omega_6\omega_4 - \omega_4\omega_8 + \omega_6^2$

$C_7 = -\omega_6^2cs^2 - 12\omega_6cs^4 + 12cs^4 - 144\omega_6cs^2v_2^2 + 7\omega_6^2v_2^4 + 36\omega_6v_2^2 - 36v_2^2 - 7\omega_6^2v_2^2 + 24\omega_6^2cs^2v_2^2 + 144cs^2v_2^2 - 36\omega_6v_2^4 + 36v_2^4 + \omega_6^2cs^4 + 12\omega_6cs^2 - 12cs^2$

$C_8 = 30\omega_7\omega_4^2v_1^2\omega_5^2 + 24\omega_7^2\omega_4cs^4 + 48\omega_7\omega_4cs^4\omega_5^2 + 150\omega_7^2\omega_4^2cs^2v_1^2\omega_5 + 24\omega_4v_1^2\omega_5^2 + 12\omega_4^2cs^4\omega_5^2 - 48\omega_7\omega_4v_1^4\omega_5 + 96\omega_7^2\omega_4v_1^2\omega_5 + 14\omega_7^2\omega_4^2cs^4\omega_5 - 48\omega_7v_1^4\omega_5^2 - 48\omega_7^2v_1^2\omega_5 + 288\omega_7^2\omega_4cs^2v_1^2 - 3\omega_7^2\omega_4^2v_1^4\omega_5^2 + 12\omega_7^2\omega_4^2cs^2 + 72\omega_7\omega_4^2cs^2v_1^2\omega_5 + 48\omega_7^2\omega_4cs^2\omega_5 + 36\omega_7^2\omega_4^2v_1^4\omega_5 - 126\omega_7\omega_4^2cs^2v_1^2\omega_5^2 - 24\omega_7cs^4\omega_5^2 - 24\omega_7^2cs^2\omega_5 - 216\omega_7cs^2v_1^2\omega_5^2 - \omega_7^2\omega_4^2cs^4\omega_5^2 - 36\omega_7^2\omega_4^2v_1^4 + 12\omega_7\omega_4^2cs^2\omega_5^2 - 144\omega_4cs^2v_1^2\omega_5^2 - 72\omega_7^2\omega_4v_1^2 + 96\omega_7\omega_4v_1^4\omega_5^2 - 24\omega_7\omega_4^2v_1^2\omega_5 + 24\omega_4cs^2\omega_5^2 - 12\omega_7^2\omega_4^2cs^2v_1^2\omega_5^2 + 12\omega_4^2v_1^4\omega_5^2 - 96\omega_7^2\omega_4v_1^4\omega_5 - 14\omega_7^2\omega_4^2cs^2\omega_5 + 36\omega_7^2\omega_4^2v_1^2 + 48\omega_7v_1^2\omega_5^2 + 48\omega_7^2v_1^4\omega_5 - 432\omega_7^2\omega_4cs^2v_1^2\omega_5 + 3\omega_7^2\omega_4^2v_1^2\omega_5^2 - 30\omega_7\omega_4^2v_1^4\omega_5^2 - 144\omega_7\omega_4cs^2v_1^2\omega_5 - 48\omega_7\omega_4cs^2\omega_5^2 - 24\omega_4v_1^4\omega_5^2 + 72\omega_7^2\omega_4v_1^4 + 48\omega_7\omega_4v_1^2\omega_5 + 216\omega_7^2cs^2v_1^2\omega_5 - 12\omega_4^2cs^2\omega_5^2 - 12\omega_7\omega_4^2cs^4\omega_5^2 - 96\omega_7\omega_4v_1^2\omega_5^2 - 24\omega_4cs^4\omega_5^2 + 24\omega_7\omega_4^2v_1^4\omega_5 + 432\omega_7\omega_4cs^2v_1^2\omega_5^2 - 24\omega_7^2\omega_4cs^2 - 12\omega_4^2v_1^2\omega_5^2 - 48\omega_7^2\omega_4cs^4\omega_5 - 36\omega_7^2\omega_4^2v_1^2\omega_5 - 12\omega_7^2\omega_4^2cs^4 + 24\omega_7cs^2\omega_5^2 + 24\omega_7^2cs^4\omega_5 + 72\omega_4^2cs^2v_1^2\omega_5^2 + \omega_7^2\omega_4^2cs^2\omega_5^2 - 144\omega_7^2\omega_4^2cs^2v_1^2$

$C_9 = -51\omega_7\omega_4^2v_1^2\omega_5^2 - 48\omega_4v_1^2\omega_5^2 + 12\omega_7\omega_4^2cs^2\omega_5 - 36\omega_7^2\omega_5 + 72\omega_7^2\omega_4\omega_5 - 168\omega_7^2\omega_4v_1^2\omega_5 - 12\omega_4^2\omega_5^2 + 84\omega_7^2v_1^2\omega_5 - 12\omega_7\omega_4^2\omega_5 - 36\omega_7^2\omega_4^2cs^2 + 21\omega_7\omega_4^2\omega_5^2 - 120\omega_7^2\omega_4cs^2\omega_5 + 60\omega_7^2cs^2\omega_5 - 33\omega_7^2\omega_4^2cs^2\omega_5^2 + 120\omega_7^2\omega_4v_1^2 + 36\omega_7\omega_4^2v_1^2\omega_5 - 48\omega_4cs^2\omega_5^2 + 36\omega_7\omega_5^2 + 24\omega_7^2\omega_4^2 + 2\omega_7^2\omega_4^2\omega_5^2 +$

$$39\omega_7^2\omega_4^2cs^2\omega_5 - 60\omega_7^2\omega_4^2v_1^2 - 84\omega_7v_1^2\omega_5^2 - 5\omega_7^2\omega_4^2v_1^2\omega_5^2 - 72\omega_7\omega_4\omega_5^2 + 120\omega_7\omega_4cs^2\omega_5^2 - 72\omega_7\omega_4v_1^2\omega_5 + 24\omega_4^2cs^2\omega_5^2 + 168\omega_7\omega_4v_1^2\omega_5^2 + 24\omega_4\omega_5^2 + 24\omega_7\omega_4\omega_5 + 72\omega_7^2\omega_4cs^2 + 24\omega_4^2v_1^2\omega_5^2 - 24\omega_7\omega_4cs^2\omega_5 + 61\omega_7^2\omega_4^2v_1^2\omega_5 - 60\omega_7cs^2\omega_5^2 - 48\omega_7^2\omega_4 - 25\omega_7^2\omega_4^2\omega_5 - 3\omega_7^2\omega_4^2cs^2\omega_5^2$$

$$C_{10} = 24\omega_7^2cs^4 + 3\omega_7^2\omega_4^3v_1^4 - 48\omega_7^2\omega_4cs^4 + 12\omega_4^3cs^2v_1^2 - 24\omega_7\omega_4cs^2 + 18\omega_7\omega_4^3v_1^2 - 24\omega_7\omega_4^2cs^4 - 96\omega_7^2cs^2v_1^2 + 24\omega_4^2v_1^2 + 156\omega_7^2\omega_4cs^2v_1^2 - 8\omega_7^2\omega_4^2cs^2 - 72\omega_7\omega_4^2v_1^2 + 6\omega_7^2\omega_4^3cs^2v_1^2 - 24\omega_7^2\omega_4^2v_1^4 + \omega_7^2\omega_4^3cs^2 + 48\omega_7\omega_4^2cs^2v_1^2 - 24\omega_7^2\omega_4v_1^2 - 12\omega_4^3v_1^2 - 48\omega_7\omega_4v_1^4 + 6\omega_7\omega_4^3cs^4 + 24\omega_7^2\omega_4^2v_1^2 + 72\omega_7\omega_4^2v_1^4 + 12\omega_4^3v_1^4 + 48\omega_7\omega_4v_1^2 - 24\omega_7\omega_4cs^2v_1^2 - 6\omega_7^2\omega_4^3cs^2 - 3\omega_7^2\omega_4^3cs^4 - 24\omega_4^2cs^2v_1^2 + 24\omega_7^2\omega_4v_1^4 + 24\omega_7\omega_4cs^4 - 18\omega_7\omega_4^3v_1^4 - 12\omega_7\omega_4^3cs^2v_1^2 - 3\omega_7^2\omega_4^3v_1^2 + 12\omega_7^2\omega_4cs^2 + 24\omega_7^2\omega_4^2cs^4 + 24\omega_7\omega_4^2cs^2 - 24\omega_4^2v_1^4 - 72\omega_7^2\omega_4^2cs^2v_1^2$$

$$C_{11} = -36\omega_9\omega_6\omega_7^2\omega_4cs^4\omega_8\omega_5 + 36\omega_6\omega_7\omega_4^2cs^4\omega_8\omega_5^2 - 12\omega_7^2\omega_4^3\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_7\omega_4cs^2\omega_8\omega_5^2 + 6\omega_9\omega_6\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8v_1^2v_2^2 - 36\omega_6\omega_7^2\omega_4^3cs^2\omega_5^2v_2^2 + 12\omega_6\omega_7\omega_4^2cs^2\omega_8v_1^2\omega_5^2 + 18\omega_9\omega_6\omega_4^3cs^2\omega_8\omega_5^2v_2^2 + \omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8v_1^2\omega_5^2 + 12\omega_7^2\omega_4^3cs^2v_1^2\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^2v_2^2 + 24\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5v_2^2 - 108\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8\omega_5v_2^2 - 36\omega_9\omega_6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5v_2^2 - 6\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 72\omega_9\omega_7^2\omega_4^2cs^2\omega_8\omega_5v_2^2 - 12\omega_6\omega_7^2\omega_4^3cs^2v_1^2\omega_5^2 + 12\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_5v_2^2 + 36\omega_6\omega_7\omega_4^2cs^2\omega_8\omega_5^2v_2^2 + 6\omega_9\omega_6\omega_4^3cs^2\omega_8v_1^2\omega_5^2 + 72\omega_9\omega_6\omega_7^2\omega_4cs^2\omega_8\omega_5v_2^2 - 12\omega_6\omega_7^2\omega_4^2\omega_5^2v_2^2 + 6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 24\omega_9\omega_6\omega_7^2\omega_4cs^2\omega_8\omega_5^2v_2^2 - 24\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8\omega_5^2v_2^2 + 144\omega_9\omega_6\omega_7^2\omega_4^2cs^4\omega_8\omega_5 + 18\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2v_2^2 + 12\omega_6\omega_7^2\omega_4^3\omega_5^2v_2^2 - 72\omega_9\omega_7\omega_4^2cs^2\omega_8\omega_5^2v_2^2 + 6\omega_6\omega_7^2\omega_4^2v_1^2\omega_5^2v_2^2 + 12\omega_6\omega_7^2\omega_4^3cs^4\omega_8\omega_5^2 - 45\omega_9\omega_6\omega_7\omega_4^3cs^2\omega_8\omega_5^2v_2^2 + 6\omega_9\omega_6\omega_7^2\omega_4^3\omega_8v_2^2 - 15\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 - 12\omega_6\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_7\omega_4cs^4\omega_8\omega_5^2 - 12\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^2v_2^2 + 36\omega_6\omega_7^2\omega_4^2cs^4\omega_8\omega_5^2 - 24\omega_9\omega_6\omega_7^2\omega_4\omega_8\omega_5v_2^2 - 12\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5v_2^2 + 6\omega_9\omega_7^2\omega_4^3cs^2\omega_8v_1^2\omega_5 - 5\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8v_1^2\omega_5 - 36\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8\omega_5v_2^2 - 6\omega_9\omega_6\omega_4^3\omega_8\omega_5^2v_2^2 - 12\omega_9\omega_6\omega_7\omega_4cs^2\omega_8v_1^2\omega_5^2 + 3\omega_9\omega_6\omega_7^2\omega_4^3cs^4\omega_8\omega_5^2 + 6\omega_6\omega_7\omega_4^3\omega_8\omega_5^2v_2^2 + 6\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2 + 36\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8v_2^2 - 9\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5v_2^2 - 12\omega_9\omega_7^2\omega_4^3cs^2v_1^2\omega_5 + 6\omega_9\omega_7^2\omega_4^3\omega_8\omega_5v_2^2 + 12\omega_9\omega_6\omega_7^2\omega_4^3cs^2v_1^2\omega_5 - 6\omega_9\omega_6\omega_4^3cs^4\omega_8\omega_5^2 + 12\omega_9\omega_7^2\omega_4^3\omega_5v_2^2 - 12\omega_9\omega_6\omega_7^2\omega_4^3\omega_5v_2^2 - 12\omega_9\omega_6\omega_7^2\omega_4cs^2\omega_8v_1^2\omega_5 + 144\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8\omega_5^2v_2^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2v_1^2\omega_5v_2^2 - 24\omega_9\omega_7\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 + 54\omega_9\omega_6\omega_7^2\omega_4^2cs^4\omega_8\omega_5 + 18\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2v_2^2 + 12\omega_6\omega_7^2\omega_4^3\omega_5^2v_2^2 - 72\omega_9\omega_7\omega_4^2cs^2\omega_8\omega_5^2v_2^2 + 6\omega_6\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 + 48\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 - 18\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8\omega_5^2 + 12\omega_6\omega_7^2\omega_4^2v_1^2\omega_5^2v_2^2 + 6\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5v_2^2 + 18\omega_9\omega_6\omega_7\omega_4^3cs^2\omega_8\omega_5v_2^2 + 18\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2v_2^2 + 24\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_4^2cs^2\omega_8\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 - 18\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 15\omega_9\omega_6\omega_7\omega_4^3cs^4\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_4^2cs^2\omega_8\omega_5^2 - 6\omega_9\omega_6\omega_7\omega_4^3\omega_8\omega_5v_2^2 - \omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 27\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5v_2^2 - 6\omega_9\omega_7^2\omega_4^3\omega_8v_1^2\omega_5v_2^2 - 96\omega_9\omega_6\omega_7^2cs^4\omega_8\omega_5^2 + 36\omega_6\omega_7^2\omega_4^2cs^4\omega_5^2 - 18\omega_9\omega_7^2\omega_4^3cs^2\omega_8\omega_5v_2^2 + 9\omega_9\omega_6\omega_7^2\omega_4^3\omega_8v_1^2\omega_5v_2^2 - 12\omega_6\omega_7^2\omega_4^3v_1^2\omega_5^2v_2^2 - 12\omega_9\omega_6\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5v_2^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8v_1^2\omega_5^2 - 6\omega_9\omega_6\omega_4^3cs^2\omega_8\omega_5^2 - 36\omega_9\omega_6\omega_4^2cs^2\omega_8\omega_5^2v_2^2 - 6\omega_7^2\omega_4^3cs^2\omega_8v_1^2\omega_5^2 + 12\omega_6\omega_7^2\omega_4^3cs^2\omega_5^2 - 6\omega_6\omega_7\omega_4^3cs^2\omega_8\omega_5^2v_2^2 + 12\omega_7^2\omega_4^3v_1^2\omega_5^2v_2^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8v_2^2 + 18\omega_9\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2cs^4\omega_8\omega_5 + 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8v_2^2 - 15\omega_9\omega_6\omega_7^2\omega_4^3cs^4\omega_8\omega_5 - 12\omega_9\omega_7^2\omega_4^3v_1^2\omega_5v_2^2 - 6\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 - 6\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_4^2cs^4\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_5 - 18\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2v_2^2 - 12\omega_9\omega_6\omega_4^2cs^2\omega_8v_1^2\omega_5^2 + 12\omega_7^2\omega_4^3v_1^2\omega_5^2v_2^2$$

$$C_{12} = -12\omega_9\omega_6\omega_7^2\omega_4cs^4\omega_8\omega_5 + 12\omega_6\omega_7\omega_4^2cs^4\omega_8\omega_5^2 - 12\omega_7^2\omega_4^3\omega_5^2v_2^2 - 12\omega_9\omega_6\omega_7\omega_4cs^2\omega_8\omega_5^2 + 18\omega_9\omega_6\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 + 36\omega_9\omega_6\omega_7^2\omega_4^2\omega_8v_1^2v_2^2 - 12\omega_6\omega_7^2\omega_4^3cs^2\omega_5^2v_2^2 + 36\omega_6\omega_7\omega_4^2cs^2\omega_8v_1^2\omega_5^2 + 6\omega_9\omega_6\omega_4^3cs^2\omega_8\omega_5^2v_2^2 + 36\omega_7^2\omega_4^3cs^2v_1^2\omega_5^2 + 12\omega_9\omega_6\omega_4^2\omega_8\omega_5^2v_2^2 + 72\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5v_2^2 - 36\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2v_2^2 - 108\omega_9\omega_6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5v_2^2 - 6\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 24\omega_9\omega_7^2\omega_4^2cs^2\omega_8\omega_5v_2^2 - 36\omega_6\omega_7^2\omega_4^3cs^2v_1^2\omega_5^2 + 36\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_4^2\omega_4^2\omega_5v_2^2 + 12\omega_6\omega_7\omega_4^2cs^2\omega_8\omega_5^2v_2^2 - 12\omega_9\omega_6\omega_4^3cs^2\omega_8v_1^2\omega_5^2 + 24\omega_9\omega_6\omega_7^2\omega_4cs^2\omega_8\omega_5v_2^2 - 12\omega_6\omega_7^2\omega_4^2\omega_5^2v_2^2 + 6\omega_6\omega_7\omega_4^3cs^2\omega_8\omega_5^2 + 6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 72\omega_9\omega_6\omega_7^2\omega_4\omega_8v_1^2\omega_5v_2^2 - 12\omega_9\omega_7^2\omega_4^3cs^2\omega_5v_2^2 + 12\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_5v_2^2 - 48\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5^2v_2^2 - 12\omega_6\omega_7^2\omega_4^2cs^4\omega_8\omega_5^2 + 24\omega_9\omega_7\omega_4^2\omega_8\omega_5^2v_2^2 + 12\omega_7^2\omega_4^3cs^2\omega_5^2v_2^2 - 12\omega_6\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2v_2^2 + 36\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 - 12\omega_6\omega_7\omega_4^2cs^2\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_7\omega_4cs^4\omega_8\omega_5^2 - 15\omega_9\omega_6\omega_7\omega_4^3cs^2\omega_8\omega_5^2v_2^2 + 6\omega_9\omega_6\omega_7^2\omega_4^3\omega_8v_2^2 - 45\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 - 36\omega_6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_7^2\omega_4cs^2\omega_8\omega_5 + 12\omega_9\omega_7\omega_4^3cs^2\omega_8\omega_5^2v_2^2 - 12\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_5 + 12\omega_9\omega_7^2\omega_4^3cs^2\omega_5 - 12\omega_7^2\omega_4^3cs^2\omega_5^2 + 36\omega_6\omega_7^2\omega_4^2cs^2v_1^2\omega_5^2 + 15\omega_9\omega_6\omega_7\omega_4^3\omega_8\omega_5^2v_2^2 - 12\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2 + 6\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2cs^4\omega_5 - 12\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_5^2v_2^2 - 12\omega_6\omega_7^2\omega_4^2cs^2\omega_5^2v_2^2 + 12\omega_6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 - 18\omega_6\omega_7\omega_4^3cs^2\omega_8v_1^2\omega_5^2 + 12\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^2v_2^2 - 36\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8v_2^2 + 60\omega_9\omega_6\omega_7\omega_4cs^2\omega_8v_1^2\omega_5^2 - \omega_9\omega_6\omega_7^2\omega_4^3cs^4\omega_8\omega_5^2 + 6\omega_6\omega_7\omega_4^3\omega_8\omega_5^2v_2^2 + 6\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8v_2^2 - 9\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5v_2^2 - 36\omega_9\omega_7^2\omega_4^3cs^2v_1^2\omega_5 + 6\omega_9\omega_7^2\omega_4^3\omega_8\omega_5v_2^2 + 36\omega_9\omega_6\omega_7^2\omega_4^3cs^2v_1^2\omega_5 + 12\omega_9\omega_7^2\omega_4^3\omega_5v_2^2 - 12\omega_9\omega_6\omega_7^2\omega_4^3\omega_5v_2^2 - 36\omega_9\omega_6\omega_7^2\omega_4cs^2\omega_8v_1^2\omega_5 + 48\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8\omega_5^2v_2^2 - 36\omega_9\omega_6\omega_7^2\omega_4^2v_1^2\omega_5v_2^2 - 72\omega_9\omega_7\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 + 18\omega_9\omega_6\omega_7^2\omega_4^2cs^4\omega_8\omega_5 + 6\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2v_2^2 + 12\omega_6\omega_7^2\omega_4^3\omega_5^2v_2^2 - 24\omega_9\omega_7\omega_4^2cs^2\omega_8\omega_5^2v_2^2 + 18\omega_6\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 + 144\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 + 18\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8\omega_5^2 + 36\omega_6\omega_7^2\omega_4^2v_1^2\omega_5^2v_2^2 + 18\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5v_2^2 + 6\omega_9\omega_6\omega_7\omega_4^3cs^2\omega_8\omega_5v_2^2 + 54\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8v_1^2\omega_5 - 24\omega_9\omega_6\omega_7\omega_4cs^2\omega_8\omega_5^2v_2^2 + 24\omega_9\omega_6\omega_7\omega_4\omega_8\omega_5^2v_2^2 - 72\omega_9\omega_6\omega_7\omega_4\omega_8v_1^2\omega_5^2v_2^2 + \omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3cs^2\omega_8\omega_5 - 102\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8v_1^2\omega_5^2 + 18\omega_6\omega_7^2\omega_4^3cs^2\omega_8v_1^2\omega_5^2 + 5\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5 - 6\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2v_2^2 + 6\omega_9\omega_6\omega_7\omega_4^3cs^4\omega_8\omega_5^2 - 6\omega_9\omega_6\omega_7\omega_4^3\omega_8\omega_5v_2^2 + 9\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5v_2^2 - 18\omega_9\omega_7^2\omega_4^3\omega_8v_1^2\omega_5v_2^2 - 12\omega_9\omega_6\omega_7^2cs^4\omega_8\omega_5^2 + 12\omega_6\omega_7^2\omega_4^2cs^4\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3cs^2\omega_8\omega_5v_2^2 + 27\omega_9\omega_6\omega_7^2\omega_4^3\omega_8v_1^2\omega_5v_2^2 - 36\omega_6\omega_7^2\omega_4^3v_1^2\omega_5^2v_2^2 - 36\omega_9\omega_6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8\omega_5^2 - 15\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8v_1^2\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_5^2 - 18\omega_6\omega_7\omega_4^3cs^2\omega_8v_1^2\omega_5^2 + 12\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^2v_2^2 - 18\omega_9\omega_6\omega_7\omega_4^2cs^4\omega_8\omega_5^2 - 18\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2v_2^2 + 36\omega_9\omega_6\omega_7^2\omega_4^2cs^2v_1^2\omega_5 - 24\omega_9\omega_7^2\omega_4^2\omega_8\omega_5v_2^2 - 6\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8v_2^2 + 60\omega_9\omega_6\omega_7^2\omega_4cs^2\omega_8v_1^2\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^3cs^4\omega_5 - 5\omega_9\omega_6\omega_7^2\omega_4^3cs^4\omega_8\omega_5^2 - 12\omega_9\omega_7^2\omega_4^3cs^4\omega_5 - 12\omega_6\omega_7\omega_4^2\omega_8\omega_5^2v_2^2 + 12\omega_7^2\omega_4^3cs^4\omega_5^2 - 6\omega_9\omega_6\omega_7\omega_4^3cs^2\omega_8\omega_5^2 + 6\omega_9\omega_7^2\omega_4^3cs^4\omega_8\omega_5 + 36\omega_9\omega_6\omega_7^2\omega_4^3v_1^2\omega_5v_2^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8v_2^2 - 5\omega_9\omega_6\omega_7^2\omega_4^3cs^4\omega_8\omega_5 - 36\omega_9\omega_7^2\omega_4^3v_1^2\omega_5v_2^2 - 18\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 - 18\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2v_2^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_5 - 6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2v_2^2 + 24\omega_9\omega_6\omega_4^2cs^2\omega_8v_1^2\omega_5^2 - 6\omega_6\omega_7\omega_4^3cs^2\omega_8\omega_5^2v_2^2 + 36\omega_7^2\omega_4^3v_1^2\omega_5^2v_2^2$$

$$C_{13} = 24\omega_9\omega_6^2\omega_4^3cs^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2v_1^2 + 6\omega_9\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2\omega_5 + 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2\omega_5^2 - 24\omega_9\omega_6^2\omega_7^2\omega_4^3cs^2\omega_5^2 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 - 12\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^2 + 90\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2v_1^2\omega_5^2 + 24\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 24\omega_9\omega_6^2\omega_7^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2 + 18\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 36\omega_9\omega_6^2\omega_7\omega_4\omega_8^2v_1^2\omega_5^2 - 66\omega_9\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5 + 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2v_1^2\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2 + 3\omega_9\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5^2 -$$

$$24\omega_9\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2 + 84\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5^2 + 72\omega_9\omega_6^2\omega_7^2\omega_4cs^2\omega_8\omega_5^2 - 12\omega_6\omega_7^2\omega_4^3\omega_8^2v_1^2\omega_5^2 + 36\omega_9\omega_6^2\omega_7\omega_4\omega_8^2\omega_5^2 - 96\omega_9\omega_6^2\omega_7^2cs^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 6\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2v_1^2\omega_5^2 - 42\omega_9\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 18\omega_9\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2 + 12\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2 + 24\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2\omega_5^2 - 48\omega_9\omega_6^2\omega_4^2cs^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2v_1^2\omega_5 + 12\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2\omega_5 - 24\omega_9\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2\omega_5^2 - 24\omega_6^2\omega_7^2\omega_4^3\omega_8^2v_1^2\omega_5^2 - 18\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5 - 24\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8^2\omega_5^2 - 24\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 - 36\omega_9\omega_6^2\omega_7\omega_4cs^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2v_1^2\omega_5^2 - 24\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2 + 6\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2 + 4\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2v_1^2\omega_5 + 12\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5^2 - 66\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2 + 24\omega_6\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2 + 60\omega_9\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2v_1^2\omega_5^2 + 6\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2\omega_5 + 48\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2 + 24\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2\omega_5^2 - \omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 6\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2v_1^2 + 66\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2\omega_5^2 + 156\omega_9\omega_6^2\omega_7^2\omega_4cs^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5 + 24\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2\omega_5^2 + 24\omega_9\omega_6^2\omega_7^2\omega_4^2cs^2\omega_5^2 - 84\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 - 4\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5 + 24\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2\omega_5^2 + 24\omega_9\omega_7^2\omega_4^3cs^2\omega_8\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4cs^2\omega_8^2\omega_5 + 12\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 24\omega_9\omega_6^2\omega_4^2\omega_8^2\omega_5^2 - 24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2v_1^2\omega_5^2 - 132\omega_9\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2 - 24\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2\omega_5^2 - 72\omega_9\omega_6^2\omega_4cs^2\omega_8^2\omega_5^2 + 36\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2v_1^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + \omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2v_1^2\omega_5^2 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5 - 24\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5^2 - 18\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2v_1^2\omega_5 - 24\omega_6^2\omega_7^2\omega_4^3\omega_8v_1^2\omega_5^2 - 12\omega_6\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5^2$$

$$C_{14} = -6\omega_9\omega_6^3\omega_7\omega_4^3cs^2\omega_8v_2^2 + 18\omega_9\omega_6^2\omega_4^3cs^2\omega_8^2v_1^2 - 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8 + 24\omega_9\omega_6^2\omega_7\omega_4\omega_8^2v_1^2v_2^2 + 12\omega_9\omega_6^3\omega_7\omega_4^3v_1^2v_2^2 + 12\omega_9\omega_6^3\omega_7\omega_4^2v_1^2 + 12\omega_9\omega_6^3\omega_7\omega_4^3\omega_8v_1^2 + 36\omega_9\omega_7\omega_4^3cs^2\omega_8^2v_1^2 - 6\omega_6^3\omega_4^3cs^2\omega_8^2v_2^2 - 54\omega_9\omega_6\omega_7\omega_4^3cs^2\omega_8^2v_1^2 + 6\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2 + 12\omega_9\omega_6^3\omega_7\omega_4cs^2\omega_8^2v_2^2 - 6\omega_6^3\omega_7\omega_4^3\omega_8^2v_1^2 + 12\omega_9\omega_6\omega_7\omega_4^3cs^4\omega_8 - 72\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2v_1^2 - 36\omega_6^3\omega_7\omega_4^3cs^4\omega_8 - 12\omega_9\omega_7\omega_4^3\omega_8^2v_1^2 + 18\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2v_1^2 + 18\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2 - 84\omega_9\omega_6^2\omega_7\omega_4cs^4\omega_8^2 - \omega_9\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2 - 6\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2v_2^2 + 12\omega_9\omega_6^2\omega_4^2\omega_8^2v_1^2 - 12\omega_6^2\omega_7\omega_4^3\omega_8v_1^2 + 6\omega_9\omega_6^2\omega_4^3cs^2\omega_8^2v_2^2 - 36\omega_9\omega_6^3\omega_7\omega_4^3cs^2\omega_8v_1^2 - 42\omega_9\omega_6^2\omega_7\omega_4^3cs^4\omega_8 + 12\omega_9\omega_6^3\omega_7\omega_4cs^2\omega_8 - 6\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2 - 12\omega_9\omega_6\omega_7\omega_4^3cs^2\omega_8^2v_2^2 + 24\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2v_2^2 - 18\omega_6^3\omega_4^3cs^2\omega_8^2v_1^2 + 12\omega_9\omega_7\omega_4^3cs^2\omega_8^2v_2^2 - 12\omega_9\omega_6^3\omega_7\omega_4^3cs^4 + 12\omega_6^3\omega_7\omega_4^2\omega_8v_1^2v_2^2 - 88\omega_9\omega_6^3\omega_7\omega_4^2cs^4\omega_8^2 + 18\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2v_2^2 + 12\omega_9\omega_6^2\omega_7\omega_4^3v_1^2 - 12\omega_6^3\omega_4^2\omega_8^2v_1^2 + 6\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2v_2^2 - 6\omega_9\omega_6^2\omega_4^3cs^2\omega_8^2 - 42\omega_9\omega_6^3\omega_7\omega_4^2cs^4\omega_8 - 12\omega_9\omega_6^2\omega_4^2cs^2\omega_8^2v_2^2 - 12\omega_6^3\omega_7\omega_4^2\omega_8v_1^2 + 108\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8v_1^2 - 18\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2 + 36\omega_6^2\omega_7\omega_4^3cs^2\omega_8v_1^2 + 36\omega_9\omega_6^3\omega_7\omega_4^3cs^2v_1^2 + 36\omega_6^3\omega_4^2cs^4\omega_8^2 - 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2v_2^2 + 6\omega_9\omega_6^3\omega_7\omega_4^3cs^2\omega_8 - 12\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2v_2^2 - 2\omega_9\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2v_2^2 - 12\omega_9\omega_6^3\omega_7\omega_4^3v_1^2 - 36\omega_9\omega_6^2\omega_4^2cs^4\omega_8^2 - 24\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2 - 12\omega_6^3\omega_7\omega_4^2\omega_8v_1^2v_2^2 - 12\omega_9\omega_6^3\omega_7\omega_4cs^2\omega_8^2 + 12\omega_9\omega_6^2\omega_7\omega_4^3cs^4 - 6\omega_9\omega_6^2\omega_7\omega_4^3cs^4\omega_8^2 + 6\omega_6^3\omega_4^3cs^2\omega_8^2 - 12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2v_2^2 + 36\omega_6^3\omega_4^2cs^2\omega_8^2v_1^2 - 12\omega_6^2\omega_7\omega_4^3cs^2\omega_8 + 18\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8v_2^2 + 36\omega_9\omega_7\omega_4^3cs^4\omega_8^2 - 36\omega_9\omega_6\omega_7\omega_4^3cs^4\omega_8^2 + 24\omega_9\omega_6^3\omega_7\omega_4\omega_8v_1^2 - 36\omega_9\omega_6^2\omega_4^2cs^2\omega_8^2v_1^2 - 96\omega_9\omega_6^3\omega_7cs^4\omega_8^2 + 12\omega_6^2\omega_7\omega_4^3cs^2\omega_8v_2^2 + 12\omega_9\omega_6^3\omega_7\omega_4^3cs^2v_2^2 + 12\omega_9\omega_6^3\omega_7\omega_4^2cs^4 + 18\omega_6^3\omega_7\omega_4^3cs^4\omega_8^2 - 24\omega_9\omega_6^3\omega_7\omega_4\omega_8v_1^2v_2^2 - 36\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2v_1^2 + 18\omega_9\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2v_1^2 + 12\omega_6^3\omega_4^2cs^2\omega_8^2v_2^2 + 12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2 + 36\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8^2v_1^2 + 5\omega_9\omega_6^3\omega_7\omega_4^3cs^4\omega_8^2 + 12\omega_9\omega_6^2\omega_7\omega_4cs^2\omega_8^2 + 72\omega_9\omega_6^2\omega_7\omega_4cs^2\omega_8^2v_1^2 - 12\omega_9\omega_6^3\omega_7\omega_4^3\omega_8v_1^2v_2^2 + 12\omega_9\omega_6^2\omega_7\omega_4^3cs^2 + 12\omega_9\omega_6^3\omega_7\omega_4cs^4\omega_8 - 6\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2v_2^2 - 18\omega_9\omega_6^2\omega_7\omega_4^3cs^2\omega_8 + 6\omega_9\omega_6^2\omega_4^3\omega_8^2v_1^2v_2^2 - 12\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2v_2^2 + 72\omega_9\omega_6^2\omega_7\omega_4^3cs^2\omega_8v_1^2 + 12\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8 - 36\omega_9\omega_6^2\omega_7\omega_4^3cs^2v_1^2 + 6\omega_6^3\omega_7\omega_4^3\omega_8^2v_1^2v_2^2 + 36\omega_6^3\omega_7\omega_4^2cs^2\omega_8v_1^2 - 6\omega_9\omega_6^3\omega_4^3\omega_8^2v_1^2 - 18\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2v_2^2 + 12\omega_9\omega_7\omega_4^3\omega_8^2v_1^2v_2^2 + 24\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2v_1^2 - 12\omega_9\omega_6^2\omega_7\omega_4cs^2\omega_8^2\omega_5v_2^2 - 36\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8v_1^2 - 12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2 - 18\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2v_1^2 + 36\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2v_2^2 - 48\omega_9\omega_6\omega_7\omega_4^2cs^4\omega_8^2 - 12\omega_9\omega_6^2\omega_4^2\omega_8^2v_1^2v_2^2 + 18\omega_9\omega_6^2\omega_4^3cs^4\omega_8^2 + \omega_9\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2v_2^2 - 12\omega_9\omega_6^3\omega_7\omega_4^3cs^2 - 18\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8 + 36\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2v_2^2 - 12\omega_6^3\omega_4^2cs^2\omega_8^2 + 150\omega_9\omega_6^2\omega_7\omega_4^2cs^4\omega_8^2 + 12\omega_6^2\omega_7\omega_4^3\omega_8v_1^2v_2^2 - 12\omega_9\omega_6^3\omega_7\omega_4cs^2\omega_8v_2^2 + 30\omega_9\omega_6^3\omega_7\omega_4^3cs^4\omega_8 - 36\omega_9\omega_6\omega_7\omega_4^3cs^2\omega_8v_1^2 + 12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_1^2v_2^2 + 12\omega_9\omega_6^2\omega_4^2cs^2\omega_8^2 - 36\omega_6^3\omega_7\omega_4^3cs^2\omega_8v_1^2 + 12\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2 - 18\omega_6^3\omega_4^3cs^4\omega_8^2 - 36\omega_9\omega_6^3\omega_7\omega_4^2cs^2v_1^2 - 12\omega_6^3\omega_7\omega_4^2\omega_8^2v_1^2v_2^2 + 12\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8 + 12\omega_9\omega_6^3\omega_7\omega_4^3v_1^2 + 6\omega_6^3\omega_7\omega_4^3cs^2 + 12\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2 + 36\omega_6^3\omega_4^2cs^2\omega_8^2v_2^2 + 12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2 + 12\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8^2 + 12\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8^2v_1^2 - \omega_9\omega_6^3\omega_7\omega_4^3cs^4\omega_8^2 + 12\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2 + 24\omega_9\omega_6^2\omega_7\omega_4cs^2\omega_8^2v_1^2 -$$

$$C_{15} = -4\omega_9\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2\omega_5 + 4\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2\omega_5 + 4\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8\omega_5 + 11\omega_9\omega_6^3\omega_7^2\omega_4^2cs^2\omega_8\omega_5 + 2\omega_9\omega_6^3\omega_7^2\omega_4^2cs^2\omega_8^2 + 4\omega_6^3\omega_7\omega_4^2\omega_8^2\omega_5v_2^2 + 4\omega_6^3\omega_7^2\omega_4^3\omega_8\omega_5 - 8\omega_9\omega_6^3\omega_7^2\omega_4^2cs^2\omega_5 + 4\omega_9\omega_{6\omega}7^2\omega_4^3\omega_8\omega_5 - 4\omega_6^3\omega_7^2\omega_4^2\omega_8^2\omega_5v_2^2 - 2\omega_9\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2 + \omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5v_2^2 - 7\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5 + 2\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5v_2^2 + 2\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5 + 3\omega_9\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5 + 9\omega_9\omega_6^3\omega_7^2\omega_4^2\omega_8\omega_5v_2^2 - 4\omega_6^3\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5 + 2\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2\omega_5 + 4\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5v_2^2 + 2\omega_9\omega_6\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5 - 5\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5v_2^2 + 12\omega_9\omega_6^3\omega_7\omega_4cs^2\omega_8^2\omega_5 + 4\omega_9\omega_7^2\omega_4^3\omega_8^2\omega_5v_2^2 + 4\omega_6^3\omega_7^2\omega_4^2\omega_8^2\omega_5 - 2\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5 - 3\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5v_2^2 - 9\omega_9\omega_6^3\omega_7^2\omega_4^2\omega_8\omega_5 + 2\omega_6^3\omega_7^2\omega_4^3\omega_8^2\omega_5v_2^2 - 15\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5 + 12\omega_9\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5 + 2\omega_6^3\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5 - \omega_9\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5 - 3\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_8\omega_5v_2^2 - 2\omega_9\omega_6^3\omega_7^2\omega_4\omega_8^2\omega_5 - 5\omega_9\omega_6^3\omega_7^2\omega_4^3cs^2\omega_8\omega_5 + 2\omega_9\omega_6^3\omega_7^2\omega_4\omega_8^2\omega_5v_2^2 - 2\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2\omega_5 + 2\omega_6^3\omega_7\omega_4^3\omega_8^2\omega_5 + 8\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2\omega_5 + 26\omega_9\omega_6^3\omega_7^2\omega_4cs^2\omega_8^2\omega_5 + 3\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5 - 8\omega_9\omega_6^2\omega_7^2\omega_4^3cs^2\omega_5 + 4\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_5v_2^2 - 2\omega_6^3\omega_7\omega_4^3\omega_8^2\omega_5v_2^2 + 4\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_5 - 4\omega_6^3\omega_7^2\omega_4^3\omega_8\omega_5v_2^2 - \omega_9\omega_6^3\omega_7\omega_4^3\omega_8^2\omega_5 - 2\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5v_2^2 + 6\omega_9\omega_6^3\omega_7^2\omega_4\omega_8\omega_5 - 4\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5v_2^2 + 2\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5 + 4\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2 - 12\omega_9\omega_6^3\omega_7^2\omega_4^2cs^2\omega_8\omega_5 + 2\omega_9\omega_6^3\omega_4^3cs^2\omega_8^2\omega_5 - 6\omega_9\omega_6^3\omega_7^2\omega_4\omega_8\omega_5v_2^2 - \omega_9\omega_6^3\omega_7^2\omega_4^2\omega_8^2\omega_5 - 8\omega_9\omega_6\omega_7^2\omega_4^3cs^2\omega_8\omega_5 + 8\omega_9\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2\omega_5 + 4\omega_9\omega_6^3\omega_7^2\omega_4^2\omega_5 + 2\omega_9\omega_6^2\omega_7^2\omega_4^2cs^2\omega_8\omega_5 - 2\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5 - 4\omega_6^3\omega_7^2\omega_4^3cs^2\omega_8\omega_5 - 4\omega_9\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2\omega_5 - 4\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5 - 4\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_5v_2^2 + 2\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2\omega_5v_2^2 + 4\omega_6^3\omega_7^2\omega_4^3cs^2\omega_8\omega_5 + 13\omega_9\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8\omega_5 - 24\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2\omega_5 - 4\omega_6^3\omega_7\omega_4^2\omega_8^2\omega_5 + 7\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5v_2^2 - 8\omega_9\omega_6^3\omega_7^2\omega_4^2cs^2\omega_8^2\omega_5 - 4\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_5 + 4\omega_6^3\omega_7^2\omega_4^2\omega_8\omega_5v_2^2 - 2\omega_6^2\omega_7^2\omega_4^3cs^2\omega_8^2\omega_5 - 4\omega_9\omega_7^2\omega_4^3\omega_8^2\omega_5 + 5\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5 - 2\omega_6^3\omega_7^2\omega_4^3\omega_8^2\omega_5 - 2\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5v_2^2 - 16\omega_9\omega_6^3\omega_7^2cs^2\omega_8^2\omega_5 + 3\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_8\omega_5 - \omega_9\omega_6^3\omega_7^2\omega_4^2\omega_8^2\omega_5v_2^2$$

$$C_{16} = 78\omega_9\omega_6^3\omega_7\omega_4^3cs^2\omega_8v_2^2 + 6\omega_9\omega_6^2\omega_4^3cs^2\omega_8^2v_1^2 - 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8 + 72\omega_9\omega_6^2\omega_7\omega_4\omega_8^2v_1^2v_2^2 + 36\omega_9\omega_6^3\omega_7\omega_4^3v_1^2v_2^2 + 12\omega_9\omega_6^3\omega_7\omega_4^2v_1^2 + 12\omega_9\omega_6^3\omega_7\omega_4^3\omega_8v_1^2 + 12\omega_9\omega_7\omega_4^3cs^2\omega_8^2v_1^2 - 18\omega_6^3\omega_4^3cs^2\omega_8^2v_2^2 - 18\omega_9\omega_6\omega_7\omega_4^3cs^2\omega_8^2v_1^2 + 6\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2 + 84\omega_9\omega_6^3\omega_7\omega_4cs^2\omega_8^2v_2^2 - 6\omega_6^3\omega_7\omega_4^3\omega_8^2v_1^2 - 24\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2v_1^2 - 12\omega_6^3\omega_7\omega_4^3cs^4\omega_8 - 12\omega_9\omega_7\omega_4^3\omega_8^2v_1^2 + 6\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2v_1^2 + 18\omega_9\omega_6\omega_7\omega_4^3\omega_8^2v_1^2 - 12\omega_9\omega_6^2\omega_7\omega_4cs^4\omega_8^2 - 18\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2v_2^2 + 12\omega_9\omega_6^2\omega_4^2\omega_8^2v_1^2 - 12\omega_6^2\omega_7\omega_4^3\omega_8v_1^2 + 18\omega_9\omega_6^2\omega_4^3cs^2\omega_8^2v_2^2 - 12\omega_9\omega_7^3\omega_7\omega_4^3cs^2\omega_8v_1^2 - 12\omega_9\omega_6^2\omega_7\omega_4^3cs^4\omega_8 - 12\omega_9\omega_6^3\omega_7\omega_4cs^2\omega_8 - 6\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2v_1^2 + 18\omega_9\omega_6\omega_7\omega_4^3cs^2\omega_8^2v_2^2 + 72\omega_9\omega_6^2\omega_7\omega_4^3\omega_8v_1^2v_2^2 - 6\omega_6^3\omega_4^3cs^2\omega_8^2v_1^2 - 48\omega_9\omega_6^3\omega_7cs^2\omega_8^2v_2^2 + 36\omega_6^3\omega_7\omega_4^2\omega_8v_1^2v_2^2 - 4\omega_9\omega_6^3\omega_7\omega_4^2cs^4\omega_8^2 + 180\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2v_2^2 + 12\omega_9\omega_6^2\omega_7\omega_4^3v_1^2 - 12\omega_6^3\omega_4^2\omega_8^2v_1^2 - 12\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8 + 18\omega_6^3\omega_7\omega_4^3cs^2\omega_8^2v_2^2 - 6\omega_9\omega_6^2\omega_4^3cs^2\omega_8^2 - 24\omega_9\omega_6^3\omega_7\omega_4^2cs^4\omega_8 - 36\omega_9\omega_6^2\omega_4^2cs^2\omega_8^2v_2^2 - 12\omega_6^3\omega_7\omega_4^2\omega_8v_1^2 + 36\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8v_1^2 - 24\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2 + 12\omega_6^2\omega_7\omega_4^3cs^2\omega_8v_1^2 + 12\omega_9\omega_6^3\omega_7\omega_4^3cs^2v_1^2 + 12\omega_6^3\omega_4^2cs^4\omega_8^2 - 36\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2v_2^2 - 12\omega_9\omega_6^3\omega_7\omega_4^3cs^2\omega_8 - 36\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2v_2^2 - 18\omega_9\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2v_2^2 - 12\omega_9\omega_6^3\omega_7\omega_4^3v_2^2 - 12\omega_9\omega_6^2\omega_4^2cs^4\omega_8^2 - 24\omega_9\omega_6^2\omega_7\omega_4\omega_8^2v_1^2 - 36\omega_6^3\omega_7\omega_4^3\omega_8v_1^2v_2^2 - 6\omega_9\omega_6^2\omega_7\omega_4^3cs^4\omega_8^2 + 6\omega_6^3\omega_4^3cs^2\omega_8^2 - 36\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2v_2^2 - 108\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8^2v_2^2 + 12\omega_6^3\omega_4^2cs^2\omega_8^2v_1^2 - 12\omega_6^2\omega_7\omega_4^3cs^2\omega_8 - 132\omega_9\omega_6^3\omega_7\omega_4^2cs^2\omega_8v_2^2 + 6\omega_9\omega_6\omega_7\omega_4^3cs^4\omega_8^2 + 24\omega_9\omega_6^3\omega_7\omega_4\omega_8v_1^2 - 12\omega_9\omega_6^2\omega_4^2cs^2\omega_8^2v_1^2 - 12\omega_9\omega_6^3\omega_7cs^4\omega_8^2 + 36\omega_6^2\omega_7\omega_4^3cs^2\omega_8v_2^2 - 24\omega_9\omega_6^3\omega_7\omega_4^3cs^2v_2^2 + 6\omega_6^3\omega_7\omega_4^3cs^4\omega_8^2 - 72\omega_9\omega_6^3\omega_7\omega_4\omega_8v_1^2v_2^2 - 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2v_1^2 + 6\omega_9\omega_6^2\omega_7\omega_4^3cs^2\omega_8^2v_1^2 + 12\omega_6^3\omega_7\omega_4^2cs^2\omega_8^2 + 36\omega_6^3\omega_4^2cs^2\omega_8^2v_2^2 + 12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_1^2 + 12\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8^2 + 12\omega_9\omega_6\omega_7\omega_4^2cs^2\omega_8^2v_1^2 - \omega_9\omega_6^3\omega_7\omega_4^3cs^4\omega_8^2 + 12\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_8^2 + 24\omega_9\omega_6^2\omega_7\omega_4cs^2\omega_8^2v_1^2 -$$

$36\omega_9\omega_6^3\omega_7\omega_4^3\omega_8 v_1^2 v_2^2 + 12\omega_9\omega_6^3\omega_7\omega_4 cs^4\omega_8 - 18\omega_6^2\omega_7\omega_4^3 cs^2\omega_8^2 v_2^2 + 12\omega_9\omega_6^2\omega_7\omega_4^3 cs^2\omega_8 + 18\omega_9\omega_6^2\omega_4^3\omega_8^2 v_1^2 v_2^2 - 42\omega_9\omega_6^3\omega_7\omega_4^2 cs^2\omega_8^2 v_2^2 + 6\omega_6^3\omega_4^3\omega_8^2 v_1^2 - 72\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2 v_1^2 v_2^2 + 24\omega_9\omega_6^2\omega_7\omega_4^3 cs^2\omega_8 v_1^2 - 12\omega_9\omega_6^2\omega_7\omega_4^3 cs^2 v_1^2 + 18\omega_6^3\omega_7\omega_4^3\omega_8^2 v_1^2 v_2^2 + 12\omega_6^3\omega_7\omega_4^2 cs^2\omega_8 v_1^2 - 6\omega_9\omega_6^2\omega_4^3\omega_8^2 v_1^2 - 54\omega_9\omega_6\omega_7\omega_4^3\omega_8^2 v_1^2 v_2^2 + 36\omega_9\omega_7\omega_4^3\omega_8^2 v_1^2 v_2^2 + 24\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2 v_1^2 + 12\omega_9\omega_6^2\omega_7\omega_4^2 cs^4\omega_8 - 84\omega_9\omega_6^2\omega_7\omega_4 cs^2\omega_8^2 v_2^2 - 36\omega_9\omega_6^3\omega_7\omega_4^2\omega_8 v_1^2 - 12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2 v_1^2 - 6\omega_6^2\omega_7\omega_4^3 cs^2\omega_8^2 v_1^2 + 12\omega_6^3\omega_7\omega_4^2 cs^4\omega_8 + 12\omega_6^3\omega_7\omega_4^2\omega_8^2 v_1^2 - 144\omega_9\omega_6^2\omega_7\omega_4^3 cs^2\omega_8 v_2^2 - 6\omega_6^2\omega_7\omega_4^3 cs^4\omega_8^2 + 36\omega_6^3\omega_7\omega_4^2 cs^2\omega_8 v_2^2 + 24\omega_9\omega_6^2\omega_7\omega_4^3 cs^2 v_2^2 - 18\omega_6^3\omega_4^3\omega_8^2 v_1^2 v_2^2 - 36\omega_9\omega_6^3\omega_7\omega_4^2 v_1^2 v_2^2 + 12\omega_6^3\omega_7\omega_4^3 cs^2\omega_8 + 6\omega_6^2\omega_7\omega_4^3\omega_8^2 v_1^2 + 12\omega_6^2\omega_7\omega_4^3 cs^4\omega_8 - 6\omega_9\omega_6\omega_7\omega_4^3 cs^2\omega_8^2 - 24\omega_9\omega_6^2\omega_7\omega_4^3\omega_8 v_1^2 - 6\omega_6^3\omega_7\omega_4^3 cs^2\omega_8^2 - 24\omega_9\omega_6^3\omega_7\omega_4 cs^2\omega_8 v_1^2 - 36\omega_9\omega_6^2\omega_7\omega_4^3 v_1^2 v_2^2 + 36\omega_6^3\omega_4^3\omega_8^2 v_1^2 v_2^2 + 72\omega_9\omega_6\omega_7\omega_4^3 cs^2\omega_8 v_2^2 - 12\omega_6^3\omega_7\omega_4^2 cs^4\omega_8^2 + 24\omega_9\omega_6^3\omega_7\omega_4^2 cs^2 v_2^2 - 36\omega_6^3\omega_7\omega_4^3 cs^2\omega_8 v_2^2 + 60\omega_9\omega_6^2\omega_7\omega_4^2 cs^2\omega_8 v_2^2 - 12\omega_9\omega_6\omega_7\omega_4^2 cs^4\omega_8^2 - 36\omega_9\omega_6^2\omega_4^2\omega_8^2 v_1^2 v_2^2 + 6\omega_9\omega_6^2\omega_4^3 cs^4\omega_8^2 + 24\omega_9\omega_6^3\omega_7\omega_4^2 cs^2\omega_8 + 108\omega_9\omega_6^3\omega_7\omega_4^2\omega_8 v_1^2 v_2^2 - 12\omega_6^3\omega_4^2 cs^2\omega_8^2 + 24\omega_9\omega_6^2\omega_7\omega_4^2 cs^4\omega_8^2 + 36\omega_6^2\omega_7\omega_4^3\omega_8 v_1^2 v_2^2 + 60\omega_9\omega_6^3\omega_7\omega_4 cs^2\omega_8 v_2^2 + 12\omega_9\omega_6^3\omega_7\omega_4^3 cs^4\omega_8 - 12\omega_9\omega_6\omega_7\omega_4^3 cs^2\omega_8 v_1^2 + 36\omega_9\omega_6\omega_7\omega_4^2\omega_8^2 v_1^2 v_2^2 + 12\omega_9\omega_6^2\omega_4^2 cs^2\omega_8^2 - 12\omega_6^3\omega_7\omega_4^3 cs^2\omega_8 v_1^2 + 12\omega_9\omega_6\omega_7\omega_4^3\omega_8 v_1^2 - 6\omega_6^3\omega_4^3 cs^4\omega_8^2 - 12\omega_9\omega_6^3\omega_7\omega_4^2 cs^2 v_1^2 - 36\omega_6^3\omega_7\omega_4^2\omega_8^2 v_1^2 v_2^2 + 6\omega_9\omega_6^2\omega_7\omega_4^3 cs^2\omega_8^2 + 18\omega_9\omega_6^3\omega_7\omega_4 cs^4\omega_8^2 - 12\omega_9\omega_6^2\omega_7\omega_4^2 cs^2\omega_8 v_1^2 + 18\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2 v_1^2 v_2^2 + 12\omega_6^3\omega_7\omega_4^3\omega_8 v_1^2$

$C_{17} = -4\omega_6^3\omega_4^2 cs^2 + 84\omega_6^3\omega_4 cs^2\omega_8 v_2^2 + 4\omega_6^3 cs^2\omega_8 + 20\omega_6\omega_4^2\omega_8 v_2^2 + 72\omega_6\omega_4 cs^2\omega_8^2 v_2^2 + 96\omega_4^2 cs^2\omega_8^2 v_2^2 + 12\omega_6\omega_4^2 cs^2\omega_8^2 + 36\omega_6^2 cs^2\omega_8^2 v_2^2 + 4\omega_6^2\omega_4^2 cs^4\omega_8^2 - 24\omega_4^2\omega_8^2 v_2^2 - 20\omega_6\omega_4\omega_8^2 v_2^2 + 4\omega_6^2\omega_4^2 v_2^2 - 13\omega_6^3\omega_4^2\omega_8 v_2^4 - 20\omega_6^3\omega_4\omega_8 v_2^2 - 8\omega_6^2\omega_8^2 v_2^2 - 4\omega_6^3\omega_4 cs^4 - 4\omega_6^3\omega_4^2 cs^4\omega_8 - 84\omega_6^2\omega_4 cs^2\omega_8^2 v_2^2 - 36\omega_6\omega_4^2\omega_8^2 v_2^4 + 32\omega_6^2\omega_4^2\omega_8 v_2^4 + 4\omega_6^3\omega_4^2 v_2^4 + 120\omega_6^2\omega_4^2 cs^2\omega_8 v_2^2 + 8\omega_6^2\omega_4 cs^2\omega_8^2 + 8\omega_6^2\omega_4^2 cs^4\omega_8 - 8\omega_6^3\omega_4 cs^2\omega_8 + 16\omega_6^2\omega_4\omega_8 v_2^2 + 4\omega_6^2 cs^4\omega_8^2 + 8\omega_6^3\omega_8 v_2^2 - 4\omega_6^2\omega_4^2 cs^4 - 20\omega_6^2\omega_4\omega_8^2 v_2^4 + 4\omega_6\omega_4^2 cs^2\omega_8 - 24\omega_6^3\omega_4 cs^2 v_2^2 - 72\omega_6\omega_4^2 cs^2\omega_8 v_2^2 + 4\omega_6^3\omega_4 v_2^2 + 8\omega_4^2 cs^4\omega_8^2 - 13\omega_6^2\omega_4^2\omega_8^2 v_2^2 + 4\omega_6\omega_4 cs^4\omega_8^2 - 4\omega_6^2\omega_4^2 cs^2\omega_8^2 - 16\omega_6^2\omega_4\omega_8 v_2^4 - 4\omega_6^3\omega_4^2 v_2^2 - 32\omega_6^2\omega_4^2\omega_8 v_2^2 - 144\omega_6\omega_4^2 cs^2\omega_8^2 v_2^2 - 51\omega_6^3\omega_4^2 cs^2\omega_8 v_2^2 + 4\omega_6^3\omega_4^2 cs^2\omega_8 + 24\omega_6^3\omega_4^2 cs^2 v_2^2 - 4\omega_6^3 cs^4\omega_8 + 13\omega_6^2\omega_4^2\omega_8^2 v_2^4 - 4\omega_6^3\omega_4 v_2^4 + 51\omega_6^2\omega_4^2 cs^2\omega_8^2 v_2^2 - 36\omega_6^3 cs^2\omega_8 v_2^2 + 4\omega_6^2\omega_4^2 cs^2 - 8\omega_6^3\omega_8 v_2^2 + 20\omega_6^2\omega_4\omega_8^2 v_2^2 - 12\omega_6\omega_4^2 cs^4\omega_8^2 - 4\omega_6^2 cs^2\omega_8^2 - 4\omega_6\omega_4^2 cs^4\omega_8 - 24\omega_6^2\omega_4^2 cs^2 v_2^2 + 4\omega_6^3\omega_4^2 cs^4 - 4\omega_6\omega_4 cs^2\omega_8^2 - 8\omega_4^2 cs^2\omega_8^2 - 48\omega_6^2\omega_4 cs^2\omega_8 v_2^2 - 20\omega_6\omega_4^2\omega_8 v_2^4 + 20\omega_6^3\omega_4\omega_8 v_2^4 + 4\omega_6^3\omega_4 cs^2 + 8\omega_6^2\omega_8^2 v_2^4 - 8\omega_6^2\omega_4 cs^4\omega_8^2 + 36\omega_6\omega_4^2\omega_8^2 v_2^2 + 8\omega_6^3\omega_4 cs^4\omega_8 + 20\omega_6\omega_4\omega_8^2 v_2^4 + 24\omega_4^2\omega_8^2 v_2^4 - 8\omega_6^2\omega_4^2 cs^2\omega_8 - 4\omega_6^2\omega_4^2 v_2^4 + 13\omega_6^3\omega_4^2\omega_8 v_2^2$

$C_{18} = -12\omega_6^3\omega_4 cs^2\omega_8 v_2^2 + 12\omega_6^3\omega_4\omega_8^2 v_2^4 - 12\omega_6\omega_4^3 cs^4\omega_8^2 + 19\omega_6^2\omega_4^3\omega_8^2 v_2^4 + 12\omega_6^3\omega_4^3 cs^2\omega_8^2 v_2^2 + 12\omega_6^3\omega_4^3 cs^2 v_2^2 + 12\omega_6\omega_4^2 cs^2\omega_8^2 + 18\omega_6^3\omega_4^2\omega_8^2 v_2^2 + 12\omega_6^3\omega_4^3 v_2^4 - 36\omega_6\omega_4^3 cs^2\omega_8 v_2^2 + 6\omega_6^3\omega_4 cs^2\omega_8^2 + 6\omega_6^2\omega_4^2 cs^4\omega_8^2 - 60\omega_6^2\omega_4^3\omega_8 v_2^2 - 6\omega_6^3\omega_4^3 cs^2\omega_8 + 54\omega_6^2\omega_4^3 cs^2\omega_8 v_2^2 + 48\omega_6^3\omega_4^2\omega_8 v_2^4 + 24\omega_6^3\omega_4\omega_8 v_2^2 - \omega_6^2\omega_4^3 cs^2\omega_8^2 - 18\omega_6^3\omega_4^2 cs^4\omega_8 - 48\omega_6^2\omega_4 cs^2\omega_8^2 v_2^2 - 24\omega_6^2\omega_4^2\omega_8 v_2^4 - 12\omega_6^3\omega_4^2 v_2^4 - 12\omega_6^2\omega_4^2 cs^2\omega_8 v_2^2 + 6\omega_6^2\omega_4^3 cs^2\omega_8 + 72\omega_4^3\omega_8^2 v_2^4 + 27\omega_6^3\omega_4^3\omega_8 v_2^2 - 48\omega_6^3 cs^2\omega_8^2 v_2^2 + 13\omega_6^3\omega_4^2 cs^4\omega_8^2 + 12\omega_6^2\omega_4^2 cs^4\omega_8 - 12\omega_6^3\omega_4 cs^2\omega_8 + 90\omega_6\omega_4^3\omega_8^2 v_2^2 + 252\omega_4^3 cs^2\omega_8^2 v_2^2 - 12\omega_6^3 cs^2\omega_8^2 - 36\omega_6\omega_4^3\omega_8 v_2^4 - 12\omega_6^2\omega_4^2\omega_8^2 v_2^2 - 12\omega_6^2\omega_4^3 cs^2 v_2^2 - 81\omega_6^3\omega_4^2 cs^2\omega_8^2 v_2^2 + 12\omega_6^2\omega_4^3 v_2^2 + 4\omega_6^3\omega_4^3\omega_8^2 v_2^4 - 6\omega_6^2\omega_4^2 cs^2\omega_8^2 - 24\omega_6^3\omega_4 cs^4\omega_8^2 - 90\omega_6\omega_4^3\omega_8^2 v_2^4 + 6\omega_6^3\omega_4^3 cs^4\omega_8 + 12\omega_6^3\omega_4^2 v_2^2 + 24\omega_6^2\omega_4^2\omega_8 v_2^2 - 72\omega_4^3\omega_8^2 v_2^2 + \omega_6^2\omega_4^3 cs^4\omega_8^2 - 108\omega_6\omega_4^2 cs^2\omega_8^2 v_2^2 + 30\omega_6^3\omega_4^2 cs^2\omega_8 v_2^2 - 27\omega_6^3\omega_4^3\omega_8 v_2^4 + 18\omega_6^3\omega_4^2 cs^2\omega_8 - 12\omega_6^3\omega_4^2 cs^2 v_2^2 + 12\omega_6^2\omega_4^2\omega_8^2 v_2^4 + 162\omega_6^2\omega_4^2 cs^2\omega_8^2 v_2^2 - 12\omega_6^2\omega_4^3 v_2^4 - 4\omega_6^3\omega_4^3\omega_8^2 v_2^2 + 12\omega_6\omega_4^3 cs^2\omega_8^2 - 12\omega_6\omega_4^2 cs^4\omega_8^2 + 36\omega_6\omega_4^3\omega_8 v_2^2 - 19\omega_6^2\omega_4^3\omega_8^2 v_2^2 + 12\omega_4^3 cs^4\omega_8^2 + 60\omega_6^2\omega_4^3 cs^2\omega_8^2 v_2^2 - 18\omega_6^3\omega_4^2\omega_8^2 v_2^4 - 12\omega_6^3\omega_4^3 v_2^2 - 12\omega_6^3\omega_4\omega_8^2 v_2^2 + 12\omega_6^3 cs^4\omega_8^2 - 24\omega_6^3\omega_4\omega_8 v_2^4 + 102\omega_6^3\omega_4 cs^2\omega_8^2 v_2^2 - 6\omega_6^2\omega_4^3 cs^4\omega_8 - 5\omega_6^3\omega_4^2 cs^2\omega_8^2 + 12\omega_6^3\omega_4 cs^4\omega_8 - 12\omega_6^2\omega_4^2 cs^2\omega_8 + 60\omega_6^2\omega_4^3\omega_8 v_2^4 - 21\omega_6^3\omega_4^3 cs^2\omega_8 v_2^2 - 306\omega_6\omega_4^3 cs^2\omega_8^2 v_2^2 - \omega_6^3\omega_4^3 cs^4\omega_8^2 - 48\omega_6^3\omega_4^2\omega_8 v_2^2$

$C_{19} = 16\omega_6^3\omega_4^2 cs^2 - 20\omega_6^3 cs^2\omega_8 - 64\omega_6\omega_4^2\omega_8 v_2^2 - 72\omega_6\omega_4^2 cs^2\omega_8^2 - 8\omega_6^3\omega_4^2 - 40\omega_6^2\omega_4^2\omega_8 + 80\omega_4^2\omega_8^2 v_2^2 + 64\omega_6\omega_4\omega_8^2 v_2^2 - 16\omega_6^2\omega_4^2 v_2^2 + 68\omega_6^3\omega_4\omega_8 v_2^2 + 28\omega_6^2\omega_8^2 v_2^2 - 16\omega_6^2\omega_4 cs^2\omega_8 + 8\omega_6^2\omega_4^2 - 24\omega_6\omega_4\omega_8^2 - 32\omega_4^2\omega_8^2 - 28\omega_6^3\omega_4\omega_8 - 44\omega_6^2\omega_4 cs^2\omega_8^2 + 44\omega_6^3\omega_4 cs^2\omega_8 - 48\omega_6^2\omega_4\omega_8 v_2^2 - 28\omega_6^3\omega_8 v_2^2 + 8\omega_6^3\omega_4 - 17\omega_6^2\omega_4^2\omega_8^2 - 32\omega_6\omega_4^2 cs^2\omega_8 - 16\omega_6^3\omega_4 v_2^2 + 43\omega_6^2\omega_4^2\omega_8^2 v_2^2 + 25\omega_6^2\omega_4^2 cs^2\omega_8^2 + 28\omega_6^2\omega_4\omega_8^2 + 16\omega_6^3\omega_4^2 v_2^2 + 104\omega_6^2\omega_4^2\omega_8 v_2^2 - 25\omega_6^3\omega_4^2 cs^2\omega_8 + 48\omega_6\omega_4^2\omega_8^2 + 17\omega_6^3\omega_4^2\omega_8 - 16\omega_6^2\omega_4^2 cs^2 - 68\omega_6^2\omega_4\omega_8^2 v_2^2 + 20\omega_6^2 cs^2\omega_8^2 - 12\omega_6^2\omega_8^2 + 32\omega_6\omega_4 cs^2\omega_8^2 + 48\omega_4^2 cs^2\omega_8^2 + 24\omega_6\omega_4^2\omega_8 + 12\omega_6^3\omega_8 - 16\omega_6^3\omega_4 cs^2 - 120\omega_6\omega_4^2\omega_8^2 v_2^2 + 56\omega_6^2\omega_4^2 cs^2\omega_8 - 43\omega_6^3\omega_4^2\omega_8 v_2^2 + 16\omega_6^2\omega_4\omega_8$

$C_{20} = 12 - 9\omega_6^3 v_2^4 - 78\omega_6^2 cs^2 - 216\omega_6 cs^4 + 144 cs^4 - 34\omega_6^3 cs^2 v_2^2 - 18\omega_6 - 1008\omega_6 cs^2 v_2^2 + 6\omega_6^3 cs^2 + 90\omega_6^2 v_2^4 + 234\omega_6 v_2^2 - 156 v_2^2 - 98\omega_6^2 v_2^2 + 404\omega_6^2 cs^2 v_2^2 - 5\omega_6^3 cs^4 + 672 cs^2 v_2^2 - 216\omega_6 v_2^4 + 144 v_2^4 + 82\omega_6^2 cs^4 - \omega_6^3 + 10\omega_6^3 v_2^2 + 8\omega_6^2 + 198\omega_6 cs^2 - 132 cs^2$

$C_{21} = 12 - 29\omega_6^3 v_2^4 - 22\omega_6^2 cs^2 - 36\omega_6 cs^4 + 24 cs^4 - 18\omega_6^3 cs^2 v_2^2 - 18\omega_6 - 648\omega_6 cs^2 v_2^2 + 2\omega_6^3 cs^2 + 310\omega_6^2 v_2^4 + 378\omega_6 v_2^2 - 252 v_2^2 - 154\omega_6^2 v_2^2 + 252\omega_6^2 cs^2 v_2^2 - \omega_6^3 cs^4 + 432 cs^2 v_2^2 - 756\omega_6 v_2^4 + 504 v_2^4 + 14\omega_6^2 cs^4 - \omega_6^3 + 14\omega_6^3 v_2^2 + 8\omega_6^2 + 54\omega_6 cs^2 - 36 cs^2$

2.4 CLBM1

2.4.1 Definitions

Collision operator $\boldsymbol{C}$:

$$\boldsymbol{C}(\boldsymbol{f}) = \mathbf{K}^{-1}\mathbf{S}\left(\boldsymbol{\kappa}^{(eq)} - \mathbf{K}\boldsymbol{f}\right),$$

where

$$\mathbf{S} = \mathrm{diag}(\omega_1, \omega_2, \omega_3, \omega_4, \omega_5, \omega_6, \omega_7, \omega_8, \omega_9),$$

$\omega_1, \omega_2, \ldots, \omega_9 \in (0, 2)$.
Matrix $\mathbf{K}$ corresponds to the transformation matrix to the central moment basis defined by

$$\boldsymbol{\kappa} = \left(k_{(0,0)}, k_{(1,0)}, k_{(0,1)}, k_{(1,1)}, k_{(2,0)}, k_{(0,2)}, k_{(2,1)}, k_{(1,2)}, k_{(2,2)}\right)^T,$$

and is given by

$$\begin{aligned}
\mathbf{K}_{1,i} &= (\boldsymbol{c}_i - \boldsymbol{v})^{(0,0)} \\
\mathbf{K}_{2,i} &= (\boldsymbol{c}_i - \boldsymbol{v})^{(1,0)} \\
\mathbf{K}_{3,i} &= (\boldsymbol{c}_i - \boldsymbol{v})^{(0,1)} \\
\mathbf{K}_{4,i} &= (\boldsymbol{c}_i - \boldsymbol{v})^{(1,1)} \\
\mathbf{K}_{5,i} &= (\boldsymbol{c}_i - \boldsymbol{v})^{(2,0)} \\
\mathbf{K}_{6,i} &= (\boldsymbol{c}_i - \boldsymbol{v})^{(0,2)} \\
\mathbf{K}_{7,i} &= (\boldsymbol{c}_i - \boldsymbol{v})^{(2,1)} \\
\mathbf{K}_{8,i} &= (\boldsymbol{c}_i - \boldsymbol{v})^{(1,2)} \\
\mathbf{K}_{9,i} &= (\boldsymbol{c}_i - \boldsymbol{v})^{(2,2)},
\end{aligned}$$

$\forall i \in \{1, 2, \cdots, 9\}$.
The equilibrium central moments are defined by

$$\boldsymbol{\kappa}^{(eq)} = \mathbf{K}\mathbf{M}^{-1}\boldsymbol{\mu}^{(eq)},$$

i.e.,

$$\boldsymbol{\kappa}^{(eq)} = \left(\rho, 0, 0, 0, \rho c_s^2, \rho c_s^2, 0, 0, \rho c_s^4\right)^T.$$

2.4.2 Conservation of mass: ρ

attached text file: `output_d2q9_nse_clbm1_symbolic_pde_00.txt`

$$\frac{\partial \rho}{\partial t} + \frac{v_1\delta_l}{\delta_t}\frac{\partial \rho}{\partial x_1} + \frac{\rho\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\delta_l v_2}{\delta_t}\frac{\partial \rho}{\partial x_2} + \frac{\rho\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-1 + v_1^2 + 3cs^2)\frac{v_1\delta_l^3}{12\delta_t}\frac{\partial^3 \rho}{\partial x_1^3} + (-1 + 3v_1^2 + cs^2)\frac{\rho\delta_l^3}{12\delta_t}\frac{\partial^3 v_1}{\partial x_1^3} - \frac{\rho\delta_l^3 cs^2}{6\delta_t}\frac{\partial^3 v_2}{\partial x_1^2 \partial x_2} - \frac{\rho\delta_l^3 cs^2}{6\delta_t}\frac{\partial^3 v_1}{\partial x_1 \partial x_2^2} + (-1 + 3cs^2 + v_2^2)\frac{\delta_l^3 v_2}{12\delta_t}\frac{\partial^3 \rho}{\partial x_2^3} + (-1 + cs^2 + 3v_2^2)\frac{\rho\delta_l^3}{12\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} +$$
$$(-6v_1^2 + 3\omega_5 v_1^2 + \omega_5 cs^2 + 24v_1^2 cs^2 - 2cs^2 - \omega_5 cs^4 + 2cs^4 - 12\omega_5 v_1^2 cs^2 + 6v_1^4 - 3\omega_5 v_1^4)\frac{\delta_l^4}{24\omega_5\delta_t}\frac{\partial^4 \rho}{\partial x_1^4} +$$
$$(-4 + 10v_1^2 + 2\omega_5 - 5\omega_5 v_1^2 - 3\omega_5 cs^2 + 6cs^2)\frac{\rho v_1 \delta_l^4}{12\omega_5\delta_t}\frac{\partial^4 v_1}{\partial x_1^4} +$$
$$(3\omega_5 - 3\omega_5 v_1^2 - 9\omega_5 cs^2 + 3\omega_5\omega_7 cs^2 - \omega_5\omega_7 + v_1^2\omega_7 - \omega_7 + 3\omega_7 cs^2 + \omega_5 v_1^2\omega_7)\frac{\rho v_1 \delta_l^4}{12\omega_5\delta_t\omega_7}\frac{\partial^4 v_2}{\partial x_1^3 \partial x_2} +$$
$$(-2 + \omega_4)\frac{\delta_l^4 cs^4}{6\delta_t\omega_4}\frac{\partial^4 \rho}{\partial x_1^2 \partial x_2^2} +$$
$$(-3\omega_6 v_2^2 - \omega_8 + \omega_8 v_2^2 - \omega_8\omega_6 + 3\omega_8\omega_6 cs^2 + 3\omega_6 - 9\omega_6 cs^2 + 3\omega_8 cs^2 + \omega_8\omega_6 v_2^2)\frac{\rho\delta_l^4 v_2}{12\omega_8\omega_6\delta_t}\frac{\partial^4 v_1}{\partial x_1 \partial x_2^3} +$$
$$(3\omega_6 v_2^2 + 6v_2^4 - \omega_6 cs^4 - 2cs^2 - 12\omega_6 v_2^2 cs^2 + 24v_2^2 cs^2 + \omega_6 cs^2 + 2cs^4 - 3\omega_6 v_2^4 - 6v_2^2)\frac{\delta_l^4}{24\omega_6\delta_t}\frac{\partial^4 \rho}{\partial x_2^4} +$$
$$(-4 - 5\omega_6 v_2^2 + 6cs^2 + 2\omega_6 - 3\omega_6 cs^2 + 10v_2^2)\frac{\rho\delta_l^4 v_2}{12\omega_6\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0.$$

2.4.3 Conservation of momentum: ρv_1

attached text file: `output_d2q9_nse_clbm1_symbolic_pde_01.txt`

$$v_1\frac{\partial \rho}{\partial t} + \rho\frac{\partial v_1}{\partial t} + (v_1^2 + cs^2)\frac{\delta_l}{\delta_t}\frac{\partial \rho}{\partial x_1} + \frac{2\rho v_1\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{v_1\delta_l v_2}{\delta_t}\frac{\partial \rho}{\partial x_2} + \frac{\rho\delta_l v_2}{\delta_t}\frac{\partial v_1}{\partial x_2} + \frac{\rho v_1\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2} +$$
$$(-2 + 6v_1^2 + \omega_5 - 3\omega_5 v_1^2 + 4cs^2 - 2\omega_5 cs^2)\frac{\delta_l^2}{\omega_5\delta_t}\frac{\partial \rho}{\partial x_1}\frac{\partial v_1}{\partial x_1} + (2 - \omega_5)\frac{3\rho v_1\delta_l^2}{\omega_5\delta_t}\left(\frac{\partial v_1}{\partial x_1}\right)^2 + (-2 + \omega_4)\frac{\delta_l^2 cs^2}{2\delta_t\omega_4}\frac{\partial \rho}{\partial x_2}\frac{\partial v_2}{\partial x_1} +$$

$$(-2+\omega_4)\frac{\delta_l^2 cs^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_2}\frac{\partial v_1}{\partial x_2} + (-2+2v_1^2+\omega_5-\omega_5v_1^2+6cs^2-3\omega_5cs^2)\frac{v_1\delta_l^2}{2\omega_5\delta_t}\frac{\partial^2\rho}{\partial x_1^2} +$$
$$(-2+6v_1^2+\omega_5-3\omega_5v_1^2+2cs^2-\omega_5cs^2)\frac{\rho\delta_l^2}{2\omega_5\delta_t}\frac{\partial^2 v_1}{\partial x_1^2} + (-2+\omega_4)\frac{\rho\delta_l^2cs^2}{2\delta_t\omega_4}\frac{\partial^2 v_2}{\partial x_1\partial x_2} + (-2+\omega_4)\frac{\rho\delta_l^2cs^2}{2\delta_t\omega_4}\frac{\partial^2 v_1}{\partial x_2^2} +$$
$$C_1\frac{\delta_l^3}{12\omega_5^2\delta_t}\frac{\partial^3\rho}{\partial x_1^3} + (-24+60v_1^2+24\omega_5-60\omega_5v_1^2+5\omega_5^2cs^2+36cs^2-36\omega_5cs^2+11\omega_5^2v_1^2-4\omega_5^2)\frac{\rho v_1\delta_l^3}{6\omega_5^2\delta_t}\frac{\partial^3 v_1}{\partial x_1^3} +$$
$$C_2\frac{\rho v_1\delta_l^3}{12\omega_5^2\delta_t\omega_7\omega_4}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2} + (-12-\omega_4^2+12\omega_4)\frac{\delta_l^3cs^4}{6\delta_t\omega_4^2}\frac{\partial^3\rho}{\partial x_1\partial x_2^2} - \frac{\rho v_1\delta_l^3cs^2}{6\delta_t}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2} + (-1+3cs^2+v_2^2)\frac{v_1\delta_l^3v_2}{12\delta_t}\frac{\partial^3\rho}{\partial x_2^3} +$$
$$C_3\frac{\rho\delta_l^3v_2}{6\omega_8\delta_t\omega_4}\frac{\partial^3 v_1}{\partial x_2^3} + (-1+cs^2+3v_2^2)\frac{\rho v_1\delta_l^3}{12\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} + C_4\frac{v_1\delta_l^4}{12\omega_5^3\delta_t}\frac{\partial^4\rho}{\partial x_1^4} + C_5\frac{\rho\delta_l^4}{12\omega_5^3\delta_t}\frac{\partial^4 v_1}{\partial x_1^4} + C_6\frac{\rho\delta_l^4}{12\omega_5^3\delta_t\omega_7^2\omega_4^3}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2} +$$
$$C_7\frac{v_1\delta_l^4cs^2}{12\omega_8\omega_5^3\omega_9\delta_t\omega_7^2\omega_4^2}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} + C_8\frac{\rho\delta_l^4cs^2}{12\omega_8\omega_5^2\omega_9\delta_t\omega_7\omega_4^3}\frac{\partial^4 v_1}{\partial x_1^2\partial x_2^2} + C_9\frac{\delta_l^4cs^2v_2}{12\omega_8^2\omega_5\omega_9\omega_6\delta_t\omega_7\omega_4^2}\frac{\partial^4\rho}{\partial x_1\partial x_2^3} +$$
$$(3\omega_8cs^2-3\omega_6v_2^2-\omega_8+\omega_8v_2^2-\omega_8\omega_6-9\omega_6cs^2+3\omega_6+3\omega_8\omega_6cs^2+\omega_8\omega_6v_2^2)\frac{\rho v_1\delta_l^4v_2}{12\omega_8\omega_6\delta_t}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3} +$$
$$C_{10}\frac{\rho\delta_l^4cs^2}{12\omega_8\omega_5\omega_9\omega_6\delta_t\omega_7\omega_4^3}\frac{\partial^4 v_2}{\partial x_1\partial x_2^3} +$$
$$(3\omega_6v_2^2+6v_2^4+2cs^4+\omega_6cs^2-2cs^2-\omega_6cs^4-3\omega_6v_2^4-12\omega_6cs^2v_2^2+24cs^2v_2^2-6v_2^2)\frac{v_1\delta_l^4}{24\omega_6\delta_t}\frac{\partial^4\rho}{\partial x_2^4} + C_{11}\frac{\rho\delta_l^4}{24\omega_8^2\delta_t\omega_4^3}\frac{\partial^4 v_1}{\partial x_2^4}$$
$$+ (-4-5\omega_6v_2^2-3\omega_6cs^2+2\omega_6+6cs^2+10v_2^2)\frac{\rho v_1\delta_l^4v_2}{12\omega_6\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0,$$

where:

$$C_1 = 7\omega_5^2v_1^4-36v_1^2-144\omega_5v_1^2cs^2+36\omega_5v_1^2+12cs^4-\omega_5^2cs^2-12\omega_5cs^4-12cs^2+\omega_5^2cs^4+12\omega_5cs^2+144v_1^2cs^2-7\omega_5^2v_1^2+36v_1^4-36\omega_5v_1^4+24\omega_5^2v_1^2cs^2$$

$$C_2 = -6\omega_5v_1^2\omega_7\omega_4+36cs^2\omega_7\omega_4+12v_1^2\omega_7\omega_4+12\omega_5\omega_4+6\omega_5\omega_7\omega_4-18\omega_5cs^2\omega_7\omega_4+18\omega_5^2cs^2\omega_7+6\omega_5^2v_1^2\omega_7+36\omega_5^2cs^2\omega_4+12\omega_5^2v_1^2\omega_4-36\omega_5^2cs^2-11\omega_5^2cs^2\omega_7\omega_4-12\omega_5v_1^2\omega_4-12\omega_7\omega_4-3\omega_5^2v_1^2\omega_7\omega_4-6\omega_5^2\omega_7-36\omega_5cs^2\omega_4+3\omega_5^2\omega_7\omega_4-12\omega_5^2v_1^2-12\omega_5^2\omega_4+12\omega_5^2$$

$$C_3 = 6+9\omega_8cs^2+9cs^2\omega_4-3\omega_8-\omega_8v_2^2\omega_4+3\omega_8v_2^2-18cs^2+\omega_8\omega_4+3v_2^2\omega_4-3\omega_4-6v_2^2-3\omega_8cs^2\omega_4$$

$$C_4 = 12+6\omega_5^3cs^2+90\omega_5^2v_1^4-156v_1^2-18\omega_5-1008\omega_5v_1^2cs^2+234\omega_5v_1^2-34\omega_5^3v_1^2cs^2-9\omega_5^3v_1^4+144cs^4-78\omega_5^2cs^2-216\omega_5cs^4+10\omega_5^3v_1^2-132cs^2+82\omega_5^2cs^4+198\omega_5cs^2+672v_1^2cs^2-\omega_5^3-5\omega_5^3cs^4-98\omega_5^2v_1^2+144v_1^4-216\omega_5v_1^4+404\omega_5^2v_1^2cs^2+8\omega_5^2$$

$$C_5 = 12+2\omega_5^3cs^2+310\omega_5^2v_1^4-252v_1^2-18\omega_5-648\omega_5v_1^2cs^2+378\omega_5v_1^2-18\omega_5^3v_1^2cs^2-29\omega_5^3v_1^4+24cs^4-22\omega_5^2cs^2-36\omega_5cs^4+14\omega_5^3v_1^2-36cs^2+14\omega_5^2cs^4+54\omega_5cs^2+432v_1^2cs^2-\omega_5^3-\omega_5^3cs^4-154\omega_5^2v_1^2+504v_1^4-756\omega_5v_1^4+252\omega_5^2v_1^2cs^2+8\omega_5^2$$

$$C_6 = 36\omega_5^2v_1^2\omega_4^3-108\omega_5^3v_1^2cs^2\omega_4^2+6\omega_5^3cs^2\omega_7^2\omega_4+4\omega_5^3v_1^4\omega_7^2\omega_4^3-6\omega_5^2cs^2\omega_7^2\omega_4^2+36\omega_5^3v_1^4\omega_4^3-\omega_5^3cs^4\omega_7^2\omega_4^3-36\omega_5v_1^4\omega_7\omega_4^3-6\omega_5^3v_1^4\omega_7^2\omega_4^2-18\omega_5^3v_1^2cs^2\omega_7^2\omega_4-19\omega_5^2v_1^2\omega_7^2\omega_4^3+108\omega_5^3v_1^2cs^2\omega_4^3-36\omega_5^3v_1^4\omega_4^2+13\omega_5^3cs^4\omega_7^2\omega_4^2-\omega_5^2cs^2\omega_7^2\omega_4^3+198\omega_5^2v_1^2cs^2\omega_7\omega_4^3-108\omega_5^2v_1^2cs^2\omega_4^3-4\omega_5^3v_1^2\omega_7^2\omega_4^3-24\omega_5^3cs^4\omega_7^2\omega_4+12\omega_5^3cs^4\omega_7^2-3\omega_5^3v_1^2cs^2\omega_7^2\omega_4^2+6\omega_5^2cs^4\omega_7^2\omega_4^2+36\omega_5v_1^2\omega_7\omega_4^3+19\omega_5^2v_1^4\omega_7^2\omega_4^3+6\omega_5^3v_1^2\omega_7^2\omega_4^2+36\omega_5^2v_1^2cs^2\omega_7\omega_4^2-108\omega_5v_1^2cs^2\omega_7\omega_4^3+\omega_5^2cs^4\omega_7^2\omega_4^3+12\omega_5^3v_1^2cs^2\omega_7^2\omega_4^3-5\omega_5^3cs^2\omega_7^2\omega_4^2-36\omega_5^3v_1^2\omega_7\omega_4^2+72\omega_5^2v_1^4\omega_7\omega_4^3+18\omega_5^2v_1^2cs^2\omega_7^2\omega_4^2+12\omega_5cs^2\omega_7^2\omega_4^2-306\omega_5v_1^2cs^2\omega_7^2\omega_4^3+18\omega_5^3cs^2\omega_7\omega_4^2+36\omega_5^3v_1^2\omega_4^2-99\omega_5^3v_1^2cs^2\omega_7\omega_4^3-6\omega_5^2cs^4\omega_7\omega_4^3-36\omega_5^2v_1^4\omega_4^3+12\omega_5cs^2\omega_7^2\omega_4^3+60\omega_5^2v_1^2cs^2\omega_7^2\omega_4^2-72v_1^2\omega_7^2\omega_4^3+39\omega_5^3v_1^2\omega_7\omega_4^3+12\omega_5^3cs^4\omega_7\omega_4+12\omega_5^2cs^4\omega_7\omega_4^2-36\omega_5^3v_1^2\omega_4^3-6\omega_5^3cs^2\omega_7\omega_4^3-12cs^2\omega_7^2\omega_4^3+252v_1^2cs^2\omega_7^2\omega_4^3+54\omega_5^3v_1^2cs^2\omega_7\omega_4^2-36\omega_5v_1^2cs^2\omega_7^2\omega_4^2+90\omega_5v_1^2\omega_7^2\omega_4^3-72\omega_5^2v_1^2\omega_7\omega_4^3+36\omega_5^3v_1^2cs^2\omega_7\omega_4+36\omega_5^3v_1^4\omega_7\omega_4^2-12\omega_5cs^4\omega_7^2\omega_4^2+6\omega_5^2cs^2\omega_7\omega_4^3-18\omega_5^3cs^4\omega_7\omega_4^2-12\omega_5cs^4\omega_7^2\omega_4^3+72v_1^4\omega_7^2\omega_4^3-12\omega_5^3cs^2\omega_7\omega_4-39\omega_5^3v_1^4\omega_7\omega_4^3+6\omega_5^3cs^4\omega_7\omega_4^3+12cs^4\omega_7^2\omega_4^3-12\omega_5^2cs^2\omega_7\omega_4^2-90\omega_5v_1^4\omega_7^2\omega_4^3$$

$$C_7 = -12\omega_5^2v_1^2\omega_9\omega_7^2\omega_4-36\omega_8\omega_5^2\omega_9cs^2\omega_4^2+36\omega_8\omega_5^3\omega_9cs^2\omega_7^2+36\omega_5^3cs^2\omega_7^2\omega_4-\omega_8\omega_5^3\omega_9\omega_7^2\omega_4^2-12\omega_8\omega_5^3v_1^2\omega_7\omega_4^2-18\omega_8\omega_5^2\omega_9\omega_7^2\omega_4-36\omega_8\omega_5^3cs^2\omega_7\omega_4^2+54\omega_8\omega_5^3\omega_9cs^2\omega_7\omega_4+12\omega_5^3v_1^2\omega_7^2\omega_4-36\omega_8\omega_5^3\omega_9cs^2\omega_4+12\omega_8\omega_5\omega_9\omega_7\omega_4^2+18\omega_8\omega_5^2v_1^2\omega_9\omega_7^2\omega_4+18\omega_8\omega_5^3v_1^2\omega_9\omega_7\omega_4+54\omega_8\omega_5^2\omega_9cs^2\omega_7^2\omega_4-12\omega_8\omega_5^3\omega_9\omega_4^2-36\omega_5^2\omega_9cs^2\omega_7^2\omega_4-6\omega_8\omega_5^3\omega_7^2\omega_4^2+12\omega_8\omega_5^3\omega_9\omega_7+18\omega_5^2\omega_9cs^2\omega_7^2\omega_4^2+12\omega_8\omega_5^3\omega_7^2\omega_4-12\omega_8\omega_5^3\omega_9\omega_7^2-6\omega_8\omega_5^3v_1^2\omega_9\omega_7\omega_4^2-6\omega_8\omega_5^2\omega_9cs^2\omega_7^2\omega_4^2-12\omega_8\omega_5v_1^2\omega_9\omega_7^2\omega_4^2+12\omega_8\omega_5^3\omega_9\omega_4+2\omega_8\omega_5^2\omega_9\omega_7^2\omega_4^2-36\omega_8\omega_5^2\omega_9cs^2\omega_7^2+12\omega_8\omega_5^2v_1^2\omega_7\omega_4^2-12\omega_8\omega_5^2\omega_7\omega_4^2-6\omega_5^3v_1^2\omega_7^2\omega_4^2-18\omega_8\omega_5^3\omega_9cs^2\omega_7\omega_4^2+36\omega_8\omega_5^3cs^2\omega_7\omega_4-36\omega_8\omega_5\omega_9cs^2\omega_7^2\omega_4^2+36\omega_8\omega_5^3\omega_9cs^2\omega_4^2-2\omega_8\omega_5^2v_1^2\omega_9\omega_7^2\omega_4^2+6\omega_5^2v_1^2\omega_9\omega_7^2\omega_4^2+36\omega_8\omega_5^2cs^2\omega_7\omega_4^2+12\omega_8\omega_5^3v_1^2\omega_7\omega_4-18\omega_5^3cs^2\omega_7^2\omega_4^2+12\omega_8\omega_5^3\omega_9\omega_7^2\omega_4-36\omega_8\omega_5^3\omega_9cs^2\omega_7-12\omega_5^3\omega_7^2\omega_4+5\omega_8\omega_5^3\omega_9cs^2\omega_7^2\omega_4^2-36\omega_8\omega_5^3cs^2\omega_7^2\omega_4+6\omega_8\omega_5^2\omega_7^2\omega_4^2-12\omega_8\omega_5^3v_1^2\omega_9\omega_4-6\omega_8\omega_5^2v_1^2\omega_7^2\omega_4^2-18\omega_8\omega_5^2v_1^2\omega_9\omega_7\omega_4^2+18\omega_8\omega_5^2v_1^2\omega_9\omega_7\omega_4^2-36\omega_8\omega_5\omega_9cs^2\omega_7\omega_4^2+12\omega_8\omega_5^3v_1^2\omega_9\omega_7^2-18\omega_8\omega_5^3\omega_9\omega_7\omega_4-12\omega_8\omega_5^3v_1^2\omega_7^2\omega_4+12\omega_8\omega_5^2\omega_9\omega_4^2-12\omega_8\omega_5^2v_1^2\omega_9\omega_4^2-18\omega_8\omega_5^2cs^2\omega_7^2\omega_4^2+12\omega_5^2\omega_9\omega_7^2\omega_4-12\omega_8\omega_5^3\omega_7\omega_4-12\omega_8\omega_9\omega_7^2\omega_4^2+\omega_8\omega_5^3v_1^2\omega_9\omega_7^2\omega_4^2-12\omega_8\omega_5v_1^2\omega_9\omega_7\omega_4^2+54\omega_8\omega_5^2\omega_9cs^2\omega_7\omega_4^2-12\omega_8\omega_5^3v_1^2\omega_9\omega_7^2\omega_4+12\omega_8\omega_5^3\omega_7\omega_4^2+36\omega_8\omega_9cs^2\omega_7^2\omega_4^2-12\omega_8\omega_5^3v_1^2\omega_9\omega_7+6\omega_8\omega_5^3v_1^2\omega_7^2\omega_4^2+12\omega_8v_1^2\omega_9\omega_7^2\omega_4^2+6\omega_8\omega_5^3\omega_9\omega_7\omega_4^2-6\omega_5^2\omega_9\omega_7^2\omega_4^2+12\omega_8\omega_5^3v_1^2\omega_9\omega_4^2+6\omega_5^3\omega_7^2\omega_4^2+18\omega_8\omega_5^3cs^2\omega_7^2\omega_4^2-40\omega_8\omega_5^3\omega_9cs^2\omega_7^2\omega_4+12\omega_8\omega_5\omega_9\omega_7^2\omega_4^2-12\omega_8\omega_5^2v_1^2\omega_9\omega_7^2+12\omega_8\omega_5^2\omega_9\omega_7^2$$

$$C_8 = 36\omega_8\omega_5v_1^2\omega_9\omega_4^2+12\omega_8\omega_5cs^2\omega_4^3-24\omega_8\omega_5^2\omega_9cs^2\omega_4^2+36\omega_8\omega_5v_1^2\omega_4^3-36\omega_8v_1^2\omega_9\omega_7\omega_4^2-12\omega_8\omega_5^2\omega_9cs^2\omega_7+6\omega_8\omega_9cs^2\omega_7\omega_4^3-24\omega_8\omega_5\omega_9\omega_7\omega_4^2+18\omega_8v_1^2\omega_9\omega_7\omega_4^3-36\omega_8\omega_5v_1^2\omega_9\omega_4^3+12\omega_8\omega_5^2\omega_9cs^2\omega_4^3+6\omega_8\omega_5\omega_9\omega_7\omega_4^3-12\omega_8\omega_9cs^2\omega_7\omega_4^2+12\omega_8\omega_9\omega_7\omega_4^2+12\omega_8\omega_5^2\omega_4^3-6\omega_8\omega_5^2\omega_7\omega_4^3+18\omega_8\omega_5^2v_1^2\omega_7\omega_4^3+6\omega_8\omega_5^2cs^2\omega_7\omega_4^2-12\omega_8\omega_5\omega_9\omega_4^2-36\omega_8\omega_5^2v_1^2\omega_7\omega_4^2+12\omega_8\omega_5^2\omega_7\omega_4^2-6\omega_8\omega_9\omega_7\omega_4^3-12\omega_8\omega_5^2\omega_4^2+12\omega_8\omega_5\omega_9\omega_7\omega_4+12\omega_8\omega_5^2\omega_9cs^2\omega_4-12\omega_8\omega_5^2cs^2\omega_7\omega_4^2+12\omega_8\omega_5\omega_9\omega_4^3+6\omega_8\omega_5\omega_7\omega_4^3+18\omega_5v_1^2\omega_9\omega_7\omega_4^3+24\omega_8\omega_5\omega_9cs^2\omega_7\omega_4^2+6\omega_5^2\omega_7\omega_4^3-\omega_8\omega_5^2\omega_9cs^2\omega_7\omega_4^3+12\omega_5\omega_9\omega_7\omega_4^2-18\omega_8\omega_5v_1^2\omega_9\omega_7\omega_4^3-12\omega_5\omega_9cs^2\omega_7\omega_4^2+24\omega_8\omega_5^2\omega_9\omega_4^2-72\omega_8\omega_5^2v_1^2\omega_9\omega_4^2+12\omega_8\omega_5\omega_9cs^2\omega_4^2-12\omega_8\omega_5\omega_4^3-36\omega_5v_1^2\omega_9\omega_7\omega_4^2-12\omega_5^2\omega_7\omega_4^2-6\omega_8\omega_5\omega_9cs^2\omega_7\omega_4^3+36\omega_8\omega_5^2v_1^2\omega_9\omega_4^3-12\omega_8\omega_5\omega_9cs^2\omega_4^3-12\omega_8\omega_5^2\omega_9\omega_4^3+72\omega_8\omega_5v_1^2\omega_9\omega_7\omega_4^2+6\omega_5\omega_9cs^2\omega_7\omega_4^3-4\omega_8\omega_5^2\omega_9cs^2\omega_7\omega_4^2-6\omega_5\omega_9\omega_7\omega_4^3-18\omega_5^2v_1^2\omega_7\omega_4^3-36\omega_8\omega_5^2v_1^2\omega_4^3-12\omega_8\omega_5^2cs^2\omega_4^3-36\omega_8\omega_5v_1^2\omega_9\omega_7\omega_4-6\omega_8\omega_5cs^2\omega_7\omega_4^3+18\omega_8\omega_5^2\omega_9cs^2\omega_7\omega_4^2-18\omega_8\omega_5v_1^2\omega_7\omega_4^3-6\omega_5^2cs^2\omega_7\omega_4^3+12\omega_8\omega_5^2cs^2\omega_4^2-12\omega_8\omega_5^2\omega_9\omega_4+36\omega_8\omega_5^2v_1^2\omega_4^2+36\omega_5^2v_1^2\omega_7\omega_4^2+36\omega_8\omega_5^2v_1^2\omega_9\omega_4+12\omega_5^2cs^2\omega_7\omega_4^2-12\omega_8\omega_5\omega_9cs^2\omega_7\omega_4$$

$C_9 = 18\omega_8^2\omega_5\omega_6 cs^2\omega_7\omega_4^2 - 36\omega_8^2\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4 + 3\omega_8\omega_5\omega_9\omega_6\omega_7\omega_4^2 - 12\omega_8^2\omega_5\omega_6\omega_4 + 18\omega_8^2\omega_9 cs^2\omega_7\omega_4^2 + 18\omega_8^2\omega_5\omega_9 v_2^2\omega_7\omega_4 - 12\omega_8^2\omega_5\omega_6 v_2^2\omega_4^2 + 12\omega_8^2\omega_5\omega_9\omega_6\omega_7\omega_4 - 12\omega_8^2\omega_5\omega_9 v_2^2\omega_4 + 36\omega_8\omega_5\omega_6 cs^2\omega_7\omega_4 - 12\omega_8\omega_5\omega_6\omega_7\omega_4 - 6\omega_5\omega_9\omega_6\omega_7\omega_4^2 + 6\omega_5\omega_9\omega_6 v_2^2\omega_7\omega_4^2 + 36\omega_8^2\omega_6 cs^2\omega_4^2 + 12\omega_8^2\omega_5\omega_6\omega_7\omega_4 - 3\omega_8\omega_5\omega_9\omega_6 v_2^2\omega_7\omega_4^2 + 5\omega_8^2\omega_5\omega_9\omega_7\omega_4^2 + 12\omega_8^2\omega_9\omega_4^2 + 12\omega_8^2\omega_5\omega_9\omega_6 v_2^2\omega_7 + 12\omega_8\omega_5\omega_9\omega_6\omega_7 - 6\omega_8^2\omega_5\omega_6\omega_7\omega_4^2 - 12\omega_8\omega_5\omega_9\omega_6 v_2^2\omega_7 - 36\omega_8^2\omega_9 cs^2\omega_4^2 - 18\omega_8^2\omega_5\omega_9\omega_7\omega_4 + 18\omega_8\omega_5\omega_9\omega_6 v_2^2\omega_7\omega_4 + 12\omega_8^2\omega_5\omega_6 v_2^2\omega_4 - \omega_8^2\omega_5\omega_9\omega_6\omega_7\omega_4^2 - 18\omega_8\omega_5\omega_6 cs^2\omega_7\omega_4^2 + 12\omega_8^2\omega_5\omega_9 v_2^2\omega_4^2 + 6\omega_8\omega_5\omega_6\omega_7\omega_4^2 - 12\omega_5\omega_9\omega_6 v_2^2\omega_7\omega_4 + 12\omega_5\omega_9\omega_6\omega_7\omega_4 - 36\omega_8^2\omega_5\omega_6 cs^2\omega_7\omega_4 + 3\omega_8^2\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4^2 - 12\omega_8^2\omega_5\omega_9 v_2^2\omega_7 + 12\omega_8^2\omega_5\omega_6\omega_4^2 - 6\omega_8^2\omega_6 v_2^2\omega_7\omega_4^2 - 18\omega_8\omega_5\omega_9\omega_6\omega_7\omega_4 - 12\omega_8^2\omega_5\omega_9\omega_6\omega_7 - 5\omega_8^2\omega_5\omega_9 v_2^2\omega_7\omega_4^2 + 12\omega_8\omega_5\omega_6 v_2^2\omega_7\omega_4 + 18\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4^2 - 12\omega_8^2\omega_6\omega_4^2 - 36\omega_8\omega_5\omega_9\omega_6 cs^2\omega_7 + 6\omega_8^2\omega_5\omega_6 v_2^2\omega_7\omega_4^2 - 12\omega_8^2\omega_5\omega_9\omega_6 v_2^2\omega_7\omega_4 - 12\omega_8^2\omega_9 v_2^2\omega_4^2 + 54\omega_8^2\omega_5\omega_9 cs^2\omega_7\omega_4 + 6\omega_8^2\omega_9 v_2^2\omega_7\omega_4^2 + 6\omega_8^2\omega_6\omega_7\omega_4^2 + 36\omega_8^2\omega_5\omega_6 cs^2\omega_4 + 36\omega_8^2\omega_5\omega_9 cs^2\omega_4^2 - 9\omega_8\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4^2 - 36\omega_8^2\omega_5\omega_9 cs^2\omega_7 + 12\omega_8^2\omega_5\omega_9\omega_4 + 54\omega_8\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4 - 12\omega_8^2\omega_5\omega_9\omega_4^2 - 36\omega_8^2\omega_5\omega_6 cs^2\omega_4^2 + 12\omega_8^2\omega_5\omega_9\omega_7 - 6\omega_8^2\omega_9\omega_7\omega_4^2 - 36\omega_8^2\omega_5\omega_9 cs^2\omega_4 - 18\omega_8^2\omega_6 cs^2\omega_7\omega_4^2 + 12\omega_8^2\omega_6 v_2^2\omega_4^2 - 12\omega_8^2\omega_5\omega_6 v_2^2\omega_7\omega_4 + \omega_8^2\omega_5\omega_9\omega_6 v_2^2\omega_7\omega_4^2 - 15\omega_8^2\omega_5\omega_9 cs^2\omega_7\omega_4^2 - 6\omega_8\omega_5\omega_6 v_2^2\omega_7\omega_4^2 + 36\omega_8^2\omega_5\omega_9\omega_6 cs^2\omega_7 - 36\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4$

$C_{10} = \omega_8\omega_5\omega_9\omega_6\omega_7\omega_4^2 - 36\omega_8\omega_5\omega_6 v_2^2\omega_4^3 + 6\omega_8\omega_9 cs^2\omega_7\omega_4^3 + 54\omega_8\omega_5\omega_9 v_2^2\omega_7\omega_4^2 + 6\omega_8\omega_6\omega_7\omega_4^3 + 18\omega_5\omega_9\omega_6\omega_7\omega_4^2 - 54\omega_5\omega_9\omega_6 v_2^2\omega_7\omega_4^2 - 18\omega_8\omega_5\omega_9\omega_7\omega_4^2 + 36\omega_8\omega_5\omega_6 v_2^2\omega_4^2 - 36\omega_8\omega_9 v_2^2\omega_4^3 - 3\omega_8\omega_5\omega_9\omega_6 v_2^2\omega_7\omega_4^2 - 6\omega_5\omega_9\omega_6\omega_7\omega_4^3 + 5\omega_8\omega_5\omega_9\omega_7\omega_4^3 + 18\omega_5\omega_9\omega_6 v_2^2\omega_7\omega_4^3 - 15\omega_8\omega_5\omega_9 v_2^2\omega_7\omega_4^3 - 6\omega_8\omega_5\omega_6\omega_7\omega_4^3 + 6\omega_8\omega_5\omega_6 cs^2\omega_7\omega_4^3 - 6\omega_5\omega_6 cs^2\omega_7\omega_4^3 - 36\omega_8\omega_5\omega_9 v_2^2\omega_4^3 + 36\omega_8\omega_6 v_2^2\omega_4^3 + 12\omega_8\omega_5\omega_9\omega_4^2 - 12\omega_8\omega_5\omega_6 cs^2\omega_7\omega_4^2 - 36\omega_8\omega_5\omega_9 v_2^2\omega_7\omega_4 - 6\omega_8\omega_9\omega_7\omega_4^3 - 18\omega_8\omega_6 v_2^2\omega_7\omega_4^3 + 12\omega_8\omega_5\omega_6\omega_7\omega_4^2 + 12\omega_8\omega_5\omega_9\omega_7\omega_4 - 12\omega_8\omega_6\omega_4^3 + 36\omega_5\omega_9\omega_6 v_2^2\omega_7\omega_4 - 12\omega_5\omega_9\omega_6\omega_7\omega_4 + 36\omega_8\omega_5\omega_9 v_2^2\omega_4^3 - 12\omega_8\omega_5\omega_9\omega_4^3 + 12\omega_5\omega_6 cs^2\omega_7\omega_4^2 + 18\omega_8\omega_9 v_2^2\omega_7\omega_4^3 - 18\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4^2 + 18\omega_8\omega_5\omega_9 cs^2\omega_7\omega_4^2 - 12\omega_8\omega_5\omega_9\omega_6 cs^2\omega_7 - \omega_8\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4^3 + 12\omega_8\omega_6 cs^2\omega_4^3 - 12\omega_8\omega_5\omega_9 cs^2\omega_4^2 - 5\omega_8\omega_5\omega_9 cs^2\omega_7\omega_4^3 + 6\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4^3 + 12\omega_8\omega_5\omega_9 cs^2\omega_4^3 - 5\omega_8\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4^2 + 12\omega_8\omega_5\omega_6\omega_4^3 - 18\omega_5\omega_6 v_2^2\omega_7\omega_4^3 - 12\omega_8\omega_5\omega_6 cs^2\omega_4^3 + 18\omega_8\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4 + 6\omega_5\omega_6\omega_7\omega_4^3 + 12\omega_8\omega_9\omega_4^3 + 18\omega_8\omega_5\omega_6 v_2^2\omega_7\omega_4^3 - 12\omega_5\omega_6\omega_7\omega_4^2 + 36\omega_5\omega_6 v_2^2\omega_7\omega_4^2 - 12\omega_8\omega_9 cs^2\omega_4^3 + 12\omega_8\omega_5\omega_6 cs^2\omega_4^2 - 12\omega_8\omega_5\omega_6\omega_4^2 - 36\omega_8\omega_5\omega_6 v_2^2\omega_7\omega_4^2 + 12\omega_5\omega_9\omega_6 cs^2\omega_7\omega_4 - 12\omega_8\omega_5\omega_9 cs^2\omega_7\omega_4 - 6\omega_8\omega_6 cs^2\omega_7\omega_4^3$

$C_{11} = 6\omega_8 cs^4\omega_4^3 + 3\omega_8^2 v_2^4\omega_4^3 - 72v_2^4\omega_4^2 + 108cs^2 v_2^2\omega_4^3 - 36\omega_8^2 cs^2 v_2^2\omega_4 - 12\omega_8^2 v_2^4\omega_4^2 + 36v_2^4\omega_4^3 - 24\omega_8 cs^4\omega_4^2 - 216cs^2 v_2^2\omega_4^2 + 24\omega_8^2 cs^4 + 12\omega_8^2 cs^2\omega_4 + 6\omega_8^2 cs^2 v_2^2\omega_4^3 - 8\omega_8^2 cs^2\omega_4^2 - 72\omega_8 v_2^2\omega_4^2 + 24\omega_8 cs^4\omega_4 + 30\omega_8 v_2^2\omega_4^3 + \omega_8^2 cs^2\omega_4^3 - 12\omega_8^2 cs^2 v_2^2\omega_4^2 - 36v_2^2\omega_4^3 + 72\omega_8 cs^2 v_2^2\omega_4 + 12\omega_8^2 v_2^2\omega_4^2 + 24\omega_8 cs^2\omega_4^2 - 48\omega_8^2 cs^4\omega_4 - 6\omega_8 cs^2\omega_4^3 + 72v_2^2\omega_4^2 - 3\omega_8^2 v_2^2\omega_4^3 - 30\omega_8 v_2^4\omega_4^3 - 3\omega_8^2 cs^4\omega_4^3 - 72\omega_8 cs^2 v_2^2\omega_4^3 + 24\omega_8^2 cs^4\omega_4^2 + 72\omega_8 v_2^4\omega_4^2 + 144\omega_8 cs^2 v_2^2\omega_4^2 - 24\omega_8 cs^2\omega_4$

2.4.4 Conservation of momentum: ρv_2

attached text file: `output_d2q9_nse_clbm1_symbolic_pde_02.txt`

$$v_2\frac{\partial\rho}{\partial t} + \rho\frac{\partial v_2}{\partial t} + \frac{v_1\delta_l v_2}{\delta_t}\frac{\partial\rho}{\partial x_1} + \frac{\rho\delta_l v_2}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\rho v_1\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_1} + (cs^2+v_2^2)\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \frac{2\rho\delta_l v_2}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-2+\omega_4)\frac{\delta_l^2 cs^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_1} + (-2+\omega_4)\frac{\delta_l^2 cs^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_2} + (-2-3\omega_6 v_2^2-2cs^2\omega_6+4cs^2+\omega_6+6v_2^2)\frac{\delta_l^2}{\omega_6\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_2} + (2-\omega_6)\frac{3\rho\delta_l^2 v_2}{\omega_6\delta_t}\left(\frac{\partial v_2}{\partial x_2}\right)^2 + (-2+\omega_4)\frac{\rho\delta_l^2 cs^2}{2\delta_t\omega_4}\frac{\partial^2 v_2}{\partial x_1^2} + (-2+\omega_4)\frac{\rho\delta_l^2 cs^2}{2\delta_t\omega_4}\frac{\partial^2 v_1}{\partial x_1\partial x_2} + (-2-\omega_6 v_2^2-3cs^2\omega_6+6cs^2+\omega_6+2v_2^2)\frac{\delta_l^2 v_2}{2\omega_6\delta_t}\frac{\partial^2\rho}{\partial x_2^2} + (-2-3\omega_6 v_2^2-cs^2\omega_6+2cs^2+\omega_6+6v_2^2)\frac{\rho\delta_l^2}{2\omega_6\delta_t}\frac{\partial^2 v_2}{\partial x_2^2} + (-1+v_1^2+3cs^2)\frac{v_1\delta_l^3 v_2}{12\delta_t}\frac{\partial^3\rho}{\partial x_1^3} + (-1+3v_1^2+cs^2)\frac{\rho\delta_l^3 v_2}{12\delta_t}\frac{\partial^3 v_1}{\partial x_1^3} + C_1\frac{\rho v_1\delta_l^3}{6\delta_t\omega_7\omega_4}\frac{\partial^3 v_2}{\partial x_1^3} + (-12-\omega_4^2+12\omega_4)\frac{\delta_l^3 cs^4}{6\delta_t\omega_4^2}\frac{\partial^3\rho}{\partial x_1^2\partial x_2} - \frac{\rho\delta_l^3 cs^2 v_2}{6\delta_t}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2} + C_2\frac{\rho\delta_l^3 v_2}{12\omega_8\omega_6^2\delta_t\omega_4}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2} + C_3\frac{\delta_l^3}{12\omega_6^2\delta_t}\frac{\partial^3\rho}{\partial x_2^3} + (-24-60\omega_6 v_2^2-36cs^2\omega_6+5cs^2\omega_6^2+36cs^2+24\omega_6-4\omega_6^2+60v_2^2+11\omega_6^2 v_2^2)\frac{\rho\delta_l^3 v_2}{6\omega_6^2\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} + (-6v_1^2+3\omega_5 v_1^2+\omega_5 cs^2+24v_1^2cs^2-2cs^2-\omega_5 cs^4+2cs^4-12\omega_5 v_1^2cs^2+6v_1^4-3\omega_5 v_1^4)\frac{\delta_l^4 v_2}{24\omega_5\delta_t}\frac{\partial^4\rho}{\partial x_1^4} + (-4+10v_1^2+2\omega_5-5\omega_5 v_1^2-3\omega_5 cs^2+6cs^2)\frac{\rho v_1\delta_l^4 v_2}{12\omega_5\delta_t}\frac{\partial^4 v_1}{\partial x_1^4} + C_4\frac{\rho\delta_l^4}{24\delta_t\omega_7^2\omega_4^3}\frac{\partial^4 v_2}{\partial x_1^4} + C_5\frac{v_1\delta_l^4 cs^2}{12\omega_8\omega_5\omega_9\omega_6\delta_t\omega_7^2\omega_4^2}\frac{\partial^4\rho}{\partial x_1^3\partial x_2} + C_6\frac{\rho\delta_l^4 cs^2}{12\omega_8\omega_5\omega_9\omega_6\delta_t\omega_7\omega_4^3}\frac{\partial^4 v_1}{\partial x_1^3\partial x_2} + (3\omega_5 cs^2\omega_7+3\omega_5-3\omega_5 v_1^2-9\omega_5 cs^2-\omega_5\omega_7+v_1^2\omega_7+3cs^2\omega_7-\omega_7+\omega_5 v_1^2\omega_7)\frac{\rho v_1\delta_l^4 v_2}{12\omega_5\delta_t\omega_7}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2} + C_7\frac{\delta_l^4 cs^2 v_2}{12\omega_8^2\omega_9\omega_6^3\delta_t\omega_7\omega_4^2}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} + C_8\frac{\rho\delta_l^4 cs^2}{12\omega_8\omega_9\omega_6^2\delta_t\omega_7\omega_4^3}\frac{\partial^4 v_2}{\partial x_1^2\partial x_2^2} + C_9\frac{\rho\delta_l^4}{12\omega_8^2\omega_6^3\delta_t\omega_4^3}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3} + C_{10}\frac{\delta_l^4 v_2}{12\omega_6^3\delta_t}\frac{\partial^4\rho}{\partial x_2^4} + C_{11}\frac{\rho\delta_l^4}{12\omega_6^3\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0,$$

where:

$C_1 = 6 - 6v_1^2 - v_1^2\omega_7\omega_4 + 3v_1^2\omega_4 - 18cs^2 + 3v_1^2\omega_7 + 9cs^2\omega_7 + \omega_7\omega_4 - 3\omega_7 - 3cs^2\omega_7\omega_4 + 9cs^2\omega_4 - 3\omega_4$

$C_2 = 36\omega_8 cs^2\omega_4 + 12\omega_6^2 v_2^2\omega_4 - 6\omega_8\omega_6 v_2^2\omega_4 + 6\omega_8\omega_6^2 v_2^2 - 6\omega_8\omega_6^2 + 6\omega_8\omega_6\omega_4 - 12\omega_6^2\omega_4 + 12\omega_8 v_2^2\omega_4 + 36cs^2\omega_6^2\omega_4 - 36cs^2\omega_6^2 - 18\omega_8 cs^2\omega_6\omega_4 - 11\omega_8 cs^2\omega_6^2\omega_4 + 12\omega_6^2 - 36cs^2\omega_6\omega_4 - 12\omega_8\omega_4 + 18\omega_8 cs^2\omega_6^2 - 3\omega_8\omega_6^2 v_2^2\omega_4 - 12\omega_6 v_2^2\omega_4 + 12\omega_6\omega_4 + 3\omega_8\omega_6^2\omega_4 - 12\omega_6^2 v_2^2$

$C_3 = 36\omega_6 v_2^2 + 144cs^2 v_2^2 + 7\omega_6^2 v_2^4 + 12cs^2\omega_6 + 36v_2^4 - cs^2\omega_6^2 - 144cs^2\omega_6 v_2^2 - 12cs^2 + 24cs^2\omega_6^2 v_2^2 - 12cs^4\omega_6 + 12cs^4 - 36\omega_6 v_2^4 - 36v_2^2 - 7\omega_6^2 v_2^2 + cs^4\omega_6^2$

$C_4 = 12cs^2\omega_7^2\omega_4 - 36v_1^2cs^2\omega_7^2\omega_4 - 30v_1^4\omega_7\omega_4^3 - 216v_1^2cs^2\omega_4^2 - 3cs^4\omega_7^2\omega_4^3 + 72v_1^4\omega_7\omega_4^2 + 24cs^4\omega_7^2\omega_4^2 + 108v_1^2cs^2\omega_4^3 - 48cs^4\omega_7^2\omega_4 - 36v_1^2\omega_4^3 + 30v_1^2\omega_7\omega_4^3 + 24cs^4\omega_7^2 + cs^2\omega_7^2\omega_4^3 + 6v_1^2cs^2\omega_7^2\omega_4^3 - 72v_1^2\omega_7\omega_4^2 + 72v_1^2\omega_4^2 - 12v_1^2cs^2\omega_7^2\omega_4^2 - 8cs^2\omega_7^2\omega_4^2 + 12v_1^2\omega_7^2\omega_4^2 + 144v_1^2cs^2\omega_7\omega_4^2 + 24cs^2\omega_7\omega_4^2 + 24cs^4\omega_7\omega_4 - 3v_1^2\omega_7^2\omega_4^3 - 6cs^2\omega_7\omega_4^3 - 72v_1^2cs^2\omega_7\omega_4^3 - 12v_1^4\omega_7^2\omega_4^2 - 72v_1^2\omega_4^2 - 24cs^4\omega_7\omega_4^2 - 24cs^2\omega_7\omega_4 + 72v_1^2cs^2\omega_7\omega_4 + 36v_1^4\omega_4^3 + 3v_1^4\omega_7^2\omega_4^3 + 6cs^4\omega_7\omega_4^3$

$C_5 = 12\omega_5\omega_6\omega_7^2\omega_4^2 + 54\omega_8\omega_9cs^2\omega_6\omega_7^2\omega_4 + 3\omega_8\omega_5\omega_9\omega_6\omega_7\omega_4^2 - 12\omega_8\omega_5\omega_6\omega_7\omega_4 - 36\omega_9cs^2\omega_6\omega_7^2\omega_4 + 3\omega_8\omega_5\omega_9cs^2\omega_6\omega_7^2\omega_4^2 - 6\omega_8\omega_5v_1^2\omega_7^2\omega_4^2 + 18\omega_8\omega_5\omega_9cs^2\omega_6\omega_4^2 - 18\omega_8\omega_9\omega_6\omega_7^2\omega_4 - 18\omega_8\omega_5cs^2\omega_6\omega_7\omega_4^2 + 12\omega_8\omega_5\omega_9\omega_6\omega_4 + 6\omega_8\omega_5v_1^2\omega_6\omega_7^2\omega_4^2 - 12\omega_8v_1^2\omega_9\omega_6\omega_7^2 - 36\omega_8\omega_5\omega_9cs^2\omega_6\omega_7 + 18\omega_8\omega_9cs^2\omega_7^2\omega_4^2 - 12\omega_5v_1^2\omega_6\omega_7^2\omega_4^2 + 18\omega_8\omega_5v_1^2\omega_9\omega_6\omega_7\omega_4 - 12\omega_8\omega_5\omega_9\omega_6\omega_7^2 + 12\omega_5v_1^2\omega_6\omega_7^2\omega_4 + 36\omega_8\omega_5\omega_9cs^2\omega_6\omega_7^2 - 3\omega_8\omega_5v_1^2\omega_9\omega_6\omega_7\omega_4^2 + 6\omega_8\omega_5\omega_7^2\omega_4^2 + 12\omega_8\omega_5\omega_9\omega_6\omega_7 + 5\omega_8\omega_9\omega_6\omega_7^2\omega_4^2 + 36\omega_8\omega_5cs^2\omega_6\omega_7\omega_4 - 36\omega_8\omega_5\omega_9cs^2\omega_6\omega_4 - 12\omega_8\omega_5v_1^2\omega_6\omega_7^2\omega_4 - 6\omega_8\omega_5\omega_9\omega_6\omega_4^2 + 12\omega_9\omega_7^2\omega_4^2 + 36\omega_5cs^2\omega_7^2\omega_4^2 - 12v_1^2\omega_9\omega_7^2\omega_4^2 + 12\omega_8\omega_9\omega_6\omega_7^2 + 6\omega_8\omega_5\omega_6\omega_7\omega_4^2 + 36\omega_9cs^2\omega_6\omega_7^2\omega_4^2 - 36\omega_8\omega_5\omega_9cs^2\omega_6\omega_7^2\omega_4 - 12\omega_5\omega_6\omega_7^2\omega_4 - 15\omega_8\omega_9cs^2\omega_6\omega_7^2\omega_4^2 - 18\omega_8\omega_5\omega_9\omega_6\omega_7\omega_4 + 54\omega_8\omega_5\omega_9cs^2\omega_6\omega_7\omega_4 - 12\omega_5\omega_7^2\omega_4^2 - 6\omega_8\omega_5\omega_6\omega_7^2\omega_4^2 - 12\omega_8\omega_5v_1^2\omega_9\omega_6\omega_4 + 12\omega_8\omega_5\omega_9\omega_6\omega_7^2\omega_4 + 12\omega_5v_1^2\omega_7^2\omega_4^2 + 12\omega_8\omega_5v_1^2\omega_9\omega_6\omega_7^2 - 6\omega_8\omega_9\omega_7^2\omega_4^2 - 12v_1^2\omega_9\omega_6\omega_7^2\omega_4 + 36\omega_5cs^2\omega_6\omega_7^2\omega_4 + 12\omega_9\omega_6\omega_7^2\omega_4 + \omega_8\omega_5v_1^2\omega_9\omega_6\omega_7^2\omega_4^2 + 18\omega_8v_1^2\omega_9\omega_6\omega_7^2\omega_4 - 36\omega_8\omega_5cs^2\omega_6\omega_7^2\omega_4 - 36\omega_9cs^2\omega_7^2\omega_4^2 + 12\omega_8\omega_5v_1^2\omega_6\omega_7\omega_4 + 18\omega_8\omega_5cs^2\omega_6\omega_7^2\omega_4^2 - 5\omega_8v_1^2\omega_9\omega_6\omega_7^2\omega_4^2 - 6\omega_8\omega_5v_1^2\omega_6\omega_7\omega_4^2 - 36\omega_5cs^2\omega_6\omega_7^2\omega_4^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2 + 12v_1^2\omega_9\omega_6\omega_7^2\omega_4^2 - 12\omega_8\omega_5v_1^2\omega_9\omega_6\omega_7^2\omega_4 - \omega_8\omega_5\omega_9\omega_6\omega_7^2\omega_4^2 - 18\omega_8\omega_5cs^2\omega_7^2\omega_4^2 + 6\omega_8v_1^2\omega_9\omega_7^2\omega_4^2 - 12\omega_8\omega_5v_1^2\omega_9\omega_6\omega_7 - 36\omega_8\omega_9cs^2\omega_6\omega_7^2 - 9\omega_8\omega_5\omega_9cs^2\omega_6\omega_7\omega_4^2 + 6\omega_8\omega_5v_1^2\omega_9\omega_6\omega_4^2 + 12\omega_8\omega_5\omega_6\omega_7^2\omega_4$

$C_6 = \omega_8\omega_5\omega_9\omega_6\omega_7\omega_4^2 + 6\omega_8\omega_5\omega_9cs^2\omega_6\omega_4^3 - 15\omega_8v_1^2\omega_9\omega_6\omega_7\omega_4^3 + 6\omega_8\omega_5cs^2\omega_6\omega_7\omega_4^3 + 36v_1^2\omega_9\omega_6\omega_7\omega_4^3 - 12\omega_9\omega_6\omega_7\omega_4^3 - 12\omega_5cs^2\omega_6\omega_7\omega_4^3 + 18\omega_8v_1^2\omega_9\omega_7\omega_4^3 - 6\omega_8\omega_5cs^2\omega_7\omega_4^3 + 54\omega_8v_1^2\omega_9\omega_6\omega_7\omega_4^2 - 18\omega_8\omega_5\omega_9cs^2\omega_6\omega_4^2 - 12\omega_8\omega_5cs^2\omega_6\omega_7\omega_4^2 - 12\omega_8\omega_5\omega_9\omega_6\omega_4 - 12\omega_8\omega_5\omega_9cs^2\omega_6\omega_7 - 36v_1^2\omega_9\omega_6\omega_7\omega_4^2 + 12\omega_5cs^2\omega_6\omega_7\omega_4^2 + 12\omega_9\omega_6\omega_7\omega_4^2 - 12\omega_5\omega_7\omega_4^3 - 6\omega_8\omega_5\omega_6\omega_7\omega_4^3 - 3\omega_8\omega_5v_1^2\omega_9\omega_6\omega_7\omega_4^2 + 12\omega_8\omega_5cs^2\omega_6\omega_4^2 + 12\omega_8\omega_5\omega_9cs^2\omega_6\omega_4 - 36\omega_8v_1^2\omega_9\omega_6\omega_7\omega_4 + 36\omega_5v_1^2\omega_7\omega_4^3 + 18\omega_8\omega_5\omega_9\omega_6\omega_4^2 - 6\omega_8\omega_5cs^2\omega_6\omega_4^3 - 6\omega_8\omega_9\omega_7\omega_4^3 + 12\omega_8\omega_5\omega_6\omega_7\omega_4^2 - 12\omega_9cs^2\omega_7\omega_4^3 - 6\omega_8\omega_5\omega_9\omega_6\omega_4^3 + 6\omega_8\omega_5\omega_7\omega_4^3 + 18\omega_8\omega_5\omega_9cs^2\omega_6\omega_7\omega_4 - 12\omega_9cs^2\omega_6\omega_7\omega_4^2 + 36\omega_8\omega_5v_1^2\omega_9\omega_6\omega_4 - 18\omega_8\omega_5v_1^2\omega_6\omega_4^3 + 18\omega_8\omega_9cs^2\omega_6\omega_7\omega_4^2 + 5\omega_8\omega_9\omega_6\omega_7\omega_4^3 + 12\omega_9cs^2\omega_6\omega_7\omega_4^3 - 36v_1^2\omega_9\omega_7\omega_4^3 + 12\omega_5cs^2\omega_7\omega_4^3 + 12\omega_9\omega_7\omega_4^3 - 18\omega_8\omega_9\omega_6\omega_7\omega_4^2 - 5\omega_8\omega_9cs^2\omega_6\omega_7\omega_4^3 + 36\omega_8\omega_5v_1^2\omega_6\omega_4^2 + 12\omega_8\omega_9\omega_6\omega_7\omega_4 + 6\omega_8\omega_5\omega_6\omega_4^3 + 12\omega_5\omega_6\omega_7\omega_4^3 - 36\omega_8\omega_5v_1^2\omega_6\omega_7\omega_4^2 + 18\omega_8\omega_5v_1^2\omega_9\omega_6\omega_4^3 + 36\omega_5v_1^2\omega_6\omega_7\omega_4^2 - 18\omega_8\omega_5v_1^2\omega_7\omega_4^3 - \omega_8\omega_5\omega_9cs^2\omega_6\omega_7\omega_4^3 + 18\omega_8\omega_5v_1^2\omega_6\omega_7\omega_4^3 - 12\omega_8\omega_9cs^2\omega_6\omega_7\omega_4 - 12\omega_5\omega_6\omega_7\omega_4^2 - 12\omega_8\omega_5\omega_6\omega_4^2 - 36\omega_5v_1^2\omega_6\omega_7\omega_4^3 + 6\omega_8\omega_9cs^2\omega_7\omega_4^3 - 5\omega_8\omega_5\omega_9cs^2\omega_6\omega_7\omega_4^2 - 54\omega_8\omega_5v_1^2\omega_9\omega_6\omega_4^2$

$C_7 = 6\omega_8^2\omega_9\omega_6^2v_2^2\omega_4^2 + 36\omega_8^2\omega_9cs^2\omega_6^3\omega_7 + 12\omega_8^2\omega_9\omega_6^2\omega_4 - 12\omega_8^2\omega_9\omega_6^2v_2^2\omega_7 - 12\omega_8^2\omega_9\omega_6v_2^2\omega_7\omega_4^2 - 12\omega_8^2\omega_9\omega_6^3\omega_7 + 6\omega_8^2\omega_6^3\omega_4^2 - 18\omega_8^2cs^2\omega_6^3\omega_4^2 - 36\omega_8^2\omega_9cs^2\omega_6^2\omega_4 + 12\omega_9\omega_6^3\omega_7\omega_4 - 12\omega_8\omega_6^3\omega_7\omega_4 - 36\omega_8\omega_9cs^2\omega_6^3\omega_7 - 6\omega_8^2\omega_9cs^2\omega_6^2\omega_7\omega_4^2 - 18\omega_8^2\omega_9\omega_6^2\omega_7\omega_4 - 36\omega_9cs^2\omega_6^2\omega_7\omega_4^2 - 12\omega_8^2\omega_6^3\omega_4 - 12\omega_8\omega_9\omega_6\omega_7^2\omega_4^2 - 2\omega_8^2\omega_9\omega_6^2\omega_7\omega_4^2 + 54\omega_8^2\omega_9cs^2\omega_6^2\omega_7\omega_4 - 36\omega_8^2\omega_9cs^2\omega_6^2\omega_7 + 54\omega_8\omega_9cs^2\omega_6^2\omega_7\omega_4^2 + 36\omega_8cs^2\omega_6^2\omega_7\omega_4^2 + 6\omega_8^2\omega_6^2\omega_7\omega_4^2 + 12\omega_8^2\omega_9\omega_6^2\omega_7 - 18\omega_8^2cs^2\omega_6^2\omega_7\omega_4^2 - 12\omega_8^2\omega_9\omega_6^2v_2^2\omega_4 - 6\omega_8^2\omega_9\omega_6^2\omega_4^2 - 18\omega_8\omega_9\omega_6^2\omega_7\omega_4^2 + 6\omega_8^2\omega_6^3v_2^2\omega_7\omega_4^2 + 12\omega_8^2\omega_9\omega_6\omega_7\omega_4^2 - 36\omega_9cs^2\omega_6^3\omega_7\omega_4 + 12\omega_8^2\omega_9\omega_6^3\omega_7\omega_4 + 5\omega_8^2\omega_9cs^2\omega_6^3\omega_7\omega_4^2 - 36\omega_8\omega_9cs^2\omega_6\omega_7\omega_4^2 - 12\omega_8\omega_9\omega_6^3v_2^2\omega_7 - 6\omega_8^2\omega_6^3v_2^2\omega_4^2 + 36\omega_8cs^2\omega_6^3\omega_7\omega_4 + 54\omega_8\omega_9cs^2\omega_6^3\omega_7\omega_4 + 12\omega_8^2\omega_9v_2^2\omega_7\omega_4^2 + 12\omega_8^2\omega_6^3\omega_7\omega_4 - 12\omega_8^2\omega_9\omega_6^3v_2^2\omega_7\omega_4 + 12\omega_8^2\omega_9\omega_6^3v_2^2\omega_7 + 12\omega_8\omega_9\omega_6^3\omega_7 - 36\omega_8^2cs^2\omega_6^3\omega_7\omega_4 + 12\omega_9\omega_6^3v_2^2\omega_7\omega_4^2 + 12\omega_8\omega_9\omega_6\omega_7\omega_4^2 - 12\omega_8\omega_6^3v_2^2\omega_7\omega_4^2 - 6\omega_8\omega_9\omega_6^3v_2^2\omega_7\omega_4^2 - 18\omega_8\omega_9\omega_6^3\omega_7\omega_4 - 2\omega_8^2\omega_9\omega_6^2v_2^2\omega_7\omega_4^2 + 12\omega_8\omega_6^3v_2^2\omega_7\omega_4 - 12\omega_9\omega_6^2v_2^2\omega_7\omega_4^2 + 18\omega_8\omega_9\omega_6^3v_2^2\omega_7\omega_4 + 6\omega_8\omega_9\omega_6^3\omega_7\omega_4^2 + 18\omega_8^2\omega_9\omega_6^2v_2^2\omega_7\omega_4 - 6\omega_8^2\omega_6^3\omega_7\omega_4^2 + \omega_8^2\omega_9\omega_6^3v_2^2\omega_7\omega_4^2 + 18\omega_8^2cs^2\omega_6^3\omega_7\omega_4^2 + 18\omega_8\omega_9\omega_6^2v_2^2\omega_7\omega_4 - 12\omega_8^2\omega_9\omega_7\omega_4^2 - 12\omega_9\omega_6^3v_2^2\omega_7\omega_4 + 12\omega_8\omega_6^2v_2^2\omega_7\omega_4^2 + 36\omega_8^2\omega_9cs^2\omega_7\omega_4^2 + 12\omega_8^2\omega_6^3v_2^2\omega_4 - 36\omega_8cs^2\omega_6^3\omega_7\omega_4^2 - 6\omega_8^2\omega_6^2v_2^2\omega_7\omega_4^2 - 18\omega_8\omega_9cs^2\omega_6^3\omega_7\omega_4^2 - 36\omega_8^2\omega_9cs^2\omega_6\omega_7\omega_4^2 - 12\omega_8^2\omega_6^3v_2^2\omega_7\omega_4 + 12\omega_9\omega_6^2\omega_7\omega_4^2 + 36\omega_9cs^2\omega_6^3\omega_7\omega_4^2 - 40\omega_8^2\omega_9cs^2\omega_6^3\omega_7\omega_4 - \omega_8^2\omega_9\omega_6^3\omega_7\omega_4^2 - 12\omega_8\omega_6^2\omega_7\omega_4^2$

$C_8 = 12\omega_8\omega_9\omega_6\omega_4^2 + 12\omega_9\omega_6\omega_7\omega_4^3 + 12\omega_6^2\omega_7\omega_4^3 + 6\omega_8\omega_6\omega_7\omega_4^3 + 18\omega_8\omega_9cs^2\omega_6^2\omega_7\omega_4 - 6\omega_8\omega_9\omega_6\omega_4^3 + 12cs^2\omega_6\omega_7\omega_4^3 - 36\omega_8\omega_9\omega_6v_2^2\omega_7\omega_4 + 12\omega_9cs^2\omega_6^2\omega_7\omega_4 - 12\omega_6^2\omega_7\omega_4^2 - 12\omega_9\omega_6\omega_7\omega_4^2 - 24\omega_9cs^2\omega_6^2\omega_7\omega_4^2 + 72\omega_8\omega_9\omega_6v_2^2\omega_7\omega_4^2 + 12\omega_8\omega_9\omega_7\omega_4^2 + 36\omega_6^2v_2^2\omega_7\omega_4^2 - 4\omega_8\omega_9cs^2\omega_6^2\omega_7\omega_4^2 + 36\omega_9\omega_6v_2^2\omega_7\omega_4^2 - 12\omega_8cs^2\omega_6^2\omega_7\omega_4^2 - 12\omega_8\omega_9cs^2\omega_6^2\omega_7 - 6\omega_8\omega_9\omega_7\omega_4^3 - 18\omega_8\omega_6v_2^2\omega_7\omega_4^3 + 12\omega_9cs^2\omega_6^2\omega_7\omega_4^3 - 18\omega_8\omega_9\omega_6v_2^2\omega_7\omega_4^3 + 6\omega_8cs^2\omega_6^2\omega_7\omega_4^3 - \omega_8\omega_9cs^2\omega_6^2\omega_7\omega_4^3 - 36\omega_9\omega_6v_2^2\omega_7\omega_4^3 - 36\omega_6^2v_2^2\omega_7\omega_4^3 - 12\omega_9\omega_6^2\omega_7\omega_4 + 18\omega_8\omega_9v_2^2\omega_7\omega_4^3 + 6\omega_8\omega_6^2\omega_4^3 + 12\omega_9cs^2\omega_6\omega_7\omega_4^2 - 12\omega_8\omega_9cs^2\omega_6\omega_4^2 + 24\omega_8\omega_9cs^2\omega_6\omega_7\omega_4^2 - 18\omega_8\omega_6^2v_2^2\omega_4^3 + 6\omega_8\omega_9\omega_6\omega_7\omega_4^3 - 12\omega_9cs^2\omega_6\omega_7\omega_4^3 - 12\omega_8\omega_6^2\omega_4^2 - 36\omega_8\omega_9v_2^2\omega_7\omega_4^2 + 36\omega_9\omega_6^2v_2^2\omega_7\omega_4 - 24\omega_8\omega_9\omega_6\omega_7\omega_4^2 + 36\omega_8\omega_6^2v_2^2\omega_4^2 - 6\omega_8\omega_9cs^2\omega_6\omega_7\omega_4^3 - 6\omega_8cs^2\omega_6\omega_7\omega_4^3 + 6\omega_8\omega_9cs^2\omega_6\omega_4^3 + 12\omega_8\omega_9\omega_6\omega_7\omega_4 - 72\omega_9\omega_6^2v_2^2\omega_7\omega_4^2 - 6\omega_8\omega_6^2\omega_7\omega_4^3 + 12cs^2\omega_6^2\omega_7\omega_4^2 + 18\omega_8\omega_9\omega_6v_2^2\omega_4^3 - 12\omega_8\omega_9cs^2\omega_7\omega_4^2 - 12\omega_6\omega_7\omega_4^3 - 6\omega_8cs^2\omega_6^2\omega_4^3 - 36\omega_8\omega_6^2v_2^2\omega_7\omega_4^2 - 12\omega_9\omega_6^2\omega_7\omega_4^3 - 12\omega_8\omega_9cs^2\omega_6\omega_7\omega_4 + 36\omega_6v_2^2\omega_7\omega_4^3 + 36\omega_9\omega_6^2v_2^2\omega_7\omega_4^3 + 24\omega_9\omega_6^2\omega_7\omega_4^2 + 18\omega_8\omega_6^2v_2^2\omega_7\omega_4^3 + 12\omega_8cs^2\omega_6^2\omega_4^2 - 36\omega_8\omega_9\omega_6v_2^2\omega_4^2 + 6\omega_8\omega_9cs^2\omega_7\omega_4^3 - 12cs^2\omega_6^2\omega_7\omega_4^3 + 12\omega_8\omega_6^2\omega_7\omega_4^2$

$C_9 = 108cs^2\omega_6^3v_2^2\omega_4^3 - 36\omega_8\omega_6^3v_2^2\omega_4^2 - 24\omega_8^2cs^4\omega_6^3\omega_4 - 19\omega_8^2\omega_6^2v_2^2\omega_4^3 + \omega_8^2cs^4\omega_6^2\omega_4^3 + 60\omega_8^2cs^2\omega_6^2v_2^2\omega_4^3 + 72\omega_8^2v_2^4\omega_4^3 + 36\omega_8cs^2\omega_6^2v_2^2\omega_4^2 + 4\omega_8^2\omega_6^3v_2^4\omega_4^3 + 18\omega_8^2cs^2\omega_6^2v_2^2\omega_4^2 + 6\omega_8^2cs^4\omega_6^2\omega_4^2 + 39\omega_8\omega_6^3v_2^2\omega_4^3 - 108cs^2\omega_6^3v_2^2\omega_4^2 + 12\omega_8^2cs^4\omega_4^3 - 5\omega_8^2cs^2\omega_6^3\omega_4^2 + 72\omega_8\omega_6^2v_2^4\omega_4^3 - 6\omega_8^2\omega_6^3v_2^4\omega_4^2 + 198\omega_8cs^2\omega_6^2v_2^2\omega_4^3 - \omega_8^2cs^2\omega_6^2\omega_4^3 + 6\omega_8^2cs^2\omega_6^3\omega_4 + 36\omega_6^3v_2^4\omega_4^3 + 36\omega_8\omega_6v_2^2\omega_4^3 - \omega_8^2cs^4\omega_6^3\omega_4^3 + 36\omega_6^2v_2^2\omega_4^3 - 36\omega_6^3v_2^4\omega_4^2 - 90\omega_8^2\omega_6v_2^4\omega_4^3 - 6\omega_8^2cs^2\omega_6^2\omega_4^2 + 13\omega_8^2cs^4\omega_6^3\omega_4^2 - 6\omega_8cs^2\omega_6^3\omega_4^3 + 12\omega_8^2cs^2\omega_6\omega_4^2 - 99\omega_8cs^2\omega_6^3v_2^2\omega_4^3 - 39\omega_8\omega_6^3v_2^4\omega_4^3 - 12\omega_8^2cs^2\omega_4^3 - 3\omega_8^2cs^2\omega_6^3v_2^2\omega_4^2 + 6\omega_8^2\omega_6^3v_2^2\omega_4^2 - 72\omega_8\omega_6^2v_2^2\omega_4^3 + 12\omega_8cs^4\omega_6^3\omega_4 - 6\omega_8cs^4\omega_6^2\omega_4^3 + 54\omega_8cs^2\omega_6^3v_2^2\omega_4^2 + 19\omega_8^2\omega_6^2v_2^4\omega_4^3 + 36\omega_8\omega_6^3v_2^4\omega_4^2 + 12\omega_8^2cs^2\omega_6\omega_4^3 + 252\omega_8^2cs^2v_2^2\omega_4^3 + 18\omega_8cs^2\omega_6^3\omega_4^2 - 72\omega_8^2v_2^2\omega_4^3 + 12\omega_8cs^4\omega_6^2\omega_4^2 - 4\omega_8^2\omega_6^3v_2^2\omega_4^3 - 108cs^2\omega_6^2v_2^2\omega_4^3 + 12\omega_8^2cs^2\omega_6^3v_2^2\omega_4^3 - 306\omega_8^2cs^2\omega_6v_2^2\omega_4^3 + 6\omega_8cs^4\omega_6^3\omega_4^3 + 36\omega_6^3v_2^2\omega_4^2 - 12\omega_8^2cs^4\omega_6\omega_4^2 + 90\omega_8^2\omega_6v_2^2\omega_4^3 + 36\omega_8cs^2\omega_6^3v_2^2\omega_4 + 6\omega_8cs^2\omega_6^2\omega_4^3 - 12\omega_8cs^2\omega_6^3\omega_4 - 18\omega_8^2cs^2\omega_6^3v_2^2\omega_4 - 12\omega_8^2cs^4\omega_6\omega_4^3 - 18\omega_8cs^4\omega_6^3\omega_4^2 - 36\omega_8^2cs^2\omega_6v_2^2\omega_4^2 - 36\omega_6^3v_2^2\omega_4^3 + 12\omega_8^2cs^4\omega_6^3 - 36\omega_8\omega_6v_2^4\omega_4^3 - 12\omega_8cs^2\omega_6^2\omega_4^2 - 108\omega_8cs^2\omega_6v_2^2\omega_4^3 - 36\omega_6^2v_2^4\omega_4^3$

$C_{10} = 12 + 234\omega_6v_2^2 + 672cs^2v_2^2 + 90\omega_6^2v_2^4 + 198cs^2\omega_6 + 144v_2^4 - 78cs^2\omega_6^2 - 1008cs^2\omega_6v_2^2 - 132cs^2 + 6cs^2\omega_6^3 - 9\omega_6^3v_2^4 + 404cs^2\omega_6^2v_2^2 - 18\omega_6 - 216cs^4\omega_6 + 8\omega_6^2 + 144cs^4 + 10\omega_6^3v_2^2 - \omega_6^3 - 216\omega_6v_2^4 - 34cs^2\omega_6^3v_2^2 - 5cs^4\omega_6^3 - 156v_2^2 - 98\omega_6^2v_2^2 + 82cs^4\omega_6^2$

$C_{11} = 12 + 378\omega_6v_2^2 + 432cs^2v_2^2 + 310\omega_6^2v_2^4 + 54cs^2\omega_6 + 504v_2^4 - 22cs^2\omega_6^2 - 648cs^2\omega_6v_2^2 - 36cs^2 + 2cs^2\omega_6^3 - 29\omega_6^3v_2^4 + 252cs^2\omega_6^2v_2^2 - 18\omega_6 - 36cs^4\omega_6 + 8\omega_6^2 + 24cs^4 + 14\omega_6^3v_2^2 - \omega_6^3 - 756\omega_6v_2^4 - 18cs^2\omega_6^3v_2^2 - cs^4\omega_6^3 - 252v_2^2 - 154\omega_6^2v_2^2 + 14cs^4\omega_6^2$

2.5 CLBM2

2.5.1 Definitions

Collision operator $\boldsymbol{C}$:

$$\boldsymbol{C}\left(\boldsymbol{f}\right) = \mathbf{K}^{-1}\mathbf{S}\left(\boldsymbol{\kappa}^{(eq)} - \mathbf{K}\boldsymbol{f}\right),$$

where

$$\mathbf{S} = \mathrm{diag}(\omega_1, \omega_2, \omega_3, \omega_4, \omega_5, \omega_6, \omega_7, \omega_8, \omega_9),$$

$\omega_1, \omega_2, \ldots, \omega_9 \in (0, 2)$.
Matrix $\mathbf{K}$ corresponds to the transformation matrix to the central moment basis defined by

$$\boldsymbol{\kappa} = \begin{pmatrix} k_{(0,0)} \\ k_{(1,0)} \\ k_{(0,1)} \\ k_{(1,1)} \\ k_{(2,0)} + k_{(0,2)} \\ k_{(2,0)} - k_{(0,2)} \\ k_{(2,1)} \\ k_{(1,2)} \\ k_{(2,2)} \end{pmatrix},$$

thus, the transformation matrix $\mathbf{K}$ satisfies

$$\begin{aligned}
\mathbf{K}_{1,i} &= \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(0,0)} \\
\mathbf{K}_{2,i} &= \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(1,0)} \\
\mathbf{K}_{3,i} &= \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(0,1)} \\
\mathbf{K}_{4,i} &= \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(1,1)} \\
\mathbf{K}_{5,i} &= \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(2,0)} + \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(0,2)} \\
\mathbf{K}_{6,i} &= \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(2,0)} - \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(0,2)} \\
\mathbf{K}_{7,i} &= \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(2,1)} \\
\mathbf{K}_{8,i} &= \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(1,2)} \\
\mathbf{K}_{9,i} &= \left(\boldsymbol{c}_i - \boldsymbol{v}\right)^{(2,2)},
\end{aligned}$$

$\forall i \in \{1, 2, \cdots, 9\}$.
The equilibrium central moments are defined by

$$\boldsymbol{\kappa}^{(eq)} = \mathbf{K}\mathbf{M}^{-1}\boldsymbol{\mu}^{(eq)},$$

i.e.,

$$\boldsymbol{\kappa}^{(eq)} = \left(\rho, 0, 0, 0, 2\rho c_s^2, 0, 0, 0, \rho c_s^4\right)^T.$$

2.5.2 Conservation of mass: ρ

attached text file: `output_d2q9_nse_clbm2_symbolic_pde_00.txt`

$$\frac{\partial \rho}{\partial t} + \frac{v_1 \delta_l}{\delta_t} \frac{\partial \rho}{\partial x_1} + \frac{\rho \delta_l}{\delta_t} \frac{\partial v_1}{\partial x_1} + \frac{v_2 \delta_l}{\delta_t} \frac{\partial \rho}{\partial x_2} + \frac{\rho \delta_l}{\delta_t} \frac{\partial v_2}{\partial x_2} + (-1 + 3cs^2 + v_1^2) \frac{v_1 \delta_l^3}{12 \delta_t} \frac{\partial^3 \rho}{\partial x_1^3} + (-1 + cs^2 + 3v_1^2) \frac{\rho \delta_l^3}{12 \delta_t} \frac{\partial^3 v_1}{\partial x_1^3} -$$
$$\frac{cs^2 \rho \delta_l^3}{6 \delta_t} \frac{\partial^3 v_2}{\partial x_1^2 \partial x_2} - \frac{cs^2 \rho \delta_l^3}{6 \delta_t} \frac{\partial^3 v_1}{\partial x_1 \partial x_2^2} + (-1 + 3cs^2 + v_2^2) \frac{v_2 \delta_l^3}{12 \delta_t} \frac{\partial^3 \rho}{\partial x_2^3} + (-1 + cs^2 + 3v_2^2) \frac{\rho \delta_l^3}{12 \delta_t} \frac{\partial^3 v_2}{\partial x_2^3} +$$
$$(-2cs^2 - cs^4 \omega_5 - 3v_1^4 \omega_5 + 6v_1^4 - 12cs^2 v_1^2 \omega_5 + cs^2 \omega_5 - 6v_1^2 + 3v_1^2 \omega_5 + 2cs^4 + 24cs^2 v_1^2) \frac{\delta_l^4}{24 \delta_t \omega_5} \frac{\partial^4 \rho}{\partial x_1^4} +$$
$$(-4 + 6cs^2 - 3cs^2 \omega_5 + 10v_1^2 - 5v_1^2 \omega_5 + 2\omega_5) \frac{\rho v_1 \delta_l^4}{12 \delta_t \omega_5} \frac{\partial^4 v_1}{\partial x_1^4} +$$
$$(\omega_7 v_1^2 \omega_5 + 3\omega_7 cs^2 \omega_5 - \omega_7 + 3\omega_7 cs^2 - 9cs^2 \omega_5 - \omega_7 \omega_5 - 3v_1^2 \omega_5 + 3\omega_5 + \omega_7 v_1^2) \frac{\rho v_1 \delta_l^4}{12 \delta_t \omega_7 \omega_5} \frac{\partial^4 v_2}{\partial x_1^3 \partial x_2} +$$
$$(-2 + \omega_4) \frac{cs^4 \delta_l^4}{6 \delta_t \omega_4} \frac{\partial^4 \rho}{\partial x_1^2 \partial x_2^2} +$$
$$(3\omega_6 + 3\omega_6 cs^2 \omega_8 - 3\omega_6 v_2^2 + 3cs^2 \omega_8 - \omega_6 \omega_8 + \omega_8 v_2^2 - \omega_8 - 9\omega_6 cs^2 + \omega_6 \omega_8 v_2^2) \frac{\rho v_2 \delta_l^4}{12 \omega_6 \delta_t \omega_8} \frac{\partial^4 v_1}{\partial x_1 \partial x_2^3} +$$
$$(-2cs^2 + 3\omega_6 v_2^2 + 6v_2^4 - \omega_6 cs^4 - 6v_2^2 - 12\omega_6 cs^2 v_2^2 + \omega_6 cs^2 + 24cs^2 v_2^2 + 2cs^4 - 3\omega_6 v_2^4) \frac{\delta_l^4}{24 \omega_6 \delta_t} \frac{\partial^4 \rho}{\partial x_2^4} +$$
$$(-4 + 2\omega_6 + 6cs^2 - 5\omega_6 v_2^2 + 10v_2^2 - 3\omega_6 cs^2) \frac{\rho v_2 \delta_l^4}{12 \omega_6 \delta_t} \frac{\partial^4 v_2}{\partial x_2^4} = 0.$$

2.5.3 Conservation of momentum: ρv_1

attached text file: `output_d2q9_nse_clbm2_symbolic_pde_01.txt`

$$v_1 \frac{\partial \rho}{\partial t} + \rho \frac{\partial v_1}{\partial t} + (cs^2 + v_1^2) \frac{\delta_l}{\delta_t} \frac{\partial \rho}{\partial x_1} + \frac{2\rho v_1 \delta_l}{\delta_t} \frac{\partial v_1}{\partial x_1} + \frac{v_1 v_2 \delta_l}{\delta_t} \frac{\partial \rho}{\partial x_2} + \frac{\rho v_2 \delta_l}{\delta_t} \frac{\partial v_1}{\partial x_2} + \frac{\rho v_1 \delta_l}{\delta_t} \frac{\partial v_2}{\partial x_2} +$$
$$(-2 + 4cs^2 - 2cs^2 \omega_5 + 6v_1^2 - 3v_1^2 \omega_5 + \omega_5) \frac{\delta_l^2}{\delta_t \omega_5} \frac{\partial \rho}{\partial x_1} \frac{\partial v_1}{\partial x_1} + (2 - \omega_5) \frac{3\rho v_1 \delta_l^2}{\delta_t \omega_5} \left(\frac{\partial v_1}{\partial x_1} \right)^2 + (-2 + \omega_4) \frac{cs^2 \delta_l^2}{2 \delta_t \omega_4} \frac{\partial \rho}{\partial x_2} \frac{\partial v_2}{\partial x_1} +$$
$$(-2 + \omega_4) \frac{cs^2 \delta_l^2}{2 \delta_t \omega_4} \frac{\partial \rho}{\partial x_2} \frac{\partial v_1}{\partial x_2} + (-2 + 6cs^2 - 3cs^2 \omega_5 + 2v_1^2 - v_1^2 \omega_5 + \omega_5) \frac{v_1 \delta_l^2}{2 \delta_t \omega_5} \frac{\partial^2 \rho}{\partial x_1^2} +$$
$$(-2 + 2cs^2 - cs^2 \omega_5 + 6v_1^2 - 3v_1^2 \omega_5 + \omega_5) \frac{\rho \delta_l^2}{2 \delta_t \omega_5} \frac{\partial^2 v_1}{\partial x_1^2} + (-2 + \omega_4) \frac{cs^2 \rho \delta_l^2}{2 \delta_t \omega_4} \frac{\partial^2 v_2}{\partial x_1 \partial x_2} + (-2 + \omega_4) \frac{cs^2 \rho \delta_l^2}{2 \delta_t \omega_4} \frac{\partial^2 v_1}{\partial x_2^2} +$$
$$C_1 \frac{\delta_l^3}{12 \delta_t \omega_5^2} \frac{\partial^3 \rho}{\partial x_1^3} + (-24 + 36cs^2 - 36cs^2 \omega_5 + 11v_1^2 \omega_5^2 - 4\omega_5^2 + 60v_1^2 - 60v_1^2 \omega_5 + 24\omega_5 + 5cs^2 \omega_5^2) \frac{\rho v_1 \delta_l^3}{6 \delta_t \omega_5^2} \frac{\partial^3 v_1}{\partial x_1^3} +$$
$$C_2 \frac{\rho v_1 \delta_l^3}{12 \delta_t \omega_7 \omega_4 \omega_5^2} \frac{\partial^3 v_2}{\partial x_1^2 \partial x_2} + (-12 + 12\omega_4 - \omega_4^2) \frac{cs^4 \delta_l^3}{6 \delta_t \omega_4^2} \frac{\partial^3 \rho}{\partial x_1 \partial x_2^2} - \frac{cs^2 \rho v_1 \delta_l^3}{6 \delta_t} \frac{\partial^3 v_1}{\partial x_1 \partial x_2^2} + (-1 + 3cs^2 + v_2^2) \frac{v_1 v_2 \delta_l^3}{12 \delta_t} \frac{\partial^3 \rho}{\partial x_2^3} +$$
$$C_3 \frac{\rho v_2 \delta_l^3}{6 \delta_t \omega_4 \omega_8} \frac{\partial^3 v_1}{\partial x_2^3} + (-1 + cs^2 + 3v_2^2) \frac{\rho v_1 \delta_l^3}{12 \delta_t} \frac{\partial^3 v_2}{\partial x_2^3} + C_4 \frac{v_1 \delta_l^4}{12 \delta_t \omega_5^3} \frac{\partial^4 \rho}{\partial x_1^4} + C_5 \frac{\rho \delta_l^4}{12 \delta_t \omega_5^3} \frac{\partial^4 v_1}{\partial x_1^4} + C_6 \frac{\rho \delta_l^4}{12 \delta_t \omega_7^2 \omega_4^3 \omega_5^3} \frac{\partial^4 v_2}{\partial x_1^3 \partial x_2} +$$
$$C_7 \frac{cs^2 v_1 \delta_l^4}{12 \omega_9 \delta_t \omega_7^2 \omega_4^2 \omega_8 \omega_5^3} \frac{\partial^4 \rho}{\partial x_1^2 \partial x_2^2} + C_8 \frac{cs^2 \rho \delta_l^4}{12 \omega_9 \delta_t \omega_7 \omega_4^3 \omega_8 \omega_5^2} \frac{\partial^4 v_1}{\partial x_1^2 \partial x_2^2} + C_9 \frac{cs^2 v_2 \delta_l^4}{12 \omega_9 \omega_6 \delta_t \omega_7 \omega_4^2 \omega_8^2 \omega_5} \frac{\partial^4 \rho}{\partial x_1 \partial x_2^3} +$$
$$(3\omega_6 cs^2 \omega_8 + 3\omega_6 - 3\omega_6 v_2^2 + 3cs^2 \omega_8 - \omega_6 \omega_8 + \omega_8 v_2^2 - 9\omega_6 cs^2 - \omega_8 + \omega_6 \omega_8 v_2^2) \frac{\rho v_1 v_2 \delta_l^4}{12 \omega_6 \delta_t \omega_8} \frac{\partial^4 v_1}{\partial x_1 \partial x_2^3} +$$
$$C_{10} \frac{cs^2 \rho \delta_l^4}{12 \omega_9 \omega_6 \delta_t \omega_7 \omega_4^3 \omega_8 \omega_5} \frac{\partial^4 v_2}{\partial x_1 \partial x_2^3} +$$
$$(-2cs^2 + 3\omega_6 v_2^2 + 6v_2^4 - \omega_6 cs^4 - 6v_2^2 - 12\omega_6 cs^2 v_2^2 + \omega_6 cs^2 + 2cs^4 - 3\omega_6 v_2^4 + 24cs^2 v_2^2) \frac{v_1 \delta_l^4}{24 \omega_6 \delta_t} \frac{\partial^4 \rho}{\partial x_2^4} +$$
$$C_{11} \frac{\rho \delta_l^4}{24 \delta_t \omega_4^3 \omega_8^2} \frac{\partial^4 v_1}{\partial x_2^4} + (-4 + 6cs^2 + 2\omega_6 - 5\omega_6 v_2^2 + 10v_2^2 - 3\omega_6 cs^2) \frac{\rho v_1 v_2 \delta_l^4}{12 \omega_6 \delta_t} \frac{\partial^4 v_2}{\partial x_2^4} = 0,$$

where:

$$C_1 = -12cs^2 - 12cs^4 \omega_5 + 7v_1^4 \omega_5^2 - 144cs^2 v_1^2 \omega_5 - 36v_1^4 \omega_5 + 36v_1^4 + 24cs^2 v_1^2 \omega_5^2 + cs^4 \omega_5^2 + 12cs^2 \omega_5 - 7v_1^2 \omega_5^2 - 36v_1^2 + 36v_1^2 \omega_5 + 12cs^4 - cs^2 \omega_5^2 + 144cs^2 v_1^2$$

$$C_2 = 18cs^2 \omega_7 \omega_5^2 + 36cs^2 \omega_7 \omega_4 - 36cs^2 \omega_4 \omega_5 - 6\omega_7 \omega_4 v_1^2 \omega_5 + 6\omega_7 \omega_4 \omega_5 - 3\omega_7 \omega_4 v_1^2 \omega_5^2 + 36cs^2 \omega_4 \omega_5^2 + 3\omega_7 \omega_4 \omega_5^2 + 12\omega_7 \omega_4 v_1^2 + 6\omega_7 v_1^2 \omega_5^2 - 12\omega_4 v_1^2 \omega_5 - 18cs^2 \omega_7 \omega_4 \omega_5 - 12\omega_4 \omega_5^2 - 12v_1^2 \omega_5^2 + 12\omega_5^2 - 12\omega_7 \omega_4 - 36cs^2 \omega_5^2 - 6\omega_7 \omega_5^2 + 12\omega_4 \omega_5 + 12\omega_4 v_1^2 \omega_5^2 - 11cs^2 \omega_7 \omega_4 \omega_5^2$$

$$C_3 = 6 - 18cs^2 + \omega_4 \omega_8 + 9cs^2 \omega_8 - 3\omega_4 - 6v_2^2 + 3\omega_8 v_2^2 + 3\omega_4 v_2^2 - 3\omega_8 + 9cs^2 \omega_4 - 3cs^2 \omega_4 \omega_8 - \omega_4 \omega_8 v_2^2$$

$$C_4 = 12 - 132cs^2 - 216cs^4 \omega_5 + 90v_1^4 \omega_5^2 - 1008cs^2 v_1^2 \omega_5 - 9v_1^4 \omega_5^3 - 34cs^2 v_1^2 \omega_5^3 - 5cs^4 \omega_5^3 - 216v_1^4 \omega_5 + 144v_1^4 + 404cs^2 v_1^2 \omega_5^2 + 82cs^4 \omega_5^2 - \omega_5^3 + 10v_1^2 \omega_5^3 + 198cs^2 \omega_5 - 98v_1^2 \omega_5^2 + 8\omega_5^2 - 156v_1^2 + 234v_1^2 \omega_5 - 18\omega_5 + 144cs^4 - 78cs^2 \omega_5^2 + 672cs^2 v_1^2 + 6cs^2 \omega_5^3$$

$$C_5 = 12 - 36cs^2 - 36cs^4 \omega_5 + 310v_1^4 \omega_5^2 - 648cs^2 v_1^2 \omega_5 - 29v_1^4 \omega_5^3 - 18cs^2 v_1^2 \omega_5^3 - cs^4 \omega_5^3 - 756v_1^4 \omega_5 + 504v_1^4 + 252cs^2 v_1^2 \omega_5^2 + 14cs^4 \omega_5^2 - \omega_5^3 + 14v_1^2 \omega_5^3 + 54cs^2 \omega_5 - 154v_1^2 \omega_5^2 + 8\omega_5^2 - 252v_1^2 + 378v_1^2 \omega_5 - 18\omega_5 + 24cs^4 - 22cs^2 \omega_5^2 + 432cs^2 v_1^2 + 2cs^2 \omega_5^3$$

$$C_6 = 36\omega_4^3v_1^4\omega_5^3 + 36cs^2\omega_7\omega_4v_1^2\omega_5^3 + cs^4\omega_7^2\omega_4^3\omega_5^2 - 36cs^2\omega_7^2\omega_4^2v_1^2\omega_5 + 19\omega_7^2\omega_4^3v_1^4\omega_5^2 + 36\omega_7\omega_4^2v_1^4\omega_5^3 + 108cs^2\omega_4^3v_1^2\omega_5^3 + 36\omega_4^2v_1^2\omega_5^3 - 12cs^2\omega_7\omega_4^2\omega_5^2 + 39\omega_7\omega_4^3v_1^2\omega_5^3 + 6cs^2\omega_7^2\omega_4\omega_5^3 + 4\omega_7^2\omega_4^3v_1^4\omega_5^2 - 108cs^2\omega_7\omega_4^3v_1^2\omega_5 - cs^4\omega_7^2\omega_4^3\omega_5^2 - 12cs^4\omega_7^2\omega_4^2\omega_5 - 36\omega_4^3v_1^4\omega_5^2 + 6\omega_7^2\omega_4^2v_1^2\omega_5^3 - 72\omega_7\omega_4^3v_1^2\omega_5^2 + 18cs^2\omega_7\omega_4^2\omega_5^3 - 72\omega_7^2\omega_4^3v_1^2 - 108cs^2\omega_4^3v_1^2\omega_5^2 + 36\omega_7\omega_4^3v_1^2\omega_5 + 6cs^2\omega_7\omega_4^3\omega_5^2 + 198cs^2\omega_7\omega_4^3v_1^2\omega_5^2 - 3cs^2\omega_7^2\omega_4^2v_1^2\omega_5^3 + 12cs^4\omega_7\omega_4\omega_5^3 + 6cs^4\omega_7^2\omega_4^2\omega_5^2 - 6cs^2\omega_7\omega_4^3\omega_5^3 + 13cs^4\omega_7^2\omega_4^2\omega_5^2 - 12cs^4\omega_7^2\omega_4^3\omega_5 - 99cs^2\omega_7\omega_4^3v_1^2\omega_5^3 - 90\omega_7^2\omega_4^3v_1^4\omega_5 + 18cs^2\omega_7^2\omega_4^2v_1^2\omega_5^2 - 4\omega_7^2\omega_4^3v_1^2\omega_5^3 + 12cs^4\omega_7^2\omega_5^3 + 36\omega_4^3v_1^2\omega_5^2 + 252cs^2\omega_7^2\omega_4^3v_1^2 - cs^2\omega_7^2\omega_4^3\omega_5^2 + 72\omega_7\omega_4^3v_1^4\omega_5^2 - 6\omega_7^2\omega_4^2v_1^4\omega_5^3 + 12cs^4\omega_7\omega_4^2\omega_5^2 - 24cs^4\omega_7^2\omega_4\omega_5^3 - 18cs^2\omega_7^2\omega_4v_1^2\omega_5^3 - 36\omega_4^3v_1^2\omega_5^3 - 108cs^2\omega_4^2v_1^2\omega_5^3 + 12cs^2\omega_7^2\omega_4^2\omega_5 - 36\omega_7\omega_4^2v_1^2\omega_5^3 - 19\omega_7^2\omega_4^3v_1^2\omega_5^2 - 12cs^2\omega_7^2\omega_4^3 - 36\omega_4^2v_1^4\omega_5^3 - 39\omega_7\omega_4^3v_1^4\omega_5^3 - 18cs^4\omega_7\omega_4^2\omega_5^3 - 306cs^2\omega_7^2\omega_4^3v_1^2\omega_5 - 6cs^4\omega_7\omega_4^3\omega_5^2 + 60cs^2\omega_7^2\omega_4^3v_1^2\omega_5^2 + 54cs^2\omega_7\omega_4^2v_1^2\omega_5^3 - 12cs^2\omega_7\omega_4\omega_5^3 - 6cs^2\omega_7^2\omega_4^2\omega_5^2 + 90\omega_7^2\omega_4^3v_1^2\omega_5 + 12cs^2\omega_7^2\omega_4^3v_1^2\omega_5^3 + 36cs^2\omega_7\omega_4^2v_1^2\omega_5^2 - 36\omega_7\omega_4^3v_1^4\omega_5 + 6cs^4\omega_7\omega_4^3\omega_5^3 + 12cs^4\omega_4^2\omega_4^3 + 72\omega_7^2\omega_4^3v_1^4 - 5cs^2\omega_7^2\omega_4^2\omega_5^3 + 12cs^2\omega_7^2\omega_4^3\omega_5$$

$$C_7 = -6\omega_7^2\omega_4^2\omega_8\omega_5^3 - 6\omega_9cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_7\omega_4\omega_8v_1^2\omega_5^3 - 18\omega_9\omega_7\omega_4^2\omega_8\omega_5^2 - 36\omega_9cs^2\omega_4^2\omega_8\omega_5^2 + 36cs^2\omega_7^2\omega_4\omega_5^3 + 5\omega_9cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 + 6\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12\omega_9\omega_7^2\omega_4^2\omega_8 - 6\omega_7^2\omega_4^2v_1^2\omega_5^3 + 36cs^2\omega_7\omega_4\omega_8\omega_5^3 + 36\omega_9cs^2\omega_4^2\omega_8\omega_5^3 + 12\omega_9\omega_4\omega_8\omega_5^3 + 6\omega_9\omega_7\omega_4^2\omega_8\omega_5^3 - 12\omega_7^2\omega_4\omega_8v_1^2\omega_5^3 - 18\omega_9\omega_7^2\omega_4\omega_8\omega_5^2 + 12\omega_9\omega_7^2\omega_8\omega_5^2 + 18\omega_9\omega_7\omega_4\omega_8v_1^2\omega_5^3 + 6\omega_7^2\omega_4^2\omega_5^3 - 18cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_4^2\omega_8v_1^2\omega_5^3 + 12\omega_9\omega_7^2\omega_4\omega_5^2 - 12\omega_7\omega_4\omega_8\omega_5^3 + 18\omega_9\omega_7^2\omega_4\omega_8v_1^2\omega_5^2 - 12\omega_9\omega_7^2\omega_8v_1^2\omega_5^2 - 12\omega_9\omega_4^2\omega_8v_1^2\omega_5^2 - 36\omega_9cs^2\omega_7\omega_8\omega_5^3 + 12\omega_9\omega_7\omega_4^2\omega_8\omega_5 + 18cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 + 12\omega_9\omega_7^2\omega_4\omega_8\omega_5^3 - 12\omega_9\omega_7^2\omega_4v_1^2\omega_5^3 + 54\omega_9cs^2\omega_7\omega_4\omega_8\omega_5^3 + 18\omega_9cs^2\omega_7^2\omega_4^2\omega_5^2 + 12\omega_9\omega_7^2\omega_8v_1^2\omega_5^3 - 12\omega_9\omega_7^2\omega_4\omega_8v_1^2\omega_5^3 - 36\omega_9cs^2\omega_7^2\omega_4^2\omega_8\omega_5 - 36\omega_9cs^2\omega_7^2\omega_8\omega_5^2 - 6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2 + 12\omega_9\omega_7^2\omega_4^2\omega_8v_1^2 + 2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12\omega_9\omega_7\omega_4^2\omega_8v_1^2\omega_5 - 36\omega_9cs^2\omega_7^2\omega_4\omega_5^2 + 54\omega_9cs^2\omega_7\omega_4^2\omega_8\omega_5^2 - 12\omega_7\omega_4^2\omega_8v_1^2\omega_5^3 + 12\omega_7\omega_4^2\omega_8\omega_5^3 - \omega_9\omega_7^2\omega_4^2\omega_8\omega_5^3 + 12\omega_9\omega_7\omega_8\omega_5^3 + 6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^3 - 36cs^2\omega_7^2\omega_4\omega_8\omega_5^3 - 12\omega_7^2\omega_4\omega_5^3 + 36\omega_9cs^2\omega_7^2\omega_8\omega_5^3 - 12\omega_7\omega_4^2\omega_8\omega_5^2 - 6\omega_9\omega_7^2\omega_4^2\omega_5^2 - 18\omega_9cs^2\omega_7\omega_4^2\omega_8\omega_5^2 + 12\omega_7^2\omega_4\omega_8\omega_5^3 - 2\omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^2 - 6\omega_9\omega_7\omega_4^2\omega_8v_1^2\omega_5^3 + 36cs^2\omega_7\omega_4^2\omega_8\omega_5^2 - 12\omega_9\omega_4\omega_8v_1^2\omega_5^3 + 12\omega_9\omega_4^2\omega_8\omega_5^2 - 12\omega_9\omega_7\omega_8v_1^2\omega_5^3 + \omega_9\omega_7^2\omega_4^2\omega_8v_1^2\omega_5^3 - 36\omega_9cs^2\omega_7\omega_4^2\omega_8\omega_5 - 40\omega_9cs^2\omega_7^2\omega_4\omega_8\omega_5^3 + 36\omega_9cs^2\omega_7^2\omega_4^2\omega_8 - 12\omega_9\omega_4^2\omega_8\omega_5^3 - 18\omega_9\omega_7\omega_4\omega_8\omega_5^3 - 36\omega_9cs^2\omega_4\omega_8\omega_5^3 - 18cs^2\omega_7^2\omega_4^2\omega_5^3 + 12\omega_7^2\omega_4v_1^2\omega_5^3 + 12\omega_9\omega_7^2\omega_4^2\omega_8\omega_5 + 18\omega_9\omega_7\omega_4^2\omega_8v_1^2\omega_5^2 - 36cs^2\omega_7\omega_4^2\omega_8\omega_5^3$$

$$C_8 = -6\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_7\omega_4^2\omega_5 + 36\omega_9\omega_4^3\omega_8v_1^2\omega_5^2 - 12cs^2\omega_4^3\omega_8\omega_5^2 + 36\omega_9\omega_4^2\omega_8v_1^2\omega_5 - 12\omega_9\omega_4\omega_8\omega_5^2 - 36\omega_9\omega_7\omega_4^2\omega_8v_1^2 - 36\omega_9\omega_7\omega_4\omega_8v_1^2\omega_5 - 6cs^2\omega_7\omega_4^3\omega_8\omega_5 - 24\omega_9cs^2\omega_4^2\omega_8\omega_5^2 + 12cs^2\omega_7\omega_4^2\omega_5^2 + 12\omega_9\omega_4^3\omega_8\omega_5 - 12\omega_9cs^2\omega_7\omega_4^2\omega_8 - \omega_9cs^2\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_9cs^2\omega_7\omega_4\omega_8\omega_5 - 18\omega_7\omega_4^3v_1^2\omega_5^2 - 6cs^2\omega_7\omega_4^3\omega_5^2 - 12\omega_9cs^2\omega_7\omega_8\omega_5^2 - 6\omega_9cs^2\omega_7\omega_4^3\omega_8\omega_5 - 6\omega_9\omega_7\omega_4^3\omega_5 - 36\omega_9\omega_7\omega_4^2v_1^2\omega_5 + 18\omega_9cs^2\omega_7\omega_4\omega_8\omega_5^2 - 72\omega_9\omega_4^2\omega_8v_1^2\omega_5^2 - 24\omega_9\omega_7\omega_4^2\omega_8\omega_5 + 6cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 12\omega_9cs^2\omega_4^2\omega_8\omega_5 - 12\omega_9\omega_4^3\omega_8\omega_5^2 + 6\omega_7\omega_4^3\omega_8\omega_5 + 6\omega_9cs^2\omega_7\omega_4^3\omega_8 + 12cs^2\omega_4^3\omega_8\omega_5 - 36\omega_9\omega_4^3\omega_8v_1^2\omega_5 + 36\omega_7\omega_4^2v_1^2\omega_5^2 + 72\omega_9\omega_7\omega_4^2\omega_8v_1^2\omega_5 + 6\omega_9cs^2\omega_7\omega_4^3\omega_5 - 4\omega_9cs^2\omega_7\omega_4^2\omega_8\omega_5^2 + 18\omega_9\omega_7\omega_4^3\omega_8v_1^2 - 18\omega_7\omega_4^3\omega_8v_1^2\omega_5 + 12\omega_9\omega_7\omega_4\omega_8\omega_5 - 12\omega_9\omega_4^2\omega_8\omega_5 - 12\omega_7\omega_4^2\omega_5^2 + 12\omega_9cs^2\omega_4^3\omega_8\omega_5^2 - 36\omega_4^3\omega_8v_1^2\omega_5^2 + 12\omega_7\omega_4^2\omega_8\omega_5^2 - 6\omega_9\omega_7\omega_4^3\omega_8 - 36\omega_7\omega_4^2\omega_8v_1^2\omega_5^2 + 12cs^2\omega_4^2\omega_8\omega_5^2 + 12\omega_4^3\omega_8\omega_5^2 + 36\omega_4^2\omega_8v_1^2\omega_5^2 - 12\omega_9cs^2\omega_7\omega_4^2\omega_5 - 12\omega_4^3\omega_8\omega_5 - 12cs^2\omega_7\omega_4^2\omega_8\omega_5^2 + 6\omega_9\omega_7\omega_4^3\omega_8\omega_5 + 12\omega_9cs^2\omega_4\omega_8\omega_5^2 + 18\omega_7\omega_4^3\omega_8v_1^2\omega_5^2 + 24\omega_9\omega_4^2\omega_8\omega_5^2 + 36\omega_4^3\omega_8v_1^2\omega_5 - 12\omega_9cs^2\omega_4^3\omega_8\omega_5 + 12\omega_9\omega_7\omega_4^2\omega_8 + 18\omega_9\omega_7\omega_4^3v_1^2\omega_5 - 18\omega_9\omega_7\omega_4^3\omega_8v_1^2\omega_5 + 24\omega_9cs^2\omega_7\omega_4^2\omega_8\omega_5 + 6\omega_7\omega_4^3\omega_5^2 + 36\omega_9\omega_4\omega_8v_1^2\omega_5^2$$

$$C_9 = -15\omega_9cs^2\omega_7\omega_4^2\omega_8^2\omega_5 + 6\omega_6\omega_7\omega_4^2\omega_8^2\omega_5v_2^2 + 12\omega_6\omega_4\omega_8^2\omega_5v_2^2 - 18\omega_9\omega_6\omega_7\omega_4\omega_8\omega_5 - 18\omega_6cs^2\omega_7\omega_4^2\omega_8\omega_5 + 12\omega_9\omega_7\omega_8^2\omega_5 - 12\omega_9\omega_4^2\omega_8^2v_2^2 - 12\omega_9\omega_6\omega_7\omega_4\omega_8^2\omega_5v_2^2 + 12\omega_9\omega_6\omega_7\omega_8\omega_5 - 6\omega_6\omega_7\omega_4^2\omega_8^2v_2^2 - 36\omega_6cs^2\omega_7\omega_4\omega_8^2\omega_5 + 12\omega_9\omega_6\omega_7\omega_4\omega_5 + 12\omega_6\omega_4^2\omega_8^2\omega_5 - \omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5 - 36\omega_9cs^2\omega_4\omega_8^2\omega_5 - 3\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5v_2^2 - 12\omega_9\omega_4^2\omega_8^2\omega_5 - 18\omega_9\omega_7\omega_4\omega_8^2\omega_5 + 18\omega_9cs^2\omega_7\omega_4^2\omega_8^2 - 12\omega_6\omega_7\omega_4\omega_8\omega_5 + 54\omega_9\omega_6cs^2\omega_7\omega_4\omega_8\omega_5 + 6\omega_9\omega_6\omega_7\omega_4^2\omega_5v_2^2 + 12\omega_6\omega_7\omega_4\omega_8\omega_5v_2^2 + 36\omega_9\omega_6cs^2\omega_7\omega_8^2\omega_5 + 12\omega_6\omega_4^2\omega_8^2v_2^2 + 12\omega_9\omega_4^2\omega_8^2\omega_5v_2^2 + 18\omega_9\omega_7\omega_4\omega_8^2\omega_5v_2^2 + 18\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_5 + 3\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_8^2\omega_5 - 36\omega_6cs^2\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_4^2\omega_8^2 - 6\omega_6\omega_7\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_6\omega_7\omega_8^2\omega_5v_2^2 + 12\omega_9\omega_4\omega_8^2\omega_5 + 5\omega_9\omega_7\omega_4^2\omega_8^2\omega_5 - 36\omega_9\omega_6cs^2\omega_7\omega_8\omega_5 + \omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5v_2^2 + 36\omega_9cs^2\omega_4^2\omega_8^2\omega_5 - 6\omega_9\omega_7\omega_4^2\omega_8^2 - 12\omega_6\omega_7\omega_4\omega_8^2\omega_5v_2^2 - 9\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_8\omega_5 - 36\omega_9cs^2\omega_4^2\omega_8^2 - 36\omega_9\omega_6cs^2\omega_7\omega_4\omega_5 - 12\omega_6\omega_4^2\omega_8^2\omega_5v_2^2 - 12\omega_9\omega_6\omega_7\omega_4\omega_5v_2^2 + 6\omega_6\omega_7\omega_4^2\omega_8\omega_5 - 18\omega_6cs^2\omega_7\omega_4^2\omega_8^2 + 12\omega_6\omega_7\omega_4\omega_8^2\omega_5 - 12\omega_9\omega_6\omega_7\omega_8\omega_5v_2^2 - 36\omega_9\omega_6cs^2\omega_7\omega_4\omega_8^2\omega_5 + 36\omega_6cs^2\omega_4\omega_8^2\omega_5 - 6\omega_6\omega_7\omega_4^2\omega_8\omega_5v_2^2 - 12\omega_9\omega_7\omega_8^2\omega_5v_2^2 - 12\omega_9\omega_6\omega_7\omega_8^2\omega_5 - 12\omega_6\omega_4^2\omega_8^2 + 54\omega_9cs^2\omega_7\omega_4\omega_8^2\omega_5 + 6\omega_9\omega_7\omega_4^2\omega_8^2v_2^2 + 18\omega_9\omega_6\omega_7\omega_4\omega_8\omega_5v_2^2 - 6\omega_9\omega_6\omega_7\omega_4^2\omega_5 + 36\omega_6cs^2\omega_7\omega_4\omega_8\omega_5 - 36\omega_9cs^2\omega_7\omega_8^2\omega_5 + 3\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5 + 36\omega_6cs^2\omega_4^2\omega_8^2 + 6\omega_6\omega_7\omega_4^2\omega_8^2 - 12\omega_9\omega_4\omega_8^2\omega_5v_2^2 - 5\omega_9\omega_7\omega_4^2\omega_8^2\omega_5v_2^2 + 12\omega_9\omega_6\omega_7\omega_4\omega_8^2\omega_5 + 18\omega_6cs^2\omega_7\omega_4^2\omega_8^2\omega_5 - 12\omega_6\omega_4\omega_8^2\omega_5$$

$$C_{10} = -12\omega_6cs^2\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_9\omega_4^3\omega_8\omega_5 + 36\omega_6\omega_7\omega_4^2\omega_5v_2^2 - \omega_9\omega_6cs^2\omega_7\omega_4^3\omega_8\omega_5 - 12\omega_6cs^2\omega_4^3\omega_8\omega_5 + 6\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_5 - 12\omega_9cs^2\omega_7\omega_4\omega_8\omega_5 - 6\omega_6\omega_7\omega_4^3\omega_8\omega_5 + 6\omega_6\omega_7\omega_4^3\omega_5 - 12\omega_9\omega_6\omega_7\omega_4\omega_5 + 36\omega_6\omega_4^3\omega_8v_2^2 + 12\omega_6cs^2\omega_7\omega_4^2\omega_5 - 36\omega_6\omega_4^3\omega_8\omega_5v_2^2 + 54\omega_9\omega_7\omega_4^2\omega_8\omega_5v_2^2 - 3\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5v_2^2 - 36\omega_9\omega_4^3\omega_8v_2^2 - 5\omega_9cs^2\omega_7\omega_4^3\omega_8\omega_5 - 15\omega_9\omega_7\omega_4^3\omega_8\omega_5v_2^2 + 18\omega_9\omega_6cs^2\omega_7\omega_4\omega_8\omega_5 - 54\omega_9\omega_6\omega_7\omega_4^2\omega_5v_2^2 + 36\omega_6\omega_4^2\omega_8\omega_5v_2^2 + 12\omega_9\omega_4^3\omega_8 + 12\omega_6\omega_4^3\omega_8\omega_5 - 18\omega_9\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_9cs^2\omega_4^2\omega_8\omega_5 - 6\omega_6cs^2\omega_7\omega_4^3\omega_5 - 18\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_5 - 12\omega_6\omega_7\omega_4^2\omega_5 + 6\omega_9cs^2\omega_7\omega_4^3\omega_8 - 18\omega_6\omega_7\omega_4^3\omega_8v_2^2 + 18\omega_9\omega_7\omega_4^3\omega_8v_2^2 - 12\omega_9\omega_6cs^2\omega_7\omega_8\omega_5 - 6\omega_6cs^2\omega_7\omega_4^3\omega_8 - 6\omega_9\omega_6\omega_7\omega_4^3\omega_5 - 5\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_8\omega_5 + 12\omega_6cs^2\omega_4^2\omega_8\omega_5 + 12\omega_9\omega_6cs^2\omega_7\omega_4\omega_5 + 36\omega_9\omega_6\omega_7\omega_4\omega_5v_2^2 + 12\omega_6\omega_7\omega_4^2\omega_8\omega_5 - 36\omega_9\omega_7\omega_4^2\omega_8\omega_5v_2^2 + 12\omega_9\omega_7\omega_4\omega_8\omega_5 + 18\omega_6\omega_7\omega_4^3\omega_8\omega_5v_2^2 + 12\omega_9\omega_4^2\omega_8\omega_5 - 18\omega_6\omega_7\omega_4^3\omega_5v_2^2 + 6\omega_6cs^2\omega_7\omega_4^3\omega_8\omega_5 - 6\omega_9\omega_7\omega_4^3\omega_8 - 12\omega_9cs^2\omega_4^3\omega_8 + 12\omega_6cs^2\omega_4^3\omega_8 - 36\omega_6\omega_7\omega_4^2\omega_8\omega_5v_2^2 + 6\omega_6\omega_7\omega_4^3\omega_8 + 36\omega_9\omega_4^3\omega_8\omega_5v_2^2 + 5\omega_9\omega_7\omega_4^3\omega_8\omega_5 - 12\omega_6\omega_4^2\omega_8\omega_5 + 18\omega_9\omega_6\omega_7\omega_4^2\omega_5 + 12\omega_9cs^2\omega_4^3\omega_8\omega_5 + \omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_6\omega_4^3\omega_8 + 18\omega_9cs^2\omega_7\omega_4^2\omega_8\omega_5 + 18\omega_9\omega_6\omega_7\omega_4^3\omega_5v_2^2$$

$$C_{11} = 24cs^4\omega_4^2\omega_8^2 - 36\omega_4^3v_2^2 + cs^2\omega_4^3\omega_8^2 - 12\omega_4^2\omega_8^2v_2^2 + 6cs^4\omega_4^3\omega_8 - 72\omega_4^2\omega_8v_2^2 - 72cs^2\omega_4^3\omega_8v_2^2 + 24cs^2\omega_4^2\omega_8 - 8cs^2\omega_4^2\omega_8^2 - 30\omega_4^3\omega_8v_2^2 + 72cs^2\omega_4\omega_8v_2^2 + 72\omega_4^2v_2^2 - 3cs^4\omega_4^3\omega_8^2 - 6cs^2\omega_4^3\omega_8 - 24cs^4\omega_4^2\omega_8 - 3\omega_4^3\omega_8^2v_2^2 - 12cs^2\omega_4^2\omega_8^2v_2^2 - 72\omega_4^2v_2^2 - 216cs^2\omega_4^2v_2^2 + 24cs^4\omega_8^2 + 24cs^4\omega_4\omega_8 + 144cs^2\omega_4^2\omega_8v_2^2 + 30\omega_4^3\omega_8v_2^2 + 12cs^2\omega_4\omega_8^2 + 3\omega_4^3\omega_8^2v_2^4 - 36cs^2\omega_4\omega_8^2v_2^2 + 6cs^2\omega_4^3\omega_8^2v_2^2 + 12\omega_4^2\omega_8^2v_2^2 - 24cs^2\omega_4\omega_8 + 108cs^2\omega_4^3v_2^2 + 36\omega_4^3v_2^2 - 48cs^4\omega_4\omega_8^2 + 72\omega_4^2\omega_8v_2^2$$

2.5.4 Conservation of momentum: ρv_2

attached text file: `output_d2q9_nse_clbm2_symbolic_pde_02.txt`

$$v_2\frac{\partial\rho}{\partial t} + \rho\frac{\partial v_2}{\partial t} + \frac{v_1v_2\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1} + \frac{\rho v_2\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\rho v_1\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_1} + (cs^2+v_2^2)\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \frac{2\rho v_2\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-2+\omega_4)\frac{cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_1} + (-2+\omega_4)\frac{cs^2\delta_l^2}{2\delta_t\omega_4}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_2} + (-2+\omega_6+4cs^2-3\omega_6v_2^2-2cs^2\omega_6+6v_2^2)\frac{\delta_l^2}{\omega_6\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_2} + (2-\omega_6)\frac{3\rho v_2\delta_l^2}{\omega_6\delta_t}\left(\frac{\partial v_2}{\partial x_2}\right)^2 +$$

$$(-2+\omega_4)\frac{cs^2\rho\delta_l^2}{2\delta_t\omega_4}\frac{\partial^2 v_2}{\partial x_1^2} + (-2+\omega_4)\frac{cs^2\rho\delta_l^2}{2\delta_t\omega_4}\frac{\partial^2 v_1}{\partial x_1\partial x_2} + (-2+\omega_6+6cs^2-\omega_6v_2^2-3cs^2\omega_6+2v_2^2)\frac{v_2\delta_l^2}{2\omega_6\delta_t}\frac{\partial^2\rho}{\partial x_2^2} +$$
$$(-2+\omega_6+2cs^2-3\omega_6v_2^2-cs^2\omega_6+6v_2^2)\frac{\rho\delta_l^2}{2\omega_6\delta_t}\frac{\partial^2 v_2}{\partial x_2^2} + (-1+3cs^2+v_1^2)\frac{v_1v_2\delta_l^3}{12\delta_t}\frac{\partial^3\rho}{\partial x_1^3} + (-1+cs^2+3v_1^2)\frac{\rho v_2\delta_l^3}{12\delta_t}\frac{\partial^3 v_1}{\partial x_1^3} +$$
$$C_1\frac{\rho v_1\delta_l^3}{6\delta_t\omega_7\omega_4}\frac{\partial^3 v_2}{\partial x_1^3} + (-12+12\omega_4-\omega_4^2)\frac{cs^4\delta_l^3}{6\delta_t\omega_4^2}\frac{\partial^3\rho}{\partial x_1^2\partial x_2} - \frac{cs^2\rho v_2\delta_l^3}{6\delta_t}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2} + C_2\frac{\rho v_2\delta_l^3}{12\omega_6^2\delta_t\omega_4\omega_8}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2} + C_3\frac{\delta_l^3}{12\omega_6^2\delta_t}\frac{\partial^3\rho}{\partial x_2^3} +$$
$$(-24-4\omega_6^2+24\omega_6+36cs^2+5cs^2\omega_6^2-60\omega_6v_2^2-36cs^2\omega_6+60v_2^2+11\omega_6^2v_2^2)\frac{\rho v_2\delta_l^3}{6\omega_6^2\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} +$$
$$(-2cs^2-cs^4\omega_5-3v_1^4\omega_5+6v_1^4+24cs^2v_1^2-12cs^2v_1^2\omega_5-6v_1^2+3v_1^2\omega_5+2cs^4+cs^2\omega_5)\frac{v_2\delta_l^4}{24\delta_t\omega_5}\frac{\partial^4\rho}{\partial x_1^4} +$$
$$(-4+6cs^2+10v_1^2-5v_1^2\omega_5+2\omega_5-3cs^2\omega_5)\frac{\rho v_1v_2\delta_l^4}{12\delta_t\omega_5}\frac{\partial^4 v_1}{\partial x_1^4} + C_4\frac{\rho\delta_l^4}{24\delta_t\omega_7^2\omega_4^3}\frac{\partial^4 v_2}{\partial x_1^4} + C_5\frac{cs^2v_1\delta_l^4}{12\omega_9\omega_6\delta_t\omega_7^2\omega_4^2\omega_8\omega_5}\frac{\partial^4\rho}{\partial x_1^3\partial x_2} +$$
$$C_6\frac{cs^2\rho\delta_l^4}{12\omega_9\omega_6\delta_t\omega_7\omega_4^3\omega_8\omega_5}\frac{\partial^4 v_1}{\partial x_1^3\partial x_2} +$$
$$(\omega_7v_1^2\omega_5-\omega_7-\omega_7\omega_5+3cs^2\omega_7-3v_1^2\omega_5+3\omega_5+\omega_7v_1^2+3cs^2\omega_7\omega_5-9cs^2\omega_5)\frac{\rho v_1v_2\delta_l^4}{12\delta_t\omega_7\omega_5}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2} +$$
$$C_7\frac{cs^2v_2\delta_l^4}{12\omega_9\omega_6^3\delta_t\omega_7\omega_4^2\omega_8^2}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} + C_8\frac{cs^2\rho\delta_l^4}{12\omega_9\omega_6^2\delta_t\omega_7\omega_4^3\omega_8}\frac{\partial^4 v_2}{\partial x_1^2\partial x_2^2} + C_9\frac{\rho\delta_l^4}{12\omega_6^3\delta_t\omega_4^3\omega_8^2}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3} + C_{10}\frac{v_2\delta_l^4}{12\omega_6^3\delta_t}\frac{\partial^4\rho}{\partial x_2^4} + C_{11}\frac{\rho\delta_l^4}{12\omega_6^3\delta_t}\frac{\partial^4 v_2}{\partial x_2^4}$$
$$= 0,$$

where:

$$C_1 = 6-18cs^2-\omega_7\omega_4v_1^2-3\omega_7-3\omega_4+3\omega_4v_1^2+9cs^2\omega_4-6v_1^2-3cs^2\omega_7\omega_4+9cs^2\omega_7+\omega_7\omega_4+3\omega_7v_1^2$$

$$C_2 = -12\omega_4\omega_8+12\omega_6\omega_4+12\omega_6^2+18cs^2\omega_6^2\omega_8+12\omega_6^2\omega_4v_2^2-36cs^2\omega_6^2+6\omega_6^2\omega_8v_2^2-6\omega_6\omega_4\omega_8v_2^2+6\omega_6\omega_4\omega_8-6\omega_6^2\omega_8-11cs^2\omega_6^2\omega_4\omega_8-36cs^2\omega_6\omega_4+36cs^2\omega_4\omega_8+3\omega_6^2\omega_4\omega_8+36cs^2\omega_6^2\omega_4-18cs^2\omega_6\omega_4\omega_8-3\omega_6^2\omega_4\omega_8v_2^2-12\omega_6^2v_2^2+12\omega_4\omega_8v_2^2-12\omega_6\omega_4v_2^2-12\omega_6^2\omega_4$$

$$C_3 = 7\omega_6^2v_2^4-12cs^2-cs^2\omega_6^2+36\omega_6v_2^2+36v_2^2-144cs^2\omega_6v_2^2+12cs^2\omega_6+cs^4\omega_6^2-36v_2^2+144cs^2v_2^2+24cs^2\omega_6^2v_2^2-7\omega_6^2v_2^2-36\omega_6v_2^4+12cs^4-12cs^4\omega_6$$

$$C_4 = cs^2\omega_7^2\omega_4^3-216cs^2\omega_4^2v_1^2-72cs^2\omega_7\omega_4^3v_1^2-48cs^4\omega_7^2\omega_4-30\omega_7\omega_4^3v_1^4-8cs^2\omega_7^2\omega_4^2-36\omega_4^3v_1^2-3\omega_7^2\omega_4^3v_1^2-3cs^4\omega_7^2\omega_4^3+144cs^2\omega_7\omega_4^2v_1^2+12cs^2\omega_7^2\omega_4+108cs^2\omega_4^3v_1^2-36cs^2\omega_7^2\omega_4v_1^2+12\omega_7^2\omega_4^2v_1^2+24cs^4\omega_7^2\omega_4^2+24cs^4\omega_7^2+72\omega_4^2v_1^2+72\omega_7\omega_4^2v_1^4-12cs^2\omega_7^2\omega_4^2v_1^2-24cs^4\omega_7\omega_4^2-72\omega_4^2v_1^4+6cs^4\omega_7\omega_4^3+72cs^2\omega_7\omega_4v_1^2-72\omega_7\omega_4^2v_1^2-12\omega_7^2\omega_4^2v_1^4-24cs^2\omega_7\omega_4+24cs^2\omega_7\omega_4^2+6cs^2\omega_7^2\omega_4^3v_1^2-6cs^2\omega_7\omega_4^3+3\omega_7^2\omega_4^3v_1^4+30\omega_7\omega_4^3v_1^2+24cs^4\omega_7\omega_4+36\omega_4^3v_1^4$$

$$C_5 = -6\omega_6\omega_7^2\omega_4^2\omega_8\omega_5-12\omega_9\omega_6\omega_7\omega_8v_1^2\omega_5-18cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5-36\omega_9cs^2\omega_6\omega_7\omega_8\omega_5+3\omega_9cs^2\omega_6\omega_7^2\omega_4^2\omega_8\omega_5-18\omega_9\omega_6\omega_7\omega_4\omega_8\omega_5-12\omega_7^2\omega_4^2\omega_5-18\omega_9\omega_6\omega_7^2\omega_4\omega_8+12\omega_9\omega_6\omega_7\omega_8\omega_5+12\omega_9\omega_6\omega_7^2\omega_8-6\omega_9\omega_7^2\omega_4^2\omega_8-12\omega_9\omega_6\omega_4\omega_8v_1^2\omega_5-12\omega_6\omega_7^2\omega_4^2v_1^2\omega_5-5\omega_9\omega_6\omega_7^2\omega_4^2\omega_8v_1^2-36\omega_9cs^2\omega_6\omega_7^2\omega_4+54\omega_9cs^2\omega_6\omega_7^2\omega_4\omega_8+6\omega_6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5-\omega_9\omega_6\omega_7^2\omega_4^2\omega_8\omega_5+54\omega_9cs^2\omega_6\omega_7\omega_4\omega_8\omega_5+36\omega_9cs^2\omega_6\omega_7^2\omega_4^2-36cs^2\omega_6\omega_7^2\omega_4\omega_8\omega_5-12\omega_6\omega_7\omega_4\omega_8\omega_5-12\omega_9\omega_6\omega_7^2\omega_4\omega_8v_1^2\omega_5+18\omega_9cs^2\omega_6\omega_4^2\omega_8\omega_5-12\omega_6\omega_7^2\omega_4\omega_5+6\omega_7^2\omega_4^2\omega_8\omega_5+18\omega_9\omega_6\omega_7\omega_4\omega_8v_1^2\omega_5+12\omega_9\omega_6\omega_7^2\omega_4^2v_1^2+12\omega_7^2\omega_4^2v_1^2\omega_5-6\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5-36cs^2\omega_6\omega_7^2\omega_4^2\omega_5-6\omega_9\omega_6\omega_4^2\omega_8\omega_5+12\omega_9\omega_6\omega_7^2\omega_4\omega_8\omega_5-9\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5-12\omega_9\omega_6\omega_7^2\omega_4v_1^2+6\omega_9\omega_7^2\omega_4^2\omega_8v_1^2-18cs^2\omega_7^2\omega_4^2\omega_8\omega_5-36\omega_9cs^2\omega_6\omega_4\omega_8\omega_5+36cs^2\omega_6\omega_7^2\omega_4\omega_5+6\omega_6\omega_7\omega_4^2\omega_8\omega_5+12\omega_9\omega_6\omega_7^2\omega_8v_1^2\omega_5+18cs^2\omega_6\omega_7^2\omega_4^2\omega_8\omega_5-12\omega_9\omega_6\omega_7^2\omega_8v_1^2+6\omega_9\omega_6\omega_4^2\omega_8v_1^2\omega_5+12\omega_9\omega_6\omega_7^2\omega_4+12\omega_9\omega_7^2\omega_4^2-36\omega_9cs^2\omega_6\omega_7^2\omega_8-12\omega_9\omega_7^2\omega_4^2v_1^2+12\omega_9\omega_6\omega_4\omega_8\omega_5+12\omega_6\omega_7^2\omega_4^2\omega_5+18\omega_9cs^2\omega_7^2\omega_4^2\omega_8+36\omega_9cs^2\omega_6\omega_7^2\omega_8\omega_5+36cs^2\omega_6\omega_7\omega_4\omega_8\omega_5+\omega_9\omega_6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5+12\omega_6\omega_7^2\omega_4\omega_8\omega_5-15\omega_9cs^2\omega_6\omega_7^2\omega_4^2\omega_8-12\omega_6\omega_7^2\omega_4\omega_8v_1^2\omega_5-36\omega_9cs^2\omega_6\omega_7^2\omega_4\omega_8\omega_5-12\omega_9\omega_6\omega_7^2\omega_4^2+3\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5+12\omega_6\omega_7\omega_4\omega_8v_1^2\omega_5-12\omega_9\omega_6\omega_7^2\omega_8\omega_5+5\omega_9\omega_6\omega_7^2\omega_4^2\omega_8+36cs^2\omega_7^2\omega_4^2\omega_5-36\omega_9cs^2\omega_7^2\omega_4^2-6\omega_7^2\omega_4^2\omega_8v_1^2\omega_5+18\omega_9\omega_6\omega_7^2\omega_4\omega_8v_1^2-3\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5+12\omega_6\omega_7^2\omega_4v_1^2\omega_5$$

$$C_6 = -12cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5-12\omega_9cs^2\omega_6\omega_7\omega_8\omega_5+18\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8-12\omega_9\omega_6\omega_7\omega_4^3-15\omega_9\omega_6\omega_7\omega_4^3\omega_8v_1^2+12cs^2\omega_6\omega_4^2\omega_8\omega_5-36\omega_6\omega_7\omega_4^3v_1^2\omega_5+18\omega_6\omega_7\omega_4^3\omega_8v_1^2\omega_5-36\omega_9\omega_7\omega_4^3v_1^2+6\omega_9cs^2\omega_7\omega_4^3\omega_8-6\omega_6\omega_7\omega_4^3\omega_8\omega_5+12\omega_6\omega_7\omega_4^3\omega_5+36\omega_9\omega_6\omega_4\omega_8v_1^2\omega_5-12\omega_9cs^2\omega_7\omega_4^3+12\omega_9\omega_6\omega_7\omega_4^2-18\omega_9\omega_6\omega_7\omega_4^2\omega_8-\omega_9cs^2\omega_6\omega_7\omega_4^3\omega_8\omega_5+36\omega_7\omega_4^3v_1^2\omega_5+18\omega_9cs^2\omega_6\omega_7\omega_4\omega_8\omega_5-5\omega_9cs^2\omega_6\omega_7\omega_4^3\omega_8-18\omega_9cs^2\omega_6\omega_4^2\omega_8\omega_5-36\omega_9\omega_6\omega_7\omega_4\omega_8v_1^2+6\omega_6\omega_4^3\omega_8\omega_5+12cs^2\omega_7\omega_4^3\omega_5+5\omega_9\omega_6\omega_7\omega_4^3\omega_8+6\omega_7\omega_4^3\omega_8\omega_5-36\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5+18\omega_9\omega_6\omega_4^2\omega_8\omega_5-12\omega_6\omega_7\omega_4^2\omega_5+12\omega_9\omega_7\omega_4^3-18\omega_6\omega_4^3\omega_8v_1^2\omega_5+12\omega_9cs^2\omega_6\omega_7\omega_4^3-12\omega_7\omega_4^3\omega_5-5\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5+12\omega_9cs^2\omega_6\omega_4\omega_8\omega_5+12\omega_6\omega_7\omega_4^2\omega_8\omega_5+18\omega_9\omega_7\omega_4^3\omega_8v_1^2-18\omega_7\omega_4^3\omega_8v_1^2\omega_5-36\omega_9\omega_6\omega_7\omega_4^2v_1^2-54\omega_9\omega_6\omega_4^2\omega_8v_1^2\omega_5+36\omega_6\omega_7\omega_4^2v_1^2\omega_5-6cs^2\omega_6\omega_4^3\omega_8\omega_5+54\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2-12\omega_9cs^2\omega_6\omega_7\omega_4^2+6cs^2\omega_6\omega_7\omega_4^3\omega_8\omega_5+12cs^2\omega_6\omega_7\omega_4^2\omega_5-6\omega_9\omega_7\omega_4^3\omega_8-12\omega_9\omega_6\omega_4\omega_8\omega_5-6cs^2\omega_7\omega_4^3\omega_8\omega_5-6\omega_9\omega_6\omega_4^3\omega_8\omega_5+18\omega_9\omega_6\omega_4^3\omega_8v_1^2\omega_5-12\omega_6\omega_4^2\omega_8\omega_5+12\omega_9\omega_6\omega_7\omega_4\omega_8+\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5-12cs^2\omega_6\omega_7\omega_4^3\omega_5+6\omega_9cs^2\omega_6\omega_4^3\omega_8\omega_5+36\omega_6\omega_4^2\omega_8v_1^2\omega_5-12\omega_9cs^2\omega_6\omega_7\omega_4\omega_8-3\omega_9\omega_6\omega_7\omega_4^2\omega_8v_1^2\omega_5+36\omega_9\omega_6\omega_7\omega_4^3v_1^2$$

$$C_7 = 36\omega_9cs^2\omega_7\omega_4^2\omega_8^2-12\omega_6^2\omega_7\omega_4^2\omega_8+54\omega_9cs^2\omega_6^3\omega_7\omega_4\omega_8-12\omega_6^3\omega_7\omega_4\omega_8^2v_2^2-12\omega_9\omega_6^2\omega_7\omega_8^2v_2^2-36\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8+54\omega_9cs^2\omega_6^2\omega_7\omega_4\omega_8^2-6\omega_6^3\omega_7\omega_4^2\omega_8^2-12\omega_9\omega_6^2\omega_7\omega_4^2v_2^2-6\omega_6^2\omega_7\omega_4^2\omega_8^2v_2^2-12\omega_6^3\omega_7\omega_4^2\omega_8v_2^2-18\omega_9\omega_6^3\omega_7\omega_4\omega_8-36\omega_9cs^2\omega_6^3\omega_7\omega_8-36cs^2\omega_6^3\omega_7\omega_4\omega_8^2-18\omega_9\omega_6^2\omega_7\omega_4\omega_8^2+12\omega_9\omega_6^2\omega_4\omega_8^2+12\omega_9\omega_6^3\omega_7\omega_4+12\omega_9\omega_6\omega_7\omega_4^2\omega_8-12\omega_9\omega_6^3\omega_7\omega_4^2+36cs^2\omega_6^3\omega_7\omega_4\omega_8+18\omega_9cs^2\omega_6^2\omega_4^2\omega_8^2+12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2-12\omega_9\omega_6^3\omega_7\omega_4\omega_8^2v_2^2-18cs^2\omega_6^3\omega_4^2\omega_8^2-12\omega_6^3\omega_4\omega_8^2-2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2v_2^2+6\omega_9\omega_6^2\omega_4^2\omega_8^2v_2^2+12\omega_6^3\omega_4\omega_8^2v_2^2+36\omega_9cs^2\omega_6^3\omega_7\omega_8^2+12\omega_9\omega_6^3\omega_7\omega_4\omega_8^2-36\omega_9cs^2\omega_6^2\omega_7\omega_4^2+12\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2v_2^2-6\omega_9\omega_6^3\omega_7\omega_4^2\omega_8v_2^2-36\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8^2+12\omega_6^3\omega_7\omega_4^2\omega_8-12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_2^2+12\omega_9\omega_6^3\omega_7\omega_4^2v_2^2-40\omega_9cs^2\omega_6^3\omega_7\omega_4\omega_8^2+6\omega_6^2\omega_7\omega_4^2\omega_8^2+12\omega_9\omega_6^2\omega_7\omega_8^2+\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2v_2^2-12\omega_9\omega_6^3\omega_7\omega_8^2v_2^2+54\omega_9cs^2\omega_6^2\omega_7\omega_4^2\omega_8-12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2v_2^2-12\omega_6^3\omega_7\omega_4\omega_8-12\omega_9\omega_7\omega_4^2\omega_8^2+5\omega_9cs^2\omega_6^3\omega_7\omega_4^2\omega_8^2-12\omega_9\omega_6^2\omega_4\omega_8^2v_2^2+18\omega_9\omega_6^2\omega_7\omega_4\omega_8^2v_2^2-12\omega_9\omega_6^3\omega_7\omega_4v_2^2-6\omega_6^3\omega_4^2\omega_8^2v_2^2-36\omega_9cs^2\omega_6^3\omega_7\omega_4-36cs^2\omega_6^3\omega_7\omega_4^2\omega_8-36\omega_9cs^2\omega_6^2\omega_4\omega_8^2-18\omega_9\omega_6^2\omega_7\omega_4^2\omega_8+18\omega_9\omega_6^3\omega_7\omega_4\omega_8v_2^2+36cs^2\omega_6^3\omega_4\omega_8^2+6\omega_6^3\omega_4^2\omega_8^2-\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2-18cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2+12\omega_9\omega_6^3\omega_7\omega_8+18\omega_9\omega_6^2\omega_7\omega_4^2\omega_8v_2^2+6\omega_6^3\omega_7\omega_4^2\omega_8^2v_2^2-12\omega_9\omega_6^3\omega_7\omega_8^2+6\omega_9\omega_6^3\omega_7\omega_4^2\omega_8+36cs^2\omega_6^2\omega_7\omega_4^2\omega_8+12\omega_9\omega_7\omega_4^2\omega_8^2v_2^2+18cs^2\omega_6^3\omega_7\omega_4^2\omega_8^2-6\omega_9\omega_6^2\omega_4^2\omega_8^2+2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2+36\omega_9cs^2\omega_6^3\omega_7\omega_4^2-18\omega_9cs^2\omega_6^3\omega_7\omega_4^2\omega_8-36\omega_9cs^2\omega_6^2\omega_7\omega_8^2+12\omega_6^3\omega_7\omega_4\omega_8v_2^2+12\omega_9\omega_6^2\omega_7\omega_4^2+12\omega_6^2\omega_7\omega_4^2\omega_8v_2^2+12\omega_6^3\omega_7\omega_4\omega_8^2-6\omega_9cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2$$

$C_8 = 12\omega_6^2\omega_7\omega_4^2\omega_8 - 6cs^2\omega_6\omega_7\omega_4^3\omega_8 + 12\omega_6^2\omega_7\omega_4^3 + 12\omega_9cs^2\omega_6^2\omega_7\omega_4 + 24\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8 + 12\omega_9\omega_6\omega_7\omega_4^3 - 72\omega_9\omega_6^2\omega_7\omega_4^2v_2^2 + 36\omega_6^2\omega_4^2\omega_8v_2^2 + 12cs^2\omega_6\omega_7\omega_4^3 - 36\omega_9\omega_6\omega_4^2\omega_8v_2^2 - 12\omega_6^2\omega_7\omega_4^2 + 6\omega_9cs^2\omega_7\omega_4^3\omega_8 + 6\omega_6^2\omega_4^3\omega_8 - 6\omega_9\omega_6\omega_4^3\omega_8 - 36\omega_9\omega_7\omega_4^2\omega_8v_2^2 - 12\omega_9\omega_6\omega_7\omega_4^2 - 18\omega_9\omega_6\omega_7\omega_4^3\omega_8v_2^2 - 24\omega_9\omega_6\omega_7\omega_4^2\omega_8 - 36\omega_9\omega_6\omega_7\omega_4\omega_8v_2^2 + 36\omega_9\omega_6^2\omega_7\omega_4^3v_2^2 + 18\omega_6^2\omega_7\omega_4^3\omega_8v_2^2 + 12\omega_9cs^2\omega_6^2\omega_7\omega_4^3 - 6\omega_9cs^2\omega_6\omega_7\omega_4^3\omega_8 - 6\omega_6^2\omega_7\omega_4^3\omega_8 - 24\omega_9cs^2\omega_6^2\omega_7\omega_4^2 + 6\omega_9\omega_6\omega_7\omega_4^3\omega_8 + 12\omega_9\omega_6\omega_4^2\omega_8 + 18\omega_9cs^2\omega_6^2\omega_7\omega_4\omega_8 - 12\omega_6^2\omega_4^2\omega_8 - 12\omega_9cs^2\omega_7\omega_4^2\omega_8 - 18\omega_6\omega_7\omega_4^3\omega_8v_2^2 + 36\omega_6\omega_7\omega_4^3v_2^2 + 18\omega_9\omega_7\omega_4^3\omega_8v_2^2 - 12\omega_9cs^2\omega_6\omega_7\omega_4^3 - 12\omega_9\omega_6^2\omega_7\omega_4 + 36\omega_9\omega_6\omega_7\omega_4^2v_2^2 - 4\omega_9cs^2\omega_6^2\omega_7\omega_4^2\omega_8 + 72\omega_9\omega_6\omega_7\omega_4^2\omega_8v_2^2 + 18\omega_9\omega_6\omega_4^3\omega_8v_2^2 + 12cs^2\omega_6^2\omega_4^2\omega_8 + 6cs^2\omega_6^2\omega_7\omega_4^3\omega_8 - 12\omega_9cs^2\omega_6^2\omega_7\omega_8 + 6\omega_9cs^2\omega_6\omega_4^3\omega_8 - 18\omega_6^2\omega_4^3\omega_8v_2^2 + 12\omega_9cs^2\omega_6\omega_7\omega_4^2 - 6\omega_9\omega_7\omega_4^3\omega_8 + 36\omega_6^2\omega_7\omega_4^2v_2^2 + 12cs^2\omega_6^2\omega_7\omega_4^2 + 6\omega_6\omega_7\omega_4^3\omega_8 - 12\omega_6\omega_7\omega_4^3 - 6cs^2\omega_6^2\omega_4^3\omega_8 - 12cs^2\omega_6^2\omega_7\omega_4^2\omega_8 - \omega_9cs^2\omega_6^2\omega_7\omega_4^3\omega_8 + 12\omega_9\omega_6\omega_7\omega_4\omega_8 - 12\omega_9\omega_6^2\omega_7\omega_4^3 - 36\omega_9\omega_6\omega_7\omega_4^3v_2^2 + 12\omega_9\omega_7\omega_4^2\omega_8 - 36\omega_6^2\omega_7\omega_4^3v_2^2 - 12cs^2\omega_6^2\omega_7\omega_4^3 - 12\omega_9cs^2\omega_6\omega_7\omega_4\omega_8 + 24\omega_9\omega_6^2\omega_7\omega_4^2 - 36\omega_6^2\omega_7\omega_4^2\omega_8v_2^2 + 36\omega_9\omega_6^2\omega_7\omega_4v_2^2 - 12\omega_9cs^2\omega_6\omega_4^2\omega_8$

$C_9 = -90\omega_6\omega_4^3\omega_8^2v_2^4 - 99cs^2\omega_6^3\omega_4^3\omega_8v_2^2 - 39\omega_6^3\omega_4^3\omega_8v_2^4 + 12cs^4\omega_6^2\omega_4^2\omega_8 - 306cs^2\omega_6\omega_4^3\omega_8^2v_2^2 - 36\omega_6^3\omega_4^3v_2^2 - 4\omega_6^3\omega_4^3\omega_8^2v_2^2 + 18cs^2\omega_6^3\omega_4^2\omega_8 + 12cs^2\omega_6\omega_4^2\omega_8^2 + cs^4\omega_6^2\omega_4^3\omega_8^2 + 36\omega_6\omega_4^3\omega_8v_2^2 + 18cs^2\omega_6^2\omega_4^2\omega_8^2v_2^2 - 24cs^4\omega_6^3\omega_4\omega_8^2 - 6cs^4\omega_6^2\omega_4^3\omega_8 - 6\omega_6^3\omega_4^2\omega_8^2v_2^4 - 36\omega_6^2\omega_4^3v_2^4 + 12cs^4\omega_6^3\omega_4\omega_8 - 19\omega_6^2\omega_4^3\omega_8^2v_2^2 - 5cs^2\omega_6^3\omega_4^2\omega_8^2 - 3cs^2\omega_6^3\omega_4^2\omega_8^2v_2^2 + 198cs^2\omega_6^2\omega_4^3\omega_8v_2^2 + 6cs^4\omega_6^2\omega_4^2\omega_8^2 - 108cs^2\omega_6^2\omega_4^3v_2^2 - 36\omega_6^3\omega_4^2\omega_8v_2^2 + 36cs^2\omega_6^3\omega_4\omega_8v_2^2 + 12cs^2\omega_6\omega_4^3\omega_8^2 + 12cs^4\omega_6^3\omega_8^2 + 36\omega_6^3\omega_4^2v_2^2 - 72\omega_6^3\omega_8^2v_2^2 + 72\omega_6^2\omega_4^3\omega_8v_2^4 - 6cs^2\omega_6^3\omega_4^3\omega_8 + 60cs^2\omega_6^2\omega_4^3\omega_8^2v_2^2 - cs^4\omega_6^3\omega_4^3\omega_8^2 - 12cs^2\omega_6^2\omega_4^2\omega_8 - 18cs^2\omega_6^3\omega_4\omega_8^2v_2^2 + 36\omega_6^2\omega_4^3v_2^2 + 6\omega_6^3\omega_4^2\omega_8^2v_2^2 + 252cs^2\omega_4^3\omega_8^2v_2^2 - 108cs^2\omega_6^3\omega_4^2v_2^2 + 19\omega_6^2\omega_4^3\omega_8^2v_2^4 + 36\omega_6^3\omega_4^2\omega_8v_2^4 - 12cs^4\omega_6\omega_4^2\omega_8^2 - 36\omega_6^3\omega_4^2v_2^4 + 72\omega_4^3\omega_8^2v_2^4 - 72\omega_6^2\omega_4^3\omega_8v_2^2 - 18cs^4\omega_6^3\omega_4^2\omega_8 - 36cs^2\omega_6\omega_4^2\omega_8^2v_2^2 + 6cs^2\omega_6^3\omega_4\omega_8^2 - 12cs^2\omega_4^3\omega_8^2 - cs^2\omega_6^2\omega_4^3\omega_8^2 + 54cs^2\omega_6^3\omega_4^2\omega_8v_2^2 - 12cs^2\omega_6^3\omega_4\omega_8 + 39\omega_6^3\omega_4^3\omega_8v_2^2 + 108cs^2\omega_6^3\omega_4^3v_2^2 + 6cs^2\omega_6^2\omega_4^3\omega_8 + 36cs^2\omega_6^2\omega_4^2\omega_8v_2^2 + 90\omega_6\omega_4^3\omega_8^2v_2^2 + 13cs^4\omega_6^3\omega_4^2\omega_8^2 - 6cs^2\omega_6^2\omega_4^2\omega_8^2 - 36\omega_6\omega_4^3\omega_8v_2^4 + 12cs^2\omega_6^3\omega_4^3\omega_8^2v_2^2 + 4\omega_6^3\omega_4^3\omega_8^2v_2^4 + 36\omega_6^3\omega_4^3v_2^4 + 12cs^4\omega_4^3\omega_8^2 + 6cs^4\omega_6^3\omega_4^3\omega_8 - 108cs^2\omega_6\omega_4^3\omega_8v_2^2 - 12cs^4\omega_6\omega_4^3\omega_8^2$

$C_{10} = 12 + 6cs^2\omega_6^3 + 90\omega_6^2v_2^4 + 8\omega_6^2 - 18\omega_6 - 132cs^2 - 78cs^2\omega_6^2 + 234\omega_6v_2^2 - \omega_6^3 + 144v_2^4 - 1008cs^2\omega_6v_2^2 - 9\omega_6^3v_2^4 + 198cs^2\omega_6 + 10\omega_6^3v_2^2 + 82cs^4\omega_6^2 - 156v_2^2 - 5cs^4\omega_6^3 + 672cs^2v_2^2 + 404cs^2\omega_6^2v_2^2 - 98\omega_6^2v_2^2 - 216\omega_6v_2^4 - 34cs^2\omega_6^3v_2^2 + 144cs^4 - 216cs^4\omega_6$

$C_{11} = 12 + 2cs^2\omega_6^3 + 310\omega_6^2v_2^4 + 8\omega_6^2 - 18\omega_6 - 36cs^2 - 22cs^2\omega_6^2 + 378\omega_6v_2^2 - \omega_6^3 + 504v_2^4 - 648cs^2\omega_6v_2^2 - 29\omega_6^3v_2^4 + 54cs^2\omega_6 + 14\omega_6^3v_2^2 + 14cs^4\omega_6^2 - 252v_2^2 - cs^4\omega_6^3 + 432cs^2v_2^2 + 252cs^2\omega_6^2v_2^2 - 154\omega_6^2v_2^2 - 756\omega_6v_2^4 - 18cs^2\omega_6^3v_2^2 + 24cs^4 - 36cs^4\omega_6$

2.6 CuLBM1

2.6.1 Definitions

Based on [2], collision operator $\boldsymbol{C}$:

$$\boldsymbol{C}(\boldsymbol{f}) = \mathbf{M}^{-1}\boldsymbol{G}^{-1}\left(\mathbf{S}\left(\boldsymbol{\gamma}^{(eq)} - \boldsymbol{G}(\mathbf{M}\boldsymbol{f})\right)\right),$$

where

$$\mathbf{S} = \mathrm{diag}(0, 0, 0, \omega_1, \omega_2, \omega_3, \omega_4, \omega_5, \omega_6),$$

$\omega_1, \omega_2, \ldots, \omega_6 \in (0, 2)$.
The nonlinear operator $\boldsymbol{G}$ (with its inverse $\boldsymbol{G}^{-1}$) transforms the raw moment vector $\boldsymbol{\mu}$ defined by matrix $\mathbf{M}$ to the cumulant vector

$$\boldsymbol{\gamma} = \boldsymbol{G}(\boldsymbol{\mu}) = \left(\gamma_{(0,0)}, \gamma_{(1,0)}, \gamma_{(0,1)}, \gamma_{(2,0)}, \gamma_{(0,2)}, \gamma_{(1,1)}, \gamma_{(2,1)}, \gamma_{(1,2)}, \gamma_{(2,2)}\right)^T$$

as

$$\begin{aligned}
\gamma_{(0,0)} &= m_{(0,0)},\\
\gamma_{(1,0)} &= \frac{m_{(1,0)}}{m_{(0,0)}},\\
\gamma_{(0,1)} &= \frac{m_{(0,1)}}{m_{(0,0)}},\\
\gamma_{(2,0)} &= -\frac{m_{(1,0)}^2}{m_{(0,0)}^2} + \frac{m_{(2,0)}}{m_{(0,0)}},\\
\gamma_{(0,2)} &= -\frac{m_{(0,1)}^2}{m_{(0,0)}^2} + \frac{m_{(0,2)}}{m_{(0,0)}},\\
\gamma_{(1,1)} &= -\frac{m_{(1,0)}m_{(0,1)}}{m_{(0,0)}^2} + \frac{m_{(1,1)}}{m_{(0,0)}},\\
\gamma_{(2,1)} &= \frac{m_{(2,1)}}{m_{(0,0)}} - \frac{m_{(0,1)}m_{(2,0)}}{m_{(0,0)}^2} - 2\frac{m_{(1,0)}m_{(1,1)}}{m_{(0,0)}^2} + 2\frac{m_{(1,0)}^2m_{(0,1)}}{m_{(0,0)}^3},\\
\gamma_{(1,2)} &= \frac{m_{(1,2)}}{m_{(0,0)}} - \frac{m_{(1,0)}m_{(0,2)}}{m_{(0,0)}^2} - 2\frac{m_{(0,1)}m_{(1,1)}}{m_{(0,0)}^2} + 2\frac{m_{(0,1)}^2m_{(1,0)}}{m_{(0,0)}^3},
\end{aligned}$$

$\gamma_{(2,2)} = -6\frac{m_{(1,0)}^2 m_{(0,1)}^2}{m_{(0,0)}^4} + 2\frac{m_{(0,1)}^2 m_{(2,0)}+m_{(1,0)}^2 m_{(0,2)}}{m_{(0,0)}^2} + 8\frac{m_{(1,0)}m_{(0,1)}m_{(1,1)}}{m_{(0,0)}^3} - 2\frac{m_{(1,0)}m_{(1,2)}+m_{(0,1)}m_{(2,1)}}{m_{(0,0)}^2} + \frac{m_{(2,2)}}{m_{(0,0)}} - \frac{m_{(2,0)}m_{(0,2)}+2m_{(1,1)}^2}{m_{(0,0)}^2}$.

The equilibrium cumulant vector $\boldsymbol{\gamma}^{(eq)}$ is defined by

$$\boldsymbol{\gamma}^{(eq)} = \Big(\rho, v_1, v_2, c_s^2, c_s^2, 0, 0, 0, 0\Big)^T.$$

2.6.2 Conservation of mass: ρ

attached text file: `output_d2q9_nse_culbm1_symbolic_pde_00.txt`

$\frac{\partial \rho}{\partial t} + \frac{\delta_l v_1}{\delta_t}\frac{\partial \rho}{\partial x_1} + \frac{\delta_l \rho}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\delta_l v_2}{\delta_t}\frac{\partial \rho}{\partial x_2} + \frac{\delta_l \rho}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-1+v_1^2+3cs^2)\frac{\delta_l^3 v_1}{12\delta_t}\frac{\partial^3 \rho}{\partial x_1^3} + (-1+3v_1^2+cs^2)\frac{\delta_l^3 \rho}{12\delta_t}\frac{\partial^3 v_1}{\partial x_1^3} - \frac{\delta_l^3 \rho cs^2}{6\delta_t}\frac{\partial^3 v_2}{\partial x_1^2 \partial x_2} - \frac{\delta_l^3 \rho cs^2}{6\delta_t}\frac{\partial^3 v_1}{\partial x_1 \partial x_2^2} + (-1+3cs^2+v_2^2)\frac{\delta_l^3 v_2}{12\delta_t}\frac{\partial^3 \rho}{\partial x_2^3} + (-1+cs^2+3v_2^2)\frac{\delta_l^3 \rho}{12\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} +$
$(24v_1^2cs^2 - 12v_1^2\omega_1 cs^2 - 6v_1^2 + \omega_1 cs^2 + 3v_1^2\omega_1 + 2cs^4 + 6v_1^4 - \omega_1 cs^4 - 2cs^2 - 3v_1^4\omega_1)\frac{\delta_l^4}{24\delta_t\omega_1}\frac{\partial^4 \rho}{\partial x_1^4} +$
$(-4+10v_1^2 - 3\omega_1 cs^2 - 5v_1^2\omega_1 + 6cs^2 + 2\omega_1)\frac{\delta_l^4 v_1 \rho}{12\delta_t\omega_1}\frac{\partial^4 v_1}{\partial x_1^4} +$
$(v_1^2\omega_4 + 3\omega_4\omega_1 cs^2 - 9\omega_1 cs^2 - 3v_1^2\omega_1 + 3\omega_4 cs^2 + v_1^2\omega_4\omega_1 - \omega_4 + 3\omega_1 - \omega_4\omega_1)\frac{\delta_l^4 v_1 \rho}{12\delta_t\omega_4\omega_1}\frac{\partial^4 v_2}{\partial x_1^3 \partial x_2} +$
$(-2+\omega_3)\frac{\delta_l^4 cs^4}{6\omega_3\delta_t}\frac{\partial^4 \rho}{\partial x_1^2 \partial x_2^2} +$
$(\omega_6 v_2^2 + 3\omega_6 cs^2 + 3\omega_2\omega_6 cs^2 + \omega_2\omega_6 v_2^2 - 9\omega_2 cs^2 - 3\omega_2 v_2^2 + 3\omega_2 - \omega_2\omega_6 - \omega_6)\frac{\delta_l^4 \rho v_2}{12\omega_2\omega_6\delta_t}\frac{\partial^4 v_1}{\partial x_1 \partial x_2^3} +$
$(\omega_2 cs^2 + 3\omega_2 v_2^2 + 6v_2^4 + 2cs^4 - 2cs^2 - 6v_2^2 - 12\omega_2 cs^2 v_2^2 - 3\omega_2 v_2^4 - \omega_2 cs^4 + 24cs^2 v_2^2)\frac{\delta_l^4}{24\omega_2\delta_t}\frac{\partial^4 \rho}{\partial x_2^4} +$
$(-4 - 3\omega_2 cs^2 - 5\omega_2 v_2^2 + 2\omega_2 + 6cs^2 + 10v_2^2)\frac{\delta_l^4 \rho v_2}{12\omega_2\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0.$

2.6.3 Conservation of momentum: ρv_1

attached text file: `output_d2q9_nse_culbm1_symbolic_pde_01.txt`

$v_1\frac{\partial \rho}{\partial t} + \rho\frac{\partial v_1}{\partial t} + (v_1^2+cs^2)\frac{\delta_l}{\delta_t}\frac{\partial \rho}{\partial x_1} + \frac{2\delta_l v_1 \rho}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\delta_l v_1 v_2}{\delta_t}\frac{\partial \rho}{\partial x_2} + \frac{\delta_l \rho v_2}{\delta_t}\frac{\partial v_1}{\partial x_2} + \frac{\delta_l v_1 \rho}{\delta_t}\frac{\partial v_2}{\partial x_2} +$
$(-2+6v_1^2 - 3v_1^2\omega_1 - 2cs^2\omega_1 + 4cs^2 + \omega_1)\frac{\delta_l^2}{\delta_t\omega_1}\frac{\partial \rho}{\partial x_1}\frac{\partial v_1}{\partial x_1} + (2-\omega_1)\frac{3\delta_l^2 v_1 \rho}{\delta_t\omega_1}\left(\frac{\partial v_1}{\partial x_1}\right)^2 + (-2+\omega_3)\frac{\delta_l^2 cs^2}{2\omega_3\delta_t}\frac{\partial \rho}{\partial x_2}\frac{\partial v_2}{\partial x_1} +$
$(-2+\omega_3)\frac{\delta_l^2 cs^2}{2\omega_3\delta_t}\frac{\partial \rho}{\partial x_2}\frac{\partial v_1}{\partial x_2} + (-2+2v_1^2 - v_1^2\omega_1 - 3cs^2\omega_1 + 6cs^2 + \omega_1)\frac{\delta_l^2 v_1}{2\delta_t\omega_1}\frac{\partial^2 \rho}{\partial x_1^2} +$
$(-2+6v_1^2 - 3v_1^2\omega_1 - cs^2\omega_1 + 2cs^2 + \omega_1)\frac{\delta_l^2 \rho}{2\delta_t\omega_1}\frac{\partial^2 v_1}{\partial x_1^2} + (-2+\omega_3)\frac{\delta_l^2 cs^2 \rho}{2\omega_3\delta_t}\frac{\partial^2 v_2}{\partial x_1 \partial x_2} + (-2+\omega_3)\frac{\delta_l^2 cs^2 \rho}{2\omega_3\delta_t}\frac{\partial^2 v_1}{\partial x_2^2} +$
$C_1\frac{\delta_l^3}{12\delta_t\omega_1^2}\frac{\partial^3 \rho}{\partial x_1^3} + (-24+11v_1^2\omega_1^2 + 60v_1^2 - 60v_1^2\omega_1 - 36cs^2\omega_1 - 4\omega_1^2 + 36cs^2 + 24\omega_1 + 5cs^2\omega_1^2)\frac{\delta_l^3 v_1 \rho}{6\delta_t\omega_1^2}\frac{\partial^3 v_1}{\partial x_1^3} +$
$C_2\frac{\delta_l^3 v_1 \rho}{12\omega_3\delta_t\omega_4\omega_1^2}\frac{\partial^3 v_2}{\partial x_1^2 \partial x_2} + (-12 - \omega_3^2 + 12\omega_3)\frac{\delta_l^3 cs^4}{6\omega_3^2\delta_t}\frac{\partial^3 \rho}{\partial x_1 \partial x_2^2} - \frac{\delta_l^3 cs^2 v_1 \rho}{6\delta_t}\frac{\partial^3 v_1}{\partial x_1 \partial x_2^2} + (-1+v_2^2+3cs^2)\frac{\delta_l^3 v_1 v_2}{12\delta_t}\frac{\partial^3 \rho}{\partial x_2^3} +$
$C_3\frac{\delta_l^3 \rho v_2}{6\omega_6\omega_3\delta_t}\frac{\partial^3 v_1}{\partial x_2^3} + (-1+3v_2^2+cs^2)\frac{\delta_l^3 v_1 \rho}{12\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} + C_4\frac{\delta_l^4 v_1}{12\delta_t\omega_1^3}\frac{\partial^4 \rho}{\partial x_1^4} + C_5\frac{\delta_l^4 \rho}{12\delta_t\omega_1^3}\frac{\partial^4 v_1}{\partial x_1^4} + C_6\frac{\delta_l^4 \rho}{12\omega_3^3\delta_t\omega_4^2\omega_1^3}\frac{\partial^4 v_2}{\partial x_1^3 \partial x_2} +$
$C_7\frac{\delta_l^4 cs^2 v_1}{12\omega_3^2\delta_t\omega_4^2\omega_1^3}\frac{\partial^4 \rho}{\partial x_1^2 \partial x_2^2} + C_8\frac{\delta_l^4 cs^2 \rho}{12\omega_3^3\delta_t\omega_4\omega_1^2}\frac{\partial^4 v_1}{\partial x_1^2 \partial x_2^2} + C_9\frac{\delta_l^4 cs^2 v_2}{12\omega_2\omega_6^2\omega_3^2\delta_t}\frac{\partial^4 \rho}{\partial x_1 \partial x_2^3} +$
$(\omega_6 v_2^2 + 3\omega_6 cs^2 + \omega_2\omega_6 v_2^2 - 9\omega_2 cs^2 - 3\omega_2 v_2^2 + 3\omega_2 + 3\omega_2\omega_6 cs^2 - \omega_2\omega_6 - \omega_6)\frac{\delta_l^4 v_1 \rho v_2}{12\omega_2\omega_6\delta_t}\frac{\partial^4 v_1}{\partial x_1 \partial x_2^3} +$
$C_{10}\frac{\delta_l^4 cs^2 \rho}{12\omega_2\omega_6\omega_3^3\delta_t}\frac{\partial^4 v_2}{\partial x_1 \partial x_2^3} +$
$(\omega_2 cs^2 + 3\omega_2 v_2^2 + 2cs^4 + 6v_2^4 - 6v_2^2 - 2cs^2 + 24cs^2 v_2^2 - 3\omega_2 v_2^4 - 12\omega_2 cs^2 v_2^2 - \omega_2 cs^4)\frac{\delta_l^4 v_1}{24\omega_2\delta_t}\frac{\partial^4 \rho}{\partial x_2^4} + C_{11}\frac{\delta_l^4 \rho}{24\omega_6^2\omega_3^3\delta_t}\frac{\partial^4 v_1}{\partial x_2^4}$
$+ (-4 - 3\omega_2 cs^2 - 5\omega_2 v_2^2 + 2\omega_2 + 10v_2^2 + 6cs^2)\frac{\delta_l^4 v_1 \rho v_2}{12\omega_2\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0,$

where:

$$C_1 = -7v_1^2\omega_1^2-12cs^4\omega_1+144cs^2v_1^2-36v_1^2+cs^4\omega_1^2+12cs^4+36v_1^2\omega_1+12cs^2\omega_1+36v_1^4+7v_1^4\omega_1^2-144cs^2v_1^2\omega_1-12cs^2+24cs^2v_1^2\omega_1^2-36v_1^4\omega_1-cs^2\omega_1^2$$

$$C_2 = 36cs^2\omega_3\omega_1^2 - 12v_1^2\omega_1^2 + 36cs^2\omega_3\omega_4 - 6v_1^2\omega_3\omega_4\omega_1 + 3\omega_3\omega_4\omega_1^2 + 6\omega_3\omega_4\omega_1 - 3v_1^2\omega_3\omega_4\omega_1^2 + 18cs^2\omega_4\omega_1^2 - 36cs^2\omega_3\omega_1 - 12v_1^2\omega_3\omega_1 - 6\omega_4\omega_1^2 + 12\omega_1^2 - 11cs^2\omega_3\omega_4\omega_1^2 + 6v_1^2\omega_4\omega_1^2 + 12\omega_3\omega_1 - 12\omega_3\omega_1^2 - 18cs^2\omega_3\omega_4\omega_1 - 12\omega_3\omega_4 + 12v_1^2\omega_3\omega_4 + 12v_1^2\omega_3\omega_1^2 - 36cs^2\omega_1^2$$

$$C_3 = 6 + 3\omega_6v_2^2 - 3\omega_6cs^2\omega_3 + 9\omega_6cs^2 + 9cs^2\omega_3 - 3\omega_6 + \omega_6\omega_3 - 3\omega_3 - 6v_2^2 - 18cs^2 - \omega_6\omega_3v_2^2 + 3\omega_3v_2^2$$

$$C_4 = 12 - 98v_1^2\omega_1^2 - 216cs^4\omega_1 + 672cs^2v_1^2 + 10v_1^2\omega_1^3 - 156v_1^2 + 82cs^4\omega_1^2 + 144cs^4 + 234v_1^2\omega_1 - 5cs^4\omega_1^3 + 198cs^2\omega_1 - 9v_1^4\omega_1^3 + 8\omega_1^2 + 144v_1^4 + 90v_1^4\omega_1^2 - 1008cs^2v_1^2\omega_1 - 132cs^2 - \omega_1^3 + 404cs^2v_1^2\omega_1^2 - 216v_1^4\omega_1 + 6cs^2\omega_1^3 - 18\omega_1 - 34cs^2v_1^2\omega_1^3 - 78cs^2\omega_1^2$$

$$C_5 = 12 - 154v_1^2\omega_1^2 - 36cs^4\omega_1 + 432cs^2v_1^2 + 14v_1^2\omega_1^3 - 252v_1^2 + 14cs^4\omega_1^2 + 24cs^4 + 378v_1^2\omega_1 - cs^4\omega_1^3 + 54cs^2\omega_1 - 29v_1^4\omega_1^3 + 8\omega_1^2 + 504v_1^4 + 310v_1^4\omega_1^2 - 648cs^2v_1^2\omega_1 - 36cs^2 - \omega_1^3 + 252cs^2v_1^2\omega_1^2 - 756v_1^4\omega_1 + 2cs^2\omega_1^3 - 18\omega_1 - 18cs^2v_1^2\omega_1^3 - 22cs^2\omega_1^2$$

$$C_6 = 6cs^4\omega_3^2\omega_4^2\omega_1^2 + 12cs^4\omega_3\omega_4\omega_1^3 - 36v_1^4\omega_3^3\omega_1^2 + 39v_1^2\omega_3^3\omega_4\omega_1^3 + 198cs^2v_1^2\omega_3^3\omega_4\omega_1^2 + 36v_1^4\omega_3^3\omega_1^3 - 90v_1^4\omega_3^3\omega_4^2\omega_1 + 36v_1^4\omega_3^2\omega_4\omega_1^3 - 72v_1^2\omega_3^3\omega_4^2 + 13cs^4\omega_3^2\omega_4^2\omega_1^3 - 99cs^2v_1^2\omega_3^3\omega_4\omega_1^3 - 36cs^2v_1^2\omega_3^2\omega_4^2\omega_1 - 72v_1^2\omega_3^3\omega_4\omega_1^2 + 36v_1^2\omega_3^2\omega_1^3 - cs^2\omega_3^3\omega_4^2\omega_1^2 + 18cs^2\omega_3^2\omega_4\omega_1^3 + 6v_1^2\omega_3^2\omega_4^2\omega_1^3 + 36v_1^2\omega_3^3\omega_4\omega_1 + 18cs^2v_1^2\omega_3^2\omega_4^2\omega_1^2 + 36cs^2v_1^2\omega_3\omega_4\omega_1^3 + 36v_1^2\omega_3^3\omega_1^2 + 12cs^2\omega_3^3\omega_4^2\omega_1 - 6cs^4\omega_3^3\omega_4\omega_1^2 + 19v_1^4\omega_3^3\omega_4^2\omega_1^2 - 36v_1^2\omega_3^3\omega_1^3 - 3cs^2v_1^2\omega_3^2\omega_4^2\omega_1^3 - 108cs^2v_1^2\omega_3^3\omega_4\omega_1 + 6cs^2\omega_3\omega_4^2\omega_1^3 - 12cs^2\omega_3^2\omega_4\omega_1^2 + 72v_1^4\omega_3^3\omega_4^2 - 12cs^4\omega_3^2\omega_4^2\omega_1 + 4v_1^4\omega_3^3\omega_4^2\omega_1^2 + 6cs^4\omega_3^3\omega_4\omega_1^3 - 36v_1^4\omega_3^2\omega_1^3 + 54cs^2v_1^2\omega_3^2\omega_4\omega_1^3 - 6cs^2\omega_3^2\omega_4^2\omega_1^2 - 12cs^2\omega_3\omega_4\omega_1^3 - 306cs^2v_1^2\omega_3^3\omega_4^2\omega_1 - cs^4\omega_3^3\omega_4^2\omega_1^3 + 12cs^4\omega_3^3\omega_4^2 - 39v_1^4\omega_3^3\omega_4\omega_1^3 - 36v_1^2\omega_3^2\omega_4\omega_1^3 - 5cs^2\omega_3^2\omega_4^2\omega_1^3 - 108cs^2v_1^2\omega_3^2\omega_1^3 - 18cs^2v_1^2\omega_3\omega_4^2\omega_1^3 + 90v_1^2\omega_3^3\omega_4^2\omega_1 + 36cs^2v_1^2\omega_3^2\omega_4\omega_1^2 + 72v_1^4\omega_3^3\omega_4\omega_1^2 + cs^4\omega_3^3\omega_4^2\omega_1^2 + 252cs^2v_1^2\omega_3^3\omega_4^2 - 36v_1^4\omega_3^3\omega_4\omega_1 - 12cs^4\omega_3^3\omega_4^2\omega_1 - 18cs^4\omega_3^2\omega_4\omega_1^3 + 12cs^4\omega_4^2\omega_1^3 - 6v_1^4\omega_3^2\omega_4^2\omega_1^3 + 12cs^2v_1^2\omega_3^3\omega_4^2\omega_1^3 + 6cs^2\omega_3^3\omega_4\omega_1^2 - 12cs^2\omega_3^3\omega_4^2 - 108cs^2v_1^2\omega_3^3\omega_1^2 - 19v_1^2\omega_3^3\omega_4^2\omega_1^2 - 24cs^4\omega_3\omega_4^2\omega_1^3 + 12cs^4\omega_3^2\omega_4\omega_1^2 + 108cs^2v_1^2\omega_3^3\omega_1^3 - 4v_1^2\omega_3^3\omega_4^2\omega_1^3 - 6cs^2\omega_3^3\omega_4\omega_1^3 + 12cs^2\omega_3^2\omega_4^2\omega_1 + 60cs^2v_1^2\omega_3^3\omega_4^2\omega_1^2$$

$$C_7 = -12\omega_3^2\omega_1^3 - 12v_1^2\omega_3^2\omega_1^2 - 18v_1^2\omega_3^2\omega_4^2\omega_1 - 4\omega_3^2\omega_4^2\omega_1^2 - 18\omega_3\omega_4\omega_1^3 - 36cs^2\omega_3\omega_1^3 + 12\omega_3^2\omega_1^2 - 12\omega_3\omega_4\omega_1^2 - \omega_3^2\omega_4^2\omega_1^3 + 12v_1^2\omega_3^2\omega_1^3 - 18cs^2\omega_3^2\omega_4\omega_1^3 + 12v_1^2\omega_3\omega_4\omega_1^2 + v_1^2\omega_3^2\omega_4^2\omega_1^3 + 18cs^2\omega_3\omega_4^2\omega_1^2 - 12\omega_4^2\omega_1^3 - 12\omega_3^2\omega_4^2 - 12v_1^2\omega_4^2\omega_1^2 + 18\omega_3^2\omega_4^2\omega_1 - 36cs^2\omega_4\omega_1^3 + 4v_1^2\omega_3^2\omega_4^2\omega_1^2 + 12\omega_4^2\omega_1^2 - 40cs^2\omega_3\omega_4^2\omega_1^3 + 18cs^2\omega_3^2\omega_4\omega_1^2 + 18v_1^2\omega_3\omega_4\omega_1^3 + 12v_1^2\omega_3^2\omega_4^2 + 12v_1^2\omega_4^2\omega_1^3 + 36cs^2\omega_3^2\omega_4^2 - 12v_1^2\omega_3\omega_4^2\omega_1^3 + 12cs^2\omega_3^2\omega_4^2\omega_1^2 + 54cs^2\omega_3\omega_4\omega_1^3 + 36cs^2\omega_4^2\omega_1^3 + 6v_1^2\omega_3^2\omega_4\omega_1^2 - 12v_1^2\omega_4\omega_1^3 + 12\omega_4\omega_1^3 + 36cs^2\omega_3\omega_4\omega_1^2 - 6v_1^2\omega_3^2\omega_4\omega_1^3 - 36cs^2\omega_4^2\omega_1^2 + 6v_1^2\omega_3\omega_4^2\omega_1^2 + 5cs^2\omega_3^2\omega_4^2\omega_1^3 + 36cs^2\omega_3^2\omega_1^3 + 6\omega_3^2\omega_4\omega_1^3 - 6\omega_3\omega_4^2\omega_1^2 - 12v_1^2\omega_3\omega_1^3 + 12\omega_3\omega_1^3 - 36cs^2\omega_3^2\omega_1^2 - 54cs^2\omega_3^2\omega_4^2\omega_1 + 12\omega_3\omega_4^2\omega_1^3 - 6\omega_3^2\omega_4\omega_1^2$$

$$C_8 = 12cs^2\omega_3\omega_1^2 - 36v_1^2\omega_3^2\omega_4 + 24\omega_3^3\omega_1 - 72v_1^2\omega_3^2\omega_1^2 + 12cs^2\omega_3^3 + 12cs^2\omega_3^2\omega_4\omega_1 + 24\omega_3^2\omega_1^2 - 36v_1^2\omega_3\omega_4\omega_1 + 12\omega_3^2\omega_4 - 72v_1^2\omega_3^3\omega_1 + 12\omega_3\omega_4\omega_1 - 12cs^2\omega_4\omega_1^2 + 36v_1^2\omega_3^3\omega_1^2 - 24\omega_3^2\omega_1 + 72v_1^2\omega_3^2\omega_1 - 4cs^2\omega_3^2\omega_4\omega_1^2 - 12\omega_3^3 - 12\omega_3^3\omega_1^2 - 12\omega_3^2\omega_4\omega_1 + 24cs^2\omega_3^2\omega_1 + 18cs^2\omega_3\omega_4\omega_1^2 + 12cs^2\omega_3^3\omega_1^2 - 12\omega_3\omega_1^2 - 24cs^2\omega_3^3\omega_1 - 12cs^2\omega_3\omega_4\omega_1 - cs^2\omega_3^3\omega_4\omega_1^2 + 36v_1^2\omega_3^3 - 24cs^2\omega_3^2\omega_1^2 + 36v_1^2\omega_3\omega_1^2 - 12cs^2\omega_3^2\omega_4 + 36v_1^2\omega_3^2\omega_4\omega_1$$

$$C_9 = 36\omega_6cs^2\omega_3 + 18\omega_2cs^2\omega_3^2 - \omega_6^2\omega_3^2 - 3\omega_2\omega_6\omega_3^2v_2^2 - 12\omega_2\omega_6v_2^2 - \omega_2\omega_6^2\omega_3^2 - 9\omega_2\omega_6cs^2\omega_3^2 - 36\omega_2\omega_6cs^2 + 6\omega_2\omega_3^2v_2^2 - 12\omega_2\omega_6^2\omega_3v_2^2 - 12\omega_2\omega_6^2 + 12\omega_2\omega_6^2\omega_3 + 54\omega_2\omega_6cs^2\omega_3 + 12\omega_2\omega_6 - 6\omega_6\omega_3^2v_2^2 - 36\omega_2cs^2\omega_3 - 6\omega_6^2\omega_3 + 6\omega_6^2\omega_3v_2^2 - 18\omega_6cs^2\omega_3^2 - 12\omega_6\omega_3 - 36\omega_2\omega_6^2cs^2\omega_3 + \omega_6^2\omega_3^2v_2^2 + 12\omega_6^2 - 18\omega_2\omega_6\omega_3 + 12\omega_2\omega_3 + 3\omega_6^2cs^2\omega_3^2 + 12\omega_6\omega_3v_2^2 - 6\omega_2\omega_3^2 + 12\omega_2\omega_6^2v_2^2 + 18\omega_6^2cs^2\omega_3 + 3\omega_2\omega_6\omega_3^2 - 12\omega_2\omega_3v_2^2 + \omega_2\omega_6^2\omega_3^2v_2^2 + 36\omega_2\omega_6^2cs^2 - 12\omega_6^2v_2^2 + 18\omega_2\omega_6\omega_3v_2^2 + 6\omega_6\omega_3^2 + 3\omega_2\omega_6^2cs^2\omega_3^2 - 36\omega_6^2cs^2$$

$$C_{10} = 3\omega_6\omega_3^3v_2^2 - 12\omega_6cs^2\omega_3 - 18\omega_2cs^2\omega_3^2 - \omega_2\omega_6cs^2\omega_3^3 - 3\omega_2\omega_6\omega_3^2v_2^2 + 36\omega_3^2v_2^2 - 6cs^2\omega_3^3 + 12cs^2\omega_3^2 - 5\omega_2\omega_6cs^2\omega_3^2 - 12\omega_2\omega_6cs^2 + 6\omega_2cs^2\omega_3^3 - 54\omega_2\omega_3^2v_2^2 - 18\omega_3^3v_2^2 + 18\omega_2\omega_6cs^2\omega_3 + 18\omega_6\omega_3^2v_2^2 + \omega_6cs^2\omega_3^3 - 12\omega_3^2 + 12\omega_2cs^2\omega_3 + 18\omega_2\omega_3^3v_2^2 + 6\omega_3^3 + 6\omega_6cs^2\omega_3^2 + 12\omega_6\omega_3 - 12\omega_2\omega_3 - 36\omega_6\omega_3v_2^2 + 18\omega_2\omega_3^2 + \omega_2\omega_6\omega_3^2 + 36\omega_2\omega_3v_2^2 - \omega_6\omega_3^3 - 6\omega_2\omega_3^3 - 6\omega_6\omega_3^2$$

$$C_{11} = 30\omega_6\omega_3^3v_2^2-24\omega_6cs^2\omega_3-72\omega_6cs^2\omega_3^3v_2^2+72\omega_3^3v_2^2+24\omega_6^2cs^4\omega_3^2+3\omega_6^2\omega_3^3v_2^4-36\omega_6^2cs^2\omega_3v_2^2+24\omega_6^2cs^4-3\omega_6^2cs^4\omega_3^3-36\omega_3^3v_2^2-12\omega_6^2\omega_3^2v_2^4+144\omega_6cs^2\omega_3^2v_2^2-72\omega_6\omega_3^2v_2^2-6\omega_6cs^2\omega_3^3-48\omega_6^2cs^4\omega_3+24\omega_6cs^2\omega_3^2+108cs^2\omega_3^3v_2^2+72\omega_6\omega_3^2v_2^4+36\omega_3^3v_2^4+12\omega_6^2\omega_3^2v_2^2+\omega_6^2cs^2\omega_3^3+6\omega_6^2cs^2\omega_3^3v_2^2+24\omega_6cs^4\omega_3+72\omega_6cs^2\omega_3v_2^2-8\omega_6^2cs^2\omega_3^2+12\omega_6^2cs^2\omega_3-72\omega_3^2v_2^4-3\omega_6^2\omega_3^3v_2^2-12\omega_6^2cs^2\omega_3^2v_2^2-216cs^2\omega_3^2v_2^2-30\omega_6\omega_3^3v_2^2-24\omega_6cs^4\omega_3^2+6\omega_6cs^4\omega_3^3$$

2.6.4 Conservation of momentum: ρv_2

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$$v_2\frac{\partial\rho}{\partial t} + \rho\frac{\partial v_2}{\partial t} + \frac{\delta_l v_1 v_2}{\delta_t}\frac{\partial\rho}{\partial x_1} + \frac{\delta_l\rho v_2}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\delta_l v_1\rho}{\delta_t}\frac{\partial v_2}{\partial x_1} + (cs^2+v_2^2)\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \frac{2\delta_l\rho v_2}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-2+\omega_3)\frac{\delta_l^2cs^2}{2\omega_3\delta_t}\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_1} + (-2+\omega_3)\frac{\delta_l^2cs^2}{2\omega_3\delta_t}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_2} + (-2-2\omega_2cs^2-3\omega_2v_2^2+\omega_2+4cs^2+6v_2^2)\frac{\delta_l^2}{\omega_2\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_2} + (2-\omega_2)\frac{3\delta_l^2\rho v_2}{\omega_2\delta_t}\left(\frac{\partial v_2}{\partial x_2}\right)^2 + (-2+\omega_3)\frac{\delta_l^2cs^2\rho}{2\omega_3\delta_t}\frac{\partial^2v_2}{\partial x_1^2} + (-2+\omega_3)\frac{\delta_l^2cs^2\rho}{2\omega_3\delta_t}\frac{\partial^2v_1}{\partial x_1\partial x_2} + (-2-3\omega_2cs^2-\omega_2v_2^2+\omega_2+6cs^2+2v_2^2)\frac{\delta_l^2v_2}{2\omega_2\delta_t}\frac{\partial^2\rho}{\partial x_2^2} + (-2-\omega_2cs^2-3\omega_2v_2^2+\omega_2+2cs^2+6v_2^2)\frac{\delta_l^2\rho}{2\omega_2\delta_t}\frac{\partial^2v_2}{\partial x_2^2} + (-1+v_1^2+3cs^2)\frac{\delta_l^3v_1v_2}{12\delta_t}\frac{\partial^3\rho}{\partial x_1^3} + (-1+3v_1^2+cs^2)\frac{\delta_l^3\rho v_2}{12\delta_t}\frac{\partial^3v_1}{\partial x_1^3} + C_1\frac{\delta_l^3v_1\rho}{6\omega_3\delta_t\omega_4}\frac{\partial^3v_2}{\partial x_1^3} + (-12-\omega_3^2+12\omega_3)\frac{\delta_l^3cs^4}{6\omega_3^2\delta_t}\frac{\partial^3\rho}{\partial x_1^2\partial x_2} - \frac{\delta_l^3cs^2\rho v_2}{6\delta_t}\frac{\partial^3v_2}{\partial x_1^2\partial x_2} + C_2\frac{\delta_l^3\rho v_2}{12\omega_2^2\omega_6\omega_3\delta_t}\frac{\partial^3v_1}{\partial x_1\partial x_2^2} + C_3\frac{\delta_l^3}{12\omega_2^2\delta_t}\frac{\partial^3\rho}{\partial x_2^3} + (-24-36\omega_2cs^2-60\omega_2v_2^2-4\omega_2^2+24\omega_2+36cs^2+60v_2^2+11\omega_2^2v_2^2+5\omega_2^2cs^2)\frac{\delta_l^3\rho v_2}{6\omega_2^2\delta_t}\frac{\partial^3v_2}{\partial x_2^3} +$$

$$(-12cs^2v_1^2\omega_1 - 6v_1^2 + 2cs^4 + 3v_1^2\omega_1 + 24cs^2v_1^2 - cs^4\omega_1 + 6v_1^4 - 2cs^2 - 3v_1^4\omega_1 + cs^2\omega_1)\frac{\delta_l^4 v_2}{24\delta_t\omega_1}\frac{\partial^4\rho}{\partial x_1^4} +$$
$$(-4 + 10v_1^2 - 5v_1^2\omega_1 + 6cs^2 - 3cs^2\omega_1 + 2\omega_1)\frac{\delta_l^4 v_1\rho v_2}{12\delta_t\omega_1}\frac{\partial^4 v_1}{\partial x_1^4} + C_4\frac{\delta_l^4\rho}{24\omega_3^3\delta_t\omega_4^2}\frac{\partial^4 v_2}{\partial x_1^4} + C_5\frac{\delta_l^4 cs^2 v_1}{12\omega_3^2\delta_t\omega_4^2\omega_1}\frac{\partial^4\rho}{\partial x_1^3\partial x_2} +$$
$$C_6\frac{\delta_l^4 cs^2\rho}{12\omega_3^3\delta_t\omega_4\omega_1}\frac{\partial^4 v_1}{\partial x_1^3\partial x_2} + (v_1^2\omega_4 - 3v_1^2\omega_1 + 3cs^2\omega_4\omega_1 + 3cs^2\omega_4 + v_1^2\omega_4\omega_1 - \omega_4 - 9cs^2\omega_1 + 3\omega_1 - \omega_4\omega_1)\frac{\delta_l^4 v_1\rho v_2}{12\delta_t\omega_4\omega_1}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2}$$
$$+ C_7\frac{\delta_l^4 cs^2 v_2}{12\omega_3^2\omega_6^2\omega_3^2\delta_t}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} + C_8\frac{\delta_l^4 cs^2\rho}{12\omega_2^2\omega_6\omega_3^2\delta_t}\frac{\partial^4 v_2}{\partial x_1^2\partial x_2^2} + C_9\frac{\delta_l^4\rho}{12\omega_2^2\omega_6^2\omega_3^2\delta_t}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3} + C_{10}\frac{\delta_l^4 v_2}{12\omega_2^3\delta_t}\frac{\partial^4\rho}{\partial x_2^4} + C_{11}\frac{\delta_l^4\rho}{12\omega_2^3\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0,$$

where:

$C_1 = 6 + 9cs^2\omega_3 + 3v_1^2\omega_4 - 6v_1^2 - 3\omega_3 - 18cs^2 - 3cs^2\omega_3\omega_4 + 9cs^2\omega_4 + 3v_1^2\omega_3 - 3\omega_4 + \omega_3\omega_4 - v_1^2\omega_3\omega_4$

$C_2 = 18\omega_2^2cs^2\omega_6 + 12\omega_2^2\omega_3v_2^2 - 11\omega_2^2cs^2\omega_6\omega_3 + 12\omega_2^2 - 36\omega_2cs^2\omega_3 - 12\omega_2^2\omega_3 - 3\omega_2^2\omega_6\omega_3v_2^2 + 3\omega_2^2\omega_6\omega_3 - 12\omega_6\omega_3 + 6\omega_2\omega_6\omega_3 - 6\omega_2^2\omega_6 + 12\omega_2\omega_3 - 18\omega_2cs^2\omega_6\omega_3 + 12\omega_6\omega_3v_2^2 - 12\omega_2^2v_2^2 - 12\omega_2\omega_3v_2^2 - 36\omega_2^2cs^2 + 6\omega_2^2\omega_6v_2^2 + 36\omega_2^2cs^2\omega_3 - 6\omega_2\omega_6\omega_3v_2^2 + 36cs^2\omega_6\omega_3$

$C_3 = 12\omega_2cs^2 + 7\omega_2^2v_2^4 + 36\omega_2v_2^2 + \omega_2^2cs^4 + 12cs^4 + 24\omega_2^2cs^2v_2^2 + 36v_2^4 + 144cs^2v_2^2 - 12cs^2 - 36v_2^2 - 144\omega_2cs^2v_2^2 - 12\omega_2cs^4 - 7\omega_2^2v_2^2 - 36\omega_2v_2^4 - \omega_2^2cs^2$

$C_4 = -72v_1^2\omega_3^2\omega_4 + 72cs^2v_1^2\omega_3\omega_4 - 24cs^4\omega_3^2\omega_4 - 6cs^2\omega_3^3\omega_4 - 30v_1^4\omega_3^3\omega_4 - 3cs^4\omega_3^3\omega_4^2 - 3v_1^2\omega_3^3\omega_4^2 - 12v_1^4\omega_3^2\omega_4^2 - 8cs^2\omega_3^2\omega_4^2 + 36v_1^4\omega_3^3 + 72v_1^4\omega_3^2\omega_4 + 24cs^2\omega_3^2\omega_4 + 6cs^4\omega_3^3\omega_4 + 30v_1^2\omega_3^3\omega_4 + cs^2\omega_3^3\omega_4^2 + 24cs^4\omega_4^2 - 72v_1^4\omega_3^2 + 3v_1^4\omega_3^3\omega_4^2 + 12v_1^2\omega_3^2\omega_4^2 + 24cs^4\omega_3^2\omega_4^2 - 36cs^2v_1^2\omega_3\omega_4^2 + 108cs^2v_1^2\omega_3^3 - 48cs^4\omega_3\omega_4^2 - 12cs^2v_1^2\omega_3^2\omega_4^2 - 24cs^2\omega_3\omega_4 - 72cs^2v_1^2\omega_3^3\omega_4 - 216cs^2v_1^2\omega_3^2 + 6cs^2v_1^2\omega_3^3\omega_4^2 + 72v_1^2\omega_3^2 + 12cs^2\omega_3\omega_4^2 - 36v_1^2\omega_3^3 + 144cs^2v_1^2\omega_3^2\omega_4 + 24cs^4\omega_3\omega_4$

$C_5 = -6v_1^2\omega_3^2\omega_4 - 12\omega_4^2\omega_1 + v_1^2\omega_3^2\omega_4^2\omega_1 + 12v_1^2\omega_4^2\omega_1 + 18cs^2\omega_3^2\omega_1 + 18v_1^2\omega_3\omega_4\omega_1 + 6\omega_3^2\omega_4 + 3cs^2\omega_3^2\omega_4^2 - 18\omega_3\omega_4\omega_1 - 36cs^2\omega_3\omega_4^2\omega_1 - \omega_3^2\omega_4^2 - 18cs^2\omega_3^2\omega_4 - 6\omega_3^2\omega_1 - 9cs^2\omega_3^2\omega_4\omega_1 + 6v_1^2\omega_3^2\omega_1 - \omega_3^2\omega_4^2\omega_1 - 12v_1^2\omega_4^2 + 36cs^2\omega_4^2\omega_1 + v_1^2\omega_3^2\omega_4^2 - 12v_1^2\omega_3\omega_1 + 3cs^2\omega_3^2\omega_4^2\omega_1 - 36cs^2\omega_4\omega_1 + 3\omega_3^2\omega_4\omega_1 + 6v_1^2\omega_3\omega_4^2 + 12\omega_3\omega_4^2\omega_1 + 36cs^2\omega_3\omega_4 - 6\omega_3\omega_4^2 + 54cs^2\omega_3\omega_4\omega_1 + 12\omega_3\omega_1 - 12v_1^2\omega_4\omega_1 - 36cs^2\omega_4^2 - 36cs^2\omega_3\omega_1 - 12v_1^2\omega_3\omega_4^2\omega_1 + 18cs^2\omega_3\omega_4^2 - 12\omega_3\omega_4 + 12v_1^2\omega_3\omega_4 - 3v_1^2\omega_3^2\omega_4\omega_1 + 12\omega_4^2 + 12\omega_4\omega_1$

$C_6 = 18v_1^2\omega_3^2\omega_4 - 6\omega_3^3\omega_1 + cs^2\omega_3^3\omega_4 - 18cs^2\omega_3^2\omega_1 - 6\omega_3^2\omega_4 + 18v_1^2\omega_3^3\omega_1 - 6cs^2\omega_3^3 + 6cs^2\omega_3^2\omega_4 + 3v_1^2\omega_3^3\omega_4 + 18\omega_3^2\omega_1 - 12\omega_3^2 - \omega_3^3\omega_4 - 5cs^2\omega_3^2\omega_4\omega_1 - 54v_1^2\omega_3^2\omega_1 + 12cs^2\omega_3^2 + 6cs^2\omega_3^3\omega_1 + 6\omega_3^3 + 36v_1^2\omega_3\omega_1 - 12cs^2\omega_4\omega_1 + \omega_3^2\omega_4\omega_1 - 12cs^2\omega_3\omega_4 + 18cs^2\omega_3\omega_4\omega_1 - 12\omega_3\omega_1 + 12cs^2\omega_3\omega_1 + 36v_1^2\omega_3^2 - cs^2\omega_3^3\omega_4\omega_1 + 12\omega_3\omega_4 - 18v_1^2\omega_3^3 - 36v_1^2\omega_3\omega_4 - 3v_1^2\omega_3^2\omega_4\omega_1$

$C_7 = 18\omega_3^2\omega_6\omega_3v_2^2 + 12\omega_3^2\omega_3 - 12\omega_2^2\omega_6^2v_2^2 - 12\omega_6^2\omega_3^2 - 6\omega_2^2\omega_6\omega_3^2 + 36\omega_2^2cs^2\omega_6\omega_3 + 12\omega_2^2\omega_3^2 - 54\omega_2cs^2\omega_6^2\omega_3^2 + \omega_2^2\omega_6^2\omega_3^2v_2^2 + 18\omega_2\omega_6^2\omega_3^2 + 36\omega_2^3cs^2\omega_3^2 + 12\omega_3^3\omega_6^2\omega_3 - 18\omega_3^2cs^2\omega_6\omega_3^2 + 4\omega_2^2\omega_6^2\omega_3^2v_2^2 - 36\omega_2^3cs^2\omega_3 + 12\omega_2^3\omega_3^2v_2^2 - \omega_2^3\omega_6^2\omega_3^2 + 54\omega_2^3cs^2\omega_6\omega_3 + 18\omega_2^2cs^2\omega_6\omega_3^2 - 12\omega_2^3\omega_6v_2^2 + 36cs^2\omega_6^2\omega_3^2 + 12\omega_2^2\omega_6\omega_3v_2^2 - 12\omega_2^2\omega_6\omega_3 - 36\omega_2^2cs^2\omega_6^2 - 12\omega_2^3\omega_3^2 - 12\omega_2^3\omega_6^2 - 36\omega_2^2cs^2\omega_3^2 - 6\omega_2^2\omega_6^2\omega_3 + 6\omega_2^2\omega_6\omega_3^2v_2^2 + 12\omega_6^2\omega_3^2v_2^2 - 12\omega_2^3\omega_3v_2^2 + 6\omega_2^2\omega_6^2\omega_3v_2^2 - 40\omega_2^3cs^2\omega_6^2\omega_3 + 6\omega_2^3\omega_6\omega_3^2 + 12\omega_2^2cs^2\omega_6^2\omega_3^2 + 12\omega_2^3\omega_6^2v_2^2 - 36\omega_2^3cs^2\omega_6 + 18\omega_2^2cs^2\omega_6^2\omega_3 - 12\omega_2^3\omega_6^2\omega_3v_2^2 + 36\omega_2^3cs^2\omega_6^2 + 12\omega_2^2\omega_6^2 + 5\omega_2^3cs^2\omega_6^2\omega_3^2 - 18\omega_2\omega_6^2\omega_3^2v_2^2 - 18\omega_2^3\omega_6\omega_3 - 6\omega_2^3\omega_6\omega_3^2v_2^2 + 12\omega_2^3\omega_6 - 12\omega_2^2\omega_3^2v_2^2 - 4\omega_2^2\omega_6^2\omega_3^2$

$C_8 = -12\omega_2^2\omega_3^3 - 12\omega_2^2cs^2\omega_6 + 36\omega_2\omega_6\omega_3^2v_2^2 + 36\omega_2^2\omega_3v_2^2 + 18\omega_2^2cs^2\omega_6\omega_3 + 24\omega_2^2\omega_3^2 + 72\omega_2\omega_3^2v_2^2 + 36\omega_3^3v_2^2 + 12cs^2\omega_3^3 + 24\omega_2cs^2\omega_3^2 - 4\omega_2^2cs^2\omega_6\omega_3^2 - 12\omega_2^2\omega_3 - 36\omega_6\omega_3^2v_2^2 - 24\omega_2cs^2\omega_3^3 - 72\omega_2\omega_3^3v_2^2 - 12\omega_3^3 - \omega_2^2cs^2\omega_6\omega_3^3 - 24\omega_2^2cs^2\omega_3^2 - 12cs^2\omega_6\omega_3^2 + 12\omega_2\omega_6\omega_3 + 36\omega_2^2\omega_3^3v_2^2 + 12\omega_2^2cs^2\omega_3^3 - 12\omega_2cs^2\omega_6\omega_3 - 24\omega_2\omega_3^2 + 12\omega_2cs^2\omega_6\omega_3^2 - 12\omega_2\omega_6\omega_3^2 + 24\omega_2\omega_3^3 + 12\omega_2^2cs^2\omega_3 - 36\omega_2\omega_6\omega_3v_2^2 - 72\omega_2^2\omega_3^2v_2^2 + 12\omega_6\omega_3^2$

$C_9 = 12\omega_2cs^2\omega_6^2\omega_3^3 + 72\omega_2^2\omega_6\omega_3^3v_2^4 + 12\omega_2^3cs^4\omega_6\omega_3 + 12cs^4\omega_6^2\omega_3^3 - 3\omega_2^3cs^2\omega_6^2\omega_3^2v_2^2 - 6\omega_2^3cs^2\omega_6\omega_3^3 + 12\omega_2^2cs^4\omega_6\omega_3^2 + 36\omega_2^2cs^2\omega_6\omega_3^2v_2^2 - 19\omega_2^2\omega_6^2\omega_3^3v_2^2 - 36\omega_2^3\omega_3^3v_2^2 + 72\omega_6^2\omega_3^3v_2^4 + 252cs^2\omega_6^2\omega_3^3v_2^2 + 36\omega_2^3cs^2\omega_6\omega_3v_2^2 + 12\omega_2cs^2\omega_6^2\omega_3^2 + 6\omega_2^3\omega_6^2\omega_3^2v_2^2 + 36\omega_2^3\omega_6\omega_3^2v_2^4 - 6\omega_2^2cs^4\omega_6\omega_3^3 + 18\omega_2^3cs^2\omega_6\omega_3^2 + 198\omega_2^2cs^2\omega_6\omega_3^3v_2^2 - 12\omega_2cs^4\omega_6^2\omega_3^3 + 36\omega_2^3\omega_3^2v_2^2 + 36\omega_2\omega_6\omega_3^3v_2^2 - 12\omega_2^3cs^2\omega_6\omega_3 - 12cs^2\omega_6^2\omega_3^3 - 90\omega_2\omega_6^2\omega_3^3v_2^2 - 12\omega_2^2cs^2\omega_6\omega_3^2 + 12\omega_2^3cs^2\omega_6^2\omega_3^3v_2^2 + 6\omega_2^3cs^4\omega_6\omega_3^3 - 12\omega_2cs^4\omega_6^2\omega_3^2 + 12\omega_2^3cs^4\omega_6^2 - 39\omega_2^3\omega_6\omega_3^3v_2^2 - 108\omega_2cs^2\omega_6\omega_3^3v_2^2 - 4\omega_2^3\omega_6^2\omega_3^3v_2^2 - 18\omega_2^3cs^4\omega_6\omega_3^2 - 36\omega_2^2\omega_3^3v_2^4 + 6\omega_2^2cs^2\omega_6\omega_3^3 + 90\omega_2\omega_6^2\omega_3^3v_2^2 + 108\omega_2^3cs^2\omega_3^3v_2^2 + 60\omega_2^2cs^2\omega_6^2\omega_3^3v_2^2 - 36\omega_2^3\omega_3^2v_2^4 - 99\omega_2^3cs^2\omega_6\omega_3^3v_2^2 - \omega_2^2cs^2\omega_6^2\omega_3^3 + 13\omega_2^3cs^4\omega_6^2\omega_3^2 - 36\omega_2\omega_6\omega_3^3v_2^4 + 4\omega_2^3\omega_6^2\omega_3^3v_2^4 + 36\omega_2^2\omega_3^3v_2^2 + 6\omega_2^3cs^2\omega_6^2\omega_3 - \omega_2^3cs^4\omega_6^2\omega_3^3 - 6\omega_2^2cs^2\omega_6^2\omega_3^2 + 39\omega_2^3\omega_6\omega_3^3v_2^2 - 306\omega_2cs^2\omega_6^2\omega_3^3v_2^2 + 54\omega_2^3cs^2\omega_6\omega_3^2v_2^2 + 19\omega_2^2\omega_6^2\omega_3^3v_2^4 + 36\omega_2^3\omega_3^3v_2^4 - 72\omega_6^2\omega_3^3v_2^2 + 18\omega_2^3cs^2\omega_6^2\omega_3^3v_2^2 - 72\omega_2^2\omega_6\omega_3^3v_2^2 - 108\omega_2^3cs^2\omega_3^3v_2^2 - 5\omega_2^3cs^2\omega_6^2\omega_3^2 + \omega_2^2cs^4\omega_6^2\omega_3^3 - 108\omega_2^2cs^2\omega_3^3v_2^2 - 36\omega_2^3\omega_6\omega_3^3v_2^2 - 36\omega_2cs^2\omega_6^2\omega_3^3v_2^2 - 18\omega_2^3cs^2\omega_6^2\omega_3v_2^2 - 24\omega_2^3cs^4\omega_6^2\omega_3 + 6\omega_2^2cs^4\omega_6^2\omega_3^2 - 6\omega_2^3\omega_6^2\omega_3^2v_2^4$

$C_{10} = 12 + 198\omega_2cs^2 + 90\omega_2^2v_2^4 - \omega_2^3 + 234\omega_2v_2^2 + 82\omega_2^2cs^4 + 8\omega_2^2 - 18\omega_2 + 144cs^4 - 9\omega_2^3v_2^4 - 5\omega_2^3cs^4 + 404\omega_2^2cs^2v_2^2 + 144v_2^4 + 10\omega_2^3v_2^2 + 672cs^2v_2^2 - 132cs^2 - 156v_2^2 + 6\omega_2^3cs^2 - 1008\omega_2cs^2v_2^2 - 34\omega_2^3cs^2v_2^2 - 216\omega_2cs^4 - 98\omega_2^2v_2^2 - 216\omega_2v_2^4 - 78\omega_2^2cs^2$

$C_{11} = 12 + 54\omega_2cs^2 + 310\omega_2^2v_2^4 - \omega_2^3 + 378\omega_2v_2^2 + 14\omega_2^2cs^4 + 8\omega_2^2 - 18\omega_2 + 24cs^4 - 29\omega_2^3v_2^4 - \omega_2^3cs^4 + 252\omega_2^2cs^2v_2^2 + 504v_2^4 + 14\omega_2^3v_2^2 + 432cs^2v_2^2 - 36cs^2 - 252v_2^2 + 2\omega_2^3cs^2 - 648\omega_2cs^2v_2^2 - 18\omega_2^3cs^2v_2^2 - 36\omega_2cs^4 - 154\omega_2^2v_2^2 - 756\omega_2v_2^4 - 22\omega_2^2cs^2$

2.7 CuLBM2

2.7.1 Definitions

Collision operator $\boldsymbol{C}$:

$$\boldsymbol{C}(\boldsymbol{f}) = \mathbf{M}^{-1}\boldsymbol{G}^{-1}\left(\mathbf{N}^{-1}\mathbf{S}\mathbf{N}\left(\boldsymbol{\gamma}^{(eq)} - \boldsymbol{G}(\mathbf{M}\boldsymbol{f})\right)\right),$$

where

$$\mathbf{S} = \mathrm{diag}(0, 0, 0, \omega_1, \omega_2, \omega_1, \omega_3, \omega_3, \omega_4),$$

$\omega_1, \omega_2, \omega_3, \omega_4 \in (0, 2)$.
Matrix $\mathbf{N}$ defines the combination of cumulants for the collision as

$$\mathbf{N} = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}.$$

The nonlinear operator $\boldsymbol{G}$ is the same as in CuLBM1 in Section **??** and, again, the equilibrium cumulant vector $\boldsymbol{\gamma}^{(eq)}$ is defined by

$$\boldsymbol{\gamma}^{(eq)} = \Big(\rho, v_1, v_2, 2c_s^2, 0, 0, 0, 0, 0\Big)^T.$$

2.7.2 Conservation of mass: ρ

attached text file: `output_d2q9_nse_culbm2_symbolic_pde_00.txt`

$$\frac{\partial \rho}{\partial t} + \frac{\delta_l v_1}{\delta_t}\frac{\partial \rho}{\partial x_1} + \frac{\delta_l \rho}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\delta_l v_2}{\delta_t}\frac{\partial \rho}{\partial x_2} + \frac{\delta_l \rho}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-1 + 3cs^2 + v_1^2)\frac{\delta_l^3 v_1}{12\delta_t}\frac{\partial^3 \rho}{\partial x_1^3} + (-1 + cs^2 + 3v_1^2)\frac{\delta_l^3 \rho}{12\delta_t}\frac{\partial^3 v_1}{\partial x_1^3} -$$
$$\frac{cs^2\delta_l^3 \rho}{6\delta_t}\frac{\partial^3 v_2}{\partial x_1^2 \partial x_2} - \frac{cs^2\delta_l^3 \rho}{6\delta_t}\frac{\partial^3 v_1}{\partial x_1 \partial x_2^2} + (-1 + 3cs^2 + v_2^2)\frac{\delta_l^3 v_2}{12\delta_t}\frac{\partial^3 \rho}{\partial x_2^3} + (-1 + cs^2 + 3v_2^2)\frac{\delta_l^3 \rho}{12\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} + C_1\frac{\delta_l^4}{24\omega_1\omega_2\delta_t}\frac{\partial^4 \rho}{\partial x_1^4} +$$
$$(3\omega_1 cs^2 - 2\omega_1 + 3cs^2\omega_2 - 5\omega_1\omega_2 v_1^2 - 2\omega_2 + 5\omega_1 v_1^2 - 3\omega_1 cs^2\omega_2 + 5\omega_2 v_1^2 + 2\omega_1\omega_2)\frac{\delta_l^4 \rho v_1}{12\omega_1\omega_2\delta_t}\frac{\partial^4 v_1}{\partial x_1^4} +$$
$$(3\omega_1 cs^2 - \omega_1 - 3cs^2\omega_2 + \omega_2 + \omega_1 v_2^2 - \omega_2 v_2^2)\frac{\delta_l^4 v_1 v_2}{8\omega_1\omega_2\delta_t}\frac{\partial^4 \rho}{\partial x_1^3 \partial x_2} +$$
$$(3\omega_1 cs^2 - \omega_1 - 3cs^2\omega_2 + \omega_2 + \omega_1 v_2^2 - \omega_2 v_2^2)\frac{\delta_l^4 \rho v_2}{24\omega_1\omega_2\delta_t}\frac{\partial^4 v_1}{\partial x_1^3 \partial x_2} + C_2\frac{\delta_l^4 \rho v_1}{24\omega_1\omega_2\omega_3\delta_t}\frac{\partial^4 v_2}{\partial x_1^3 \partial x_2} +$$
$$(2\omega_1 cs^2 - 2\omega_1 - 10cs^2\omega_2 + 2\omega_2 + 3\omega_1 v_1^2 + 3\omega_1 v_2^2 + 4\omega_1 cs^2\omega_2 - 3\omega_2 v_1^2 - 3\omega_2 v_2^2)\frac{cs^2\delta_l^4}{24\omega_1\omega_2\delta_t}\frac{\partial^4 \rho}{\partial x_1^2 \partial x_2^2} +$$
$$(3\omega_1 cs^2 - \omega_1 - 3cs^2\omega_2 + \omega_2 + \omega_1 v_1^2 - \omega_2 v_1^2)\frac{\delta_l^4 \rho v_1}{24\omega_1\omega_2\delta_t}\frac{\partial^4 v_1}{\partial x_1^2 \partial x_2^2} +$$
$$(3\omega_1 cs^2 - \omega_1 - 3cs^2\omega_2 + \omega_2 + \omega_1 v_2^2 - \omega_2 v_2^2)\frac{\delta_l^4 \rho v_2}{24\omega_1\omega_2\delta_t}\frac{\partial^4 v_2}{\partial x_1^2 \partial x_2^2} +$$
$$(3\omega_1 cs^2 - \omega_1 - 3cs^2\omega_2 + \omega_2 + \omega_1 v_1^2 - \omega_2 v_1^2)\frac{\delta_l^4 v_1 v_2}{8\omega_1\omega_2\delta_t}\frac{\partial^4 \rho}{\partial x_1 \partial x_2^3} + C_3\frac{\delta_l^4 \rho v_2}{24\omega_1\omega_2\omega_3\delta_t}\frac{\partial^4 v_1}{\partial x_1 \partial x_2^3} +$$
$$(3\omega_1 cs^2 - \omega_1 - 3cs^2\omega_2 + \omega_2 + \omega_1 v_1^2 - \omega_2 v_1^2)\frac{\delta_l^4 \rho v_1}{24\omega_1\omega_2\delta_t}\frac{\partial^4 v_2}{\partial x_1 \partial x_2^3} + C_4\frac{\delta_l^4}{24\omega_1\omega_2\delta_t}\frac{\partial^4 \rho}{\partial x_2^4} +$$
$$(3\omega_1 cs^2 - 5\omega_1\omega_2 v_2^2 - 2\omega_1 + 3cs^2\omega_2 - 2\omega_2 + 5\omega_1 v_2^2 - 3\omega_1 cs^2\omega_2 + 2\omega_1\omega_2 + 5\omega_2 v_2^2)\frac{\delta_l^4 \rho v_2}{12\omega_1\omega_2\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0,$$

where:

$C_1 = 3\omega_2 v_1^4 - 12\omega_1 cs^2\omega_2 v_1^2 - \omega_1 cs^2 - cs^2\omega_2 + 3\omega_1\omega_2 v_1^2 + 3\omega_1 v_1^4 - \omega_1 cs^4\omega_2 + cs^4\omega_2 + 12\omega_1 cs^2 v_1^2 - 3\omega_1 v_1^2 + \omega_1 cs^2\omega_2 + 12cs^2\omega_2 v_1^2 - 3\omega_2 v_1^2 + \omega_1 cs^4 - 3\omega_1\omega_2 v_1^4$

$C_2 =$
$2\omega_2\omega_3 + \omega_1\omega_3 v_1^2 + 9\omega_1\omega_3 v_2^2 - 6\omega_1\omega_2 v_1^2 - 4\omega_1\omega_3 + 2\omega_1\omega_2\omega_3 v_1^2 + 6\omega_1 cs^2\omega_3 + \omega_2\omega_3 v_1^2 - 9\omega_2\omega_3 v_2^2 - 18\omega_1 cs^2\omega_2 + 6\omega_1 cs^2\omega_2\omega_3 + 6\omega_1\omega_2 - 2\omega_1\omega_2\omega_3$

$C_3 =$
$2\omega_2\omega_3 + 9\omega_1\omega_3 v_1^2 - 6\omega_1\omega_2 v_2^2 + \omega_1\omega_3 v_2^2 - 4\omega_1\omega_3 + 6\omega_1 cs^2\omega_3 + 2\omega_1\omega_2\omega_3 v_2^2 - 9\omega_2\omega_3 v_1^2 + \omega_2\omega_3 v_2^2 - 18\omega_1 cs^2\omega_2 + 6\omega_1 cs^2\omega_2\omega_3 + 6\omega_1\omega_2 - 2\omega_1\omega_2\omega_3$

$C_4 = -\omega_1 cs^2 + 3\omega_1\omega_2 v_2^2 + 3\omega_2 v_2^4 - 12\omega_1 cs^2\omega_2 v_2^2 - cs^2\omega_2 - \omega_1 cs^4\omega_2 + 3\omega_1 v_2^4 + cs^4\omega_2 + 12\omega_1 cs^2 v_2^2 - 3\omega_1 v_2^2 + \omega_1 cs^2\omega_2 - 3\omega_1\omega_2 v_2^4 + \omega_1 cs^4 + 12cs^2\omega_2 v_2^2 - 3\omega_2 v_2^2$

2.7.3 Conservation of momentum: ρv_1

attached text file: `output_d2q9_nse_culbm2_symbolic_pde_01.txt`

$$v_1\frac{\partial\rho}{\partial t} + \rho\frac{\partial v_1}{\partial t} + (cs^2+v_1^2)\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1} + \frac{2\delta_l\rho v_1}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\delta_l v_1 v_2}{\delta_t}\frac{\partial\rho}{\partial x_2} + \frac{\delta_l\rho v_2}{\delta_t}\frac{\partial v_1}{\partial x_2} + \frac{\delta_l\rho v_1}{\delta_t}\frac{\partial v_2}{\partial x_2} +$$
$$(-\omega_1 - 2\omega_1\omega_2 cs^2 - 3\omega_1\omega_2 v_1^2 - \omega_2 + 2\omega_1 cs^2 + 3\omega_1 v_1^2 + 3\omega_2 v_1^2 + 2\omega_2 cs^2 + \omega_1\omega_2)\frac{\delta_l^2}{\omega_1\omega_2\delta_t}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_1} +$$
$$(\omega_1+\omega_2-\omega_1\omega_2)\frac{3\delta_l^2\rho v_1}{\omega_1\omega_2\delta_t}\left(\frac{\partial v_1}{\partial x_1}\right)^2 + (-\omega_1+\omega_2+\omega_1 cs^2+3\omega_1 v_2^2-\omega_2 cs^2-3\omega_2 v_2^2)\frac{\delta_l^2}{2\omega_1\omega_2\delta_t}\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_2} +$$
$$(\omega_1-\omega_2)\frac{3\delta_l^2\rho v_2}{\omega_1\omega_2\delta_t}\frac{\partial v_2}{\partial x_1}\frac{\partial v_2}{\partial x_2} + (-\omega_1+\omega_1\omega_2 cs^2+\omega_2+3\omega_1 cs^2+3\omega_1 v_2^2-5\omega_2 cs^2-3\omega_2 v_2^2)\frac{\delta_l^2}{2\omega_1\omega_2\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_1} +$$
$$(-2+\omega_1)\frac{\delta_l^2 cs^2}{2\omega_1\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_1}{\partial x_2} + (-\omega_1-3\omega_1\omega_2 cs^2-\omega_1\omega_2 v_1^2-\omega_2+3\omega_1 cs^2+\omega_1 v_1^2+\omega_2 v_1^2+3\omega_2 cs^2+\omega_1\omega_2)\frac{\delta_l^2 v_1}{2\omega_1\omega_2\delta_t}\frac{\partial^2\rho}{\partial x_1^2}$$
$$+ (-\omega_1-\omega_1\omega_2 cs^2-3\omega_1\omega_2 v_1^2-\omega_2+\omega_1 cs^2+3\omega_1 v_1^2+3\omega_2 v_1^2+\omega_2 cs^2+\omega_1\omega_2)\frac{\delta_l^2\rho}{2\omega_1\omega_2\delta_t}\frac{\partial^2 v_1}{\partial x_1^2} +$$
$$(-\omega_1+\omega_2+3\omega_1 cs^2+\omega_1 v_2^2-3\omega_2 cs^2-\omega_2 v_2^2)\frac{\delta_l^2 v_2}{2\omega_1\omega_2\delta_t}\frac{\partial^2\rho}{\partial x_1\partial x_2} +$$
$$(-\omega_1+\omega_1\omega_2 cs^2+\omega_2+\omega_1 cs^2+3\omega_1 v_2^2-3\omega_2 cs^2-3\omega_2 v_2^2)\frac{\delta_l^2\rho}{2\omega_1\omega_2\delta_t}\frac{\partial^2 v_2}{\partial x_1\partial x_2} + (-2+\omega_1)\frac{\delta_l^2\rho cs^2}{2\omega_1\delta_t}\frac{\partial^2 v_1}{\partial x_2^2} + C_1\frac{\delta_l^3}{12\omega_1^2\omega_2^2\delta_t}\frac{\partial^3\rho}{\partial x_1^3}$$
$$+ C_2\frac{\delta_l^3\rho v_1}{12\omega_1^2\omega_2^2\delta_t}\frac{\partial^3 v_1}{\partial x_1^3} + C_3\frac{3\delta_l^3 v_1 v_2}{4\omega_1^2\omega_2^2\delta_t}\frac{\partial^3\rho}{\partial x_1^2\partial x_2} + C_4\frac{\delta_l^3\rho v_2}{4\omega_1^2\omega_2^2\omega_3\delta_t}\frac{\partial^3 v_1}{\partial x_1^2\partial x_2} + C_5\frac{\delta_l^3\rho v_1}{12\omega_1^2\omega_2^2\omega_3\delta_t}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2} + C_6\frac{\delta_l^3}{12\omega_1^2\omega_2^2\delta_t}\frac{\partial^3\rho}{\partial x_1\partial x_2^2} -$$
$$\frac{\delta_l^3\rho cs^2 v_1}{6\delta_t}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2} + C_7\frac{\delta_l^3\rho v_2}{4\omega_1^2\omega_2^2\delta_t}\frac{\partial^3 v_2}{\partial x_1\partial x_2^2} + (-1+v_2^2+3cs^2)\frac{\delta_l^3 v_1 v_2}{12\delta_t}\frac{\partial^3\rho}{\partial x_2^3} + C_8\frac{\delta_l^3\rho v_2}{6\omega_1\omega_3\delta_t}\frac{\partial^3 v_1}{\partial x_2^3} + (-1+3v_2^2+cs^2)\frac{\delta_l^3\rho v_1}{12\delta_t}\frac{\partial^3 v_2}{\partial x_2^3}$$
$$+ C_9\frac{\delta_l^4 v_1}{24\omega_1^3\omega_2^3\omega_3\delta_t}\frac{\partial^4\rho}{\partial x_1^4} + C_{10}\frac{\delta_l^4\rho}{24\omega_1^3\omega_2^3\omega_3\delta_t}\frac{\partial^4 v_1}{\partial x_1^4} + C_{11}\frac{\delta_l^4 v_2}{24\omega_1^3\omega_2^3\omega_3^2\delta_t}\frac{\partial^4\rho}{\partial x_1^3\partial x_2} + C_{12}\frac{\delta_l^4\rho v_1 v_2}{24\omega_1^3\omega_2^3\omega_3\delta_t}\frac{\partial^4 v_1}{\partial x_1^3\partial x_2} +$$
$$C_{13}\frac{\delta_l^4\rho}{24\omega_1^3\omega_2^3\omega_3^2\delta_t}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2} + C_{14}\frac{\delta_l^4 v_1}{24\omega_1^3\omega_2^3\omega_3^2\delta_t}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} + C_{15}\frac{\delta_l^4\rho}{24\omega_1^3\omega_2^3\omega_3^2\delta_t}\frac{\partial^4 v_1}{\partial x_1^2\partial x_2^2} + C_{16}\frac{\delta_l^4\rho v_1 v_2}{24\omega_1^3\omega_2^3\omega_3\delta_t}\frac{\partial^4 v_2}{\partial x_1^2\partial x_2^2} +$$
$$C_{17}\frac{\delta_l^4 v_2}{24\omega_1^3\omega_2^3\omega_3^2\delta_t}\frac{\partial^4\rho}{\partial x_1\partial x_2^3} + C_{18}\frac{\delta_l^4\rho v_1 v_2}{24\omega_1\omega_2\omega_3\delta_t}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3} + C_{19}\frac{\delta_l^4\rho}{24\omega_1^3\omega_2^3\omega_3\delta_t}\frac{\partial^4 v_2}{\partial x_1\partial x_2^3} + C_{20}\frac{\delta_l^4 v_1}{24\omega_1\omega_2\delta_t}\frac{\partial^4\rho}{\partial x_2^4} + C_{21}\frac{\delta_l^4\rho}{24\omega_1^3\omega_3^2\delta_t}\frac{\partial^4 v_1}{\partial x_2^4} +$$
$$(-5\omega_1\omega_2 v_2^2 - 2\omega_1 - 3\omega_1\omega_2 cs^2 - 2\omega_2 + 3\omega_1 cs^2 + 5\omega_1 v_2^2 + 3\omega_2 cs^2 + 2\omega_1\omega_2 + 5\omega_2 v_2^2)\frac{\delta_l^4\rho v_1 v_2}{12\omega_1\omega_2\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0,$$

where:

$C_1 = -18\omega_1\omega_2^2 v_1^4 - 6\omega_1\omega_2^2 cs^4 - \omega_1^2\omega_2^2 cs^2 - 7\omega_1^2\omega_2^2 v_1^2 - 18\omega_1^2\omega_2 v_1^4 - 72\omega_1\omega_2^2 cs^2 v_1^2 - 6\omega_1^2\omega_2 cs^4 - 6\omega_2^2 cs^2 - 18\omega_1\omega_2 v_1^2 - 9\omega_2^2 v_1^2 + 45\omega_1^2 cs^2 v_1^2 - 9\omega_1^2 v_1^2 - 6\omega_1^2 cs^2 - 72\omega_1^2\omega_2 cs^2 v_1^2 + 9\omega_1^2 v_1^4 + 6\omega_1^2 cs^4 + 24\omega_1^2\omega_2^2 cs^2 v_1^2 + \omega_1^2\omega_2^2 cs^4 + 7\omega_1^2\omega_2^2 v_1^4 + 18\omega_1\omega_2^2 v_1^2 + 6\omega_1\omega_2^2 cs^2 + 45\omega_2^2 cs^2 v_1^2 + 6\omega_2^2 cs^4 + 18\omega_1\omega_2 v_1^4 + 9\omega_2^2 v_1^4 + 54\omega_1\omega_2 cs^2 v_1^2 + 18\omega_1^2\omega_2 v_1^2 + 6\omega_1^2\omega_2 cs^2$

$C_2 = 10\omega_1^2\omega_2^2 cs^2 + 22\omega_1^2\omega_2^2 v_1^2 + 27\omega_2^2 cs^2 + 18\omega_1\omega_2 cs^2 + 54\omega_1\omega_2 v_1^2 + 33\omega_2^2 v_1^2 + 24\omega_1^2\omega_2 - 8\omega_1^2\omega_2^2 - 15\omega_1^2 + 33\omega_1^2 v_1^2 + 27\omega_1^2 cs^2 + 24\omega_1\omega_2^2 - 15\omega_2^2 - 60\omega_1\omega_2^2 v_1^2 - 36\omega_1\omega_2^2 cs^2 - 18\omega_1\omega_2 - 60\omega_1^2\omega_2 v_1^2 - 36\omega_1^2\omega_2 cs^2$

$C_3 = -\omega_2^2 v_2^2 - 6\omega_1\omega_2 cs^2 - 2\omega_1\omega_2 v_1^2 + \omega_2^2 v_1^2 + \omega_1^2\omega_2 + \omega_1^2 v_2^2 - 2\omega_1^2 + \omega_1^2 v_1^2 + 6\omega_1^2 cs^2 - \omega_1\omega_2^2 + 3\omega_1\omega_2^2 cs^2 + 2\omega_1\omega_2 - \omega_1^2\omega_2 v_2^2 + \omega_1\omega_2^2 v_2^2 - 3\omega_1^2\omega_2 cs^2$

$C_4 = -\omega_1\omega_2^2\omega_3 + \omega_1^2\omega_2\omega_3 + 2\omega_1^2\omega_2 - 3\omega_2^2\omega_3 cs^2 - 18\omega_1\omega_2\omega_3 v_1^2 + 9\omega_2^2\omega_3 v_1^2 - 6\omega_1\omega_2\omega_3 cs^2 - 2\omega_2^2\omega_3 v_2^2 + 3\omega_1\omega_2^2\omega_3 cs^2 - 5\omega_1^2\omega_3 + \omega_1\omega_2^2\omega_3 v_2^2 - 2\omega_1\omega_2^2 + 9\omega_1^2\omega_3 cs^2 + 9\omega_1^2\omega_3 v_1^2 + 6\omega_1\omega_2^2 cs^2 - 3\omega_1^2\omega_2\omega_3 cs^2 - 2\omega_1^2\omega_2 v_2^2 + 2\omega_1^2\omega_3 v_2^2 + 6\omega_1\omega_2\omega_3 - \omega_2^2\omega_3 + 2\omega_1\omega_2^2 v_2^2 - \omega_1^2\omega_2\omega_3 v_2^2 - 6\omega_1^2\omega_2 cs^2$

$C_5 = -12\omega_1\omega_2^2\omega_3 + 36\omega_1^2\omega_2^2 cs^2 - 11\omega_1^2\omega_2^2\omega_3 cs^2 - 3\omega_1^2\omega_2^2\omega_3 v_1^2 + 12\omega_1^2\omega_2^2 v_1^2 + 12\omega_1^2\omega_2\omega_3 + 6\omega_1^2\omega_2 + 9\omega_2^2\omega_3 cs^2 - 12\omega_1^2\omega_2^2 + 6\omega_2^2\omega_3 v_1^2 - 27\omega_2^2\omega_3 v_2^2 + 18\omega_1\omega_2^2\omega_3 cs^2 + 3\omega_1\omega_2^2\omega_3 v_1^2 - 15\omega_1^2\omega_3 + 27\omega_1\omega_2^2\omega_3 v_2^2 + 18\omega_1\omega_2^2 + 27\omega_1^2\omega_3 cs^2 + 6\omega_1^2\omega_3 v_1^2 + 3\omega_1^2\omega_2^2\omega_3 - 3\omega_1^2\omega_2\omega_3 v_1^2 - 18\omega_1\omega_2^2 v_1^2 - 54\omega_1\omega_2^2 cs^2 - 18\omega_1^2\omega_2\omega_3 cs^2 + 27\omega_1^2\omega_3 v_2^2 + 3\omega_2^2\omega_3 - 27\omega_1^2\omega_2\omega_3 v_2^2 - 6\omega_1^2\omega_2 v_1^2 - 18\omega_1^2\omega_2 cs^2$

$C_6 = 30\omega_1\omega_2^2 cs^4 + 45\omega_1\omega_2^2 cs^2 v_2^2 - 9\omega_1^2\omega_2 v_2^4 + 9\omega_2^2 v_2^2 + 9\omega_1\omega_2^2 v_2^4 - 6\omega_1^2\omega_2 cs^4 + 6\omega_2^2 cs^2 + 45\omega_1^2 cs^2 v_2^2 - 9\omega_1^2 v_2^2 - 45\omega_1^2\omega_2 cs^2 v_2^2 - 6\omega_1^2 cs^2 + 9\omega_1^2 v_2^4 + 6\omega_1^2 cs^4 - 45\omega_2^2 cs^2 v_2^2 - 9\omega_2^2 v_2^4 - 2\omega_1^2\omega_2^2 cs^4 - 6\omega_1\omega_2^2 cs^2 + 9\omega_1^2\omega_2 v_2^2 - 30\omega_2^2 cs^4 - 9\omega_1\omega_2^2 v_2^2 + 6\omega_1^2\omega_2 cs^2$

$C_7 = -11\omega_2^2 v_2^2 - 9\omega_2^2 cs^2 + 5\omega_1^2\omega_2 + 11\omega_1^2 v_2^2 - 5\omega_1^2 + 9\omega_1^2 cs^2 - 5\omega_1\omega_2^2 + 5\omega_2^2 + 9\omega_1\omega_2^2 cs^2 - 11\omega_1^2\omega_2 v_2^2 + 11\omega_1\omega_2^2 v_2^2 - 9\omega_1^2\omega_2 cs^2$

$C_8 = 6 - 3\omega_1\omega_3 cs^2 - 3\omega_1 - \omega_1\omega_3 v_2^2 + \omega_1\omega_3 + 9\omega_1 cs^2 + 3\omega_1 v_2^2 - 3\omega_3 + 3\omega_3 v_2^2 - 6v_2^2 + 9\omega_3 cs^2 - 18cs^2$

$C_9 = 99\omega_1^2\omega_2\omega_3 v_1^4 - 68\omega_1^3\omega_2^3\omega_3 cs^2 v_1^2 + 6\omega_1\omega_2^2\omega_3 + 54\omega_1^2\omega_2\omega_3 cs^4 - 10\omega_1^3\omega_2^3\omega_3 cs^4 + 6\omega_1^3\omega_2 cs^2 v_1^2 - 18\omega_1^3\omega_2^3\omega_3 v_1^4 + 12\omega_1^2\omega_2^2 cs^2 + 114\omega_1^2\omega_2^2\omega_3 cs^2 + 210\omega_1^2\omega_2^2\omega_3 v_1^2 - 2\omega_1^3\omega_2^3\omega_3 + 45\omega_2^3\omega_3 v_1^4 + 6\omega_1^2\omega_2\omega_3 + 411\omega_1^2\omega_2\omega_3 cs^2 v_1^2 + 90\omega_2^3\omega_3 cs^4 + 129\omega_1\omega_2^3\omega_3 v_1^2 + 141\omega_1\omega_2^3\omega_3 cs^2 - 6\omega_1^3\omega_2 cs^2 + 54\omega_1\omega_2^2\omega_3 cs^4 + 99\omega_1\omega_2^2\omega_3 v_1^4 - 12\omega_1\omega_2^3\omega_3 + 18\omega_1\omega_2^3 cs^4 - 171\omega_1^3\omega_2\omega_3 cs^4 + 404\omega_1^3\omega_2^2\omega_3 cs^2 v_1^2 + 261\omega_1^3\omega_3 cs^2 v_1^2 - 117\omega_1^3\omega_2\omega_3 v_1^4 -$

$$51\omega_1^3\omega_3v_1^2 - 98\omega_1^3\omega_2^2\omega_3v_1^2 - 72\omega_1^3\omega_3cs^2 - 78\omega_1^3\omega_2^2\omega_3cs^2 + 8\omega_1^3\omega_2^2\omega_3 + 90\omega_1^2\omega_2^3\omega_3v_1^4 + 82\omega_1^2\omega_2^3\omega_3cs^4 + 261\omega_2^3\omega_3cs^2v_1^2 - 60\omega_1\omega_2^2\omega_3cs^2 + 411\omega_1\omega_2^2\omega_3cs^2v_1^2 - 105\omega_1\omega_2^2\omega_3v_1^2 - 6\omega_1\omega_2^3cs^2 + 8\omega_1^2\omega_2^3\omega_3 + 18\omega_1^3\omega_2cs^4 + 6\omega_1\omega_2^3cs^2v_1^2 - 12\omega_1^3\omega_2\omega_3 + 90\omega_1^3\omega_2^2\omega_3v_1^4 + 45\omega_1^3\omega_3v_1^4 + 82\omega_1^3\omega_2^2\omega_3cs^4 + 90\omega_1^3\omega_3cs^4 - 98\omega_1^2\omega_2^3\omega_3v_1^2 - 78\omega_1^2\omega_2^3\omega_3cs^2 - 12\omega_1^2\omega_2^2cs^2v_1^2 - 816\omega_1^2\omega_2^2\omega_3cs^2v_1^2 + 141\omega_1^3\omega_2\omega_3cs^2 + 6\omega_2^3\omega_3 + 129\omega_1^3\omega_2\omega_3v_1^2 + 12\omega_1^3\omega_2^3\omega_3cs^2 + 20\omega_1^3\omega_2^3\omega_3v_1^2 - 36\omega_1^2\omega_2^2cs^4 - 90\omega_1^2\omega_2^2\omega_3cs^4 - 198\omega_1^2\omega_2^2\omega_3v_1^4 - 12\omega_1^2\omega_2^2\omega_3 - 105\omega_1^2\omega_2\omega_3v_1^2 - 60\omega_1^2\omega_2\omega_3cs^2 + 404\omega_1^2\omega_2^3\omega_3cs^2v_1^2 - 117\omega_1\omega_2^3\omega_3v_1^4 - 171\omega_1\omega_2^3\omega_3cs^4 - 600\omega_1\omega_2^3\omega_3cs^2v_1^2 - 600\omega_1^3\omega_2\omega_3cs^2v_1^2 - 51\omega_2^3\omega_3v_1^2 + 6\omega_1^3\omega_3 - 72\omega_2^3\omega_3cs^2$$

$$C_{10} = 333\omega_1^2\omega_2\omega_3v_1^4 - 36\omega_1^3\omega_2^3\omega_3cs^2v_1^2 + 6\omega_1\omega_2^2\omega_3 + 6\omega_1^2\omega_2\omega_3cs^4 - 2\omega_1^3\omega_2^3\omega_3cs^4 + 18\omega_1^3\omega_2cs^2v_1^2 - 58\omega_1^3\omega_2^3\omega_3v_1^4 + 12\omega_1^2\omega_2^2cs^2 + 18\omega_1^2\omega_2^2\omega_3cs^2 + 306\omega_1^2\omega_2^2\omega_3v_1^2 - 2\omega_1^3\omega_2^3\omega_3 + 171\omega_2^2\omega_3v_1^4 + 6\omega_1^2\omega_2\omega_3 + 225\omega_1^2\omega_2\omega_3cs^2v_1^2 + 18\omega_2^3\omega_3cs^4 + 225\omega_1\omega_2^3\omega_3v_1^2 + 45\omega_1\omega_2^3\omega_3cs^2 - 6\omega_1^3\omega_2cs^2 + 6\omega_1\omega_2^2\omega_3cs^4 + 333\omega_1\omega_2^2\omega_3v_1^4 - 12\omega_1\omega_2^3\omega_3 + 6\omega_1\omega_2^3cs^4 - 33\omega_1^3\omega_2\omega_3cs^4 + 252\omega_1^3\omega_2^2\omega_3cs^2v_1^2 + 207\omega_1^3\omega_3cs^2v_1^2 - 423\omega_1^3\omega_2\omega_3v_1^4 - 99\omega_1^3\omega_3v_1^2 - 154\omega_1^3\omega_2^2\omega_3v_1^2 - 24\omega_1^3\omega_3cs^2 - 22\omega_1^3\omega_2^2\omega_3cs^2 + 8\omega_1^3\omega_2^2\omega_3 + 310\omega_1^2\omega_2^3\omega_3v_1^4 + 14\omega_1^2\omega_2^3\omega_3cs^4 + 207\omega_2^3\omega_3cs^2v_1^2 - 12\omega_1\omega_2^2\omega_3cs^2 + 225\omega_1\omega_2^2\omega_3cs^2v_1^2 - 153\omega_1\omega_2^2\omega_3v_1^2 - 6\omega_1\omega_2^3cs^2 + 8\omega_1^2\omega_2^3\omega_3 + 6\omega_1^3\omega_2cs^4 + 18\omega_1\omega_2^3cs^2v_1^2 - 12\omega_1^3\omega_2\omega_3 + 310\omega_1^3\omega_2^2\omega_3v_1^4 + 171\omega_1^3\omega_3v_1^4 + 14\omega_1^3\omega_2^2\omega_3cs^4 + 18\omega_1^3\omega_3cs^4 - 154\omega_1^2\omega_2^3\omega_3v_1^2 - 22\omega_1^2\omega_2^3\omega_3cs^2 - 36\omega_1^2\omega_2^2cs^2v_1^2 - 432\omega_1^2\omega_2^2\omega_3cs^2v_1^2 + 45\omega_1^3\omega_2\omega_3cs^2 + 6\omega_2^3\omega_3 + 225\omega_1^3\omega_2\omega_3v_1^2 + 4\omega_1^3\omega_2^3\omega_3cs^2 + 28\omega_1^3\omega_2^3\omega_3v_1^2 - 12\omega_1^2\omega_2^2cs^4 - 6\omega_1^2\omega_2^2\omega_3cs^4 - 666\omega_1^2\omega_2^2\omega_3v_1^4 - 12\omega_1^2\omega_2^2\omega_3 - 153\omega_1^2\omega_2\omega_3v_1^2 - 12\omega_1^2\omega_2\omega_3cs^2 + 252\omega_1^2\omega_2^3\omega_3cs^2v_1^2 - 423\omega_1\omega_2^3\omega_3v_1^4 - 33\omega_1\omega_2^3\omega_3cs^4 - 432\omega_1\omega_2^3\omega_3cs^2v_1^2 - 432\omega_1^3\omega_2\omega_3cs^2v_1^2 - 99\omega_2^3\omega_3v_1^2 + 6\omega_1^3\omega_3 - 24\omega_2^3\omega_3cs^2$$

$$C_{11} = 27\omega_1\omega_2^3\omega_3^2cs^4 - 54\omega_1\omega_2^3\omega_3^2v_1^4 + 21\omega_1\omega_2^3\omega_3^2cs^2v_2^2 + \omega_1^3\omega_2^2\omega_3^2 + 72\omega_1\omega_2^3\omega_3^2v_1^2v_2^2 + 6\omega_1^2\omega_2\omega_3^2v_2^2 - 72\omega_1^3\omega_2\omega_3^2v_1^2v_2^2 - 72\omega_1^2\omega_2^3\omega_3^2cs^2v_1^2 - 21\omega_1^3\omega_2\omega_3^2cs^2v_2^2 - 9\omega_2^3\omega_3^2v_1^2 - 54\omega_1\omega_2^3\omega_3^2cs^2v_1^2 + 12\omega_1^2\omega_2^3cs^2v_2^2 + 6\omega_1\omega_2^3\omega_3^2 + 108\omega_1^2\omega_2^2\omega_3^2v_1^4 + 72\omega_1^2\omega_2^2\omega_3^2cs^4 + 60\omega_1^2\omega_2\omega_3^2cs^2 - 2\omega_1^2\omega_2^3\omega_3^2cs^2v_2^2 - 6\omega_1\omega_2^3\omega_3cs^2 + 45\omega_1^2\omega_2\omega_3^2v_1^2 - 24\omega_1^2\omega_2^3\omega_3^2v_1^2v_2^2 - 486\omega_1^2\omega_2\omega_3^2cs^2v_1^2 + 6\omega_2^3\omega_3^2v_2^2 + 6\omega_1^3\omega_2^2\omega_3^2cs^4 + 90\omega_1^3\omega_3^2cs^4 - 6\omega_1\omega_2^2\omega_3^2v_2^2 - 12\omega_1^2\omega_2^3cs^2 + 54\omega_1^3\omega_3^2v_1^4 - 297\omega_1\omega_2^2\omega_3^2cs^2v_1^2 + 5\omega_1^2\omega_2^3\omega_3^2cs^2 + 24\omega_1^2\omega_2^3\omega_3^2v_1^2 + 18\omega_1^3\omega_2^2\omega_3cs^2v_2^2 - 6\omega_1^2\omega_2\omega_3^2 + 126\omega_1^3\omega_2\omega_3^2v_1^2 + 75\omega_1^3\omega_2\omega_3^2cs^2 + 63\omega_1\omega_2^2\omega_3^2v_1^2 + 12\omega_1\omega_2^3\omega_3^2cs^2 - 9\omega_1\omega_2^2\omega_3^2v_1^2v_2^2 + 6\omega_1\omega_2^2\omega_3^2cs^2v_2^2 - 18\omega_1^3\omega_2\omega_3cs^4 + \omega_1^2\omega_2^3\omega_3^2v_2^2 + 6\omega_1\omega_2^2\omega_3^2 - 18\omega_1^3\omega_2^2\omega_3cs^2 + 6\omega_2^3\omega_3\omega_3^2v_2^2 + 540\omega_1^2\omega_2^2\omega_3^2cs^2v_1^2 - 54\omega_1^2\omega_2^3\omega_3cs^4 - 36\omega_1^3\omega_2^2cs^4 + 2\omega_1^3\omega_2^2\omega_3^2cs^2v_2^2 + 18\omega_1^3\omega_2^2cs^2v_2^2 + 6\omega_1^3\omega_2^3 - 54\omega_1^3\omega_2\omega_3^2v_1^4 - 99\omega_1^3\omega_2\omega_3^2cs^4 + 24\omega_1^3\omega_2^2\omega_3^2v_1^2v_2^2 + 45\omega_1^3\omega_3^2v_1^2v_2^2 - 72\omega_1^3\omega_2^3cs^2 - 5\omega_1^3\omega_2^2\omega_3^2cs^2 - 18\omega_2^3\omega_3^2cs^2v_2^2 + 36\omega_1^2\omega_2^3\omega_3^2cs^4 - 99\omega_1^3\omega_2^3\omega_3^2v_1^2 - 24\omega_1^3\omega_2^2\omega_3^2v_1^2 - 6\omega_1^2\omega_2^3\omega_3^2cs^4 - 45\omega_2^3\omega_3^2v_1^2v_2^2 + 72\omega_1^3\omega_2^2\omega_3^2cs^2v_1^2 + 405\omega_1^3\omega_3^2cs^2v_1^2 + 54\omega_1^3\omega_2^2\omega_3cs^4 + 18\omega_1^2\omega_2^3\omega_3cs^2 + 12\omega_1^3\omega_2^2cs^2 + 135\omega_2^3\omega_3^2cs^2v_1^2 - 54\omega_1\omega_2^2\omega_3^2v_1^4 - 18\omega_1\omega_2^2\omega_3^2cs^4 - 6\omega_1^3\omega_3^2v_2^2 - \omega_1^3\omega_2^2\omega_3^2v_2^2 + 6\omega_1^3\omega_2\omega_3cs^2 - 6\omega_1^2\omega_2\omega_3^2cs^2v_2^2 - 18\omega_2^3\omega_3^2cs^4 + 6\omega_1\omega_2^3\omega_3cs^2v_2^2 + 9\omega_1^2\omega_2\omega_3^2v_1^2v_2^2 - 6\omega_2^3\omega_3^2 + 54\omega_2^3\omega_3^2v_1^4 - 3\omega_1\omega_2^3\omega_3^2cs^2 - 18\omega_1\omega_2^3\omega_3^2v_1^2 - 6\omega_1^3\omega_2\omega_3cs^2v_2^2 - 54\omega_2^2\omega_2\omega_3^2cs^4 - 243\omega_1^2\omega_2\omega_3^2cs^2v_1^2 + 18\omega_1\omega_2^3\omega_3cs^4 - \omega_1^2\omega_2^3\omega_3^2 - 54\omega_1^2\omega_2\omega_3^2v_1^4 - 6\omega_1^3\omega_2\omega_3^2 - 6\omega_1\omega_2^3\omega_3^2v_2^2 - 18\omega_1^2\omega_2^3\omega_3cs^2v_2^2 - 108\omega_1^2\omega_2^2\omega_3^2v_1^2 - 12\omega_1^3\omega_2^2cs^2v_2^2 - 72\omega_1^2\omega_2^2\omega_3^2cs^2$$

$$C_{12} = 90\omega_1\omega_2^2\omega_3 + 45\omega_1\omega_2^3\omega_3v_2^2 - 18\omega_1^3\omega_2^2 + 324\omega_1^2\omega_2^2\omega_3cs^2 + 396\omega_1^2\omega_2^2\omega_3v_1^2 + 90\omega_1^2\omega_2\omega_3 - 198\omega_1\omega_2^3\omega_3v_1^2 - 27\omega_1\omega_2^3\omega_3cs^2 - 54\omega_1^2\omega_2^3cs^2 - 54\omega_1^3\omega_2cs^2 + 36\omega_1^3\omega_3v_2^2 + 10\omega_1^3\omega_2^2\omega_3v_2^2 + 45\omega_1\omega_2^3\omega_3 + 18\omega_1^2\omega_2^3 + 18\omega_1^3\omega_2 - 18\omega_1^2\omega_2^3v_2^2 - 18\omega_1^3\omega_2v_2^2 + 198\omega_1^3\omega_3v_1^2 + 270\omega_1^3\omega_3cs^2 + 30\omega_1^3\omega_2^2\omega_3cs^2 - 10\omega_1^3\omega_2^2\omega_3 - 162\omega_1\omega_2^2\omega_3cs^2 - 198\omega_1\omega_2^2\omega_3v_1^2 - 18\omega_1\omega_2^3 - 10\omega_1^2\omega_2^3\omega_3v_2^2 + 18\omega_1^3\omega_2^2v_2^2 + 54\omega_1\omega_2^2cs^2 + 10\omega_1^2\omega_2^2\omega_3 - 45\omega_1^3\omega_2\omega_3v_2^2 + 135\omega_1^3\omega_2\omega_3 + 18\omega_1\omega_2^3v_2^2 - 30\omega_1^2\omega_2^3\omega_3cs^2 + 54\omega_1^3\omega_2^2cs^2 - 297\omega_1^3\omega_2\omega_3cs^2 - 54\omega_2^3\omega_3 - 198\omega_1^3\omega_2\omega_3v_1^2 - 180\omega_1^2\omega_2^2\omega_3 - 198\omega_1^2\omega_2\omega_3v_1^2 - 162\omega_1^2\omega_2\omega_3cs^2 - 36\omega_2^3\omega_3v_2^2 + 198\omega_2^3\omega_3v_1^2 - 126\omega_1^3\omega_3 + 54\omega_2^3\omega_3cs^2$$

$$C_{13} = -198\omega_1^3\omega_2^3\omega_3cs^2v_1^2 - 57\omega_1\omega_2^3\omega_3^2cs^4 - 63\omega_1\omega_2^3\omega_3^2v_1^4 - 324\omega_1^2\omega_2^3cs^2v_1^2 - 9\omega_1\omega_2^3\omega_3^2cs^2v_2^2 + \omega_1^3\omega_2^2\omega_3^2 + 216\omega_1\omega_2^3\omega_3^2v_1^2v_2^2 + 12\omega_1^3\omega_2^3\omega_3cs^4 + 18\omega_1^2\omega_2\omega_3^2v_2^2 - 216\omega_1^3\omega_2\omega_3^2v_1^2v_2^2 - 78\omega_1^3\omega_2^3\omega_3v_1^4 + 30\omega_1^2\omega_2^3\omega_3^2cs^2v_1^2 - 9\omega_1^3\omega_2\omega_3^2cs^2v_2^2 - 24\omega_1^2\omega_2^2\omega_3cs^2 + 36\omega_1^2\omega_2^2\omega_3v_1^2 + 9\omega_2^3\omega_3^2v_1^2 - 8\omega_1^3\omega_2^3\omega_3^2v_1^2 + 72\omega_1^3\omega_3^2v_1^4 - 171\omega_1\omega_2^3\omega_3^2cs^2v_1^2 + 6\omega_1\omega_2^3\omega_3^2 - 54\omega_1^2\omega_2^2\omega_3^2v_1^4 + 12\omega_1^2\omega_2^2\omega_3^2cs^4 + 36\omega_1^2\omega_2\omega_3^2cs^2 + 18\omega_1\omega_2^3\omega_3v_1^2 + 6\omega_1^2\omega_2^3\omega_3^2cs^2v_2^2 - 18\omega_1\omega_2^3\omega_3cs^2 - 45\omega_1^2\omega_2\omega_3^2v_1^2 - 72\omega_1^2\omega_2^3\omega_3^2v_1^2v_2^2 - 297\omega_1^3\omega_2\omega_3^2cs^2v_1^2 + 18\omega_2^3\omega_3^2v_2^2 - \omega_1^3\omega_2^2\omega_3^2cs^4 + 18\omega_1^3\omega_3^2cs^4 - 18\omega_1\omega_2^2\omega_3^2v_2^2 + 108\omega_1^2\omega_2^2v_1^2 + 19\omega_1^3\omega_2^2\omega_3^2v_1^4 + 36\omega_1^3\omega_3^2v_1^4 + 99\omega_1\omega_2^2\omega_3^2cs^2v_1^2 - 12\omega_1^2\omega_2^3\omega_3^2cs^2 + 17\omega_1^2\omega_2^3\omega_3^2v_1^2 - 36\omega_1^3\omega_2^2\omega_3cs^2v_2^2 + 18\omega_1^2\omega_2^2\omega_3^2cs^2v_2^2 - 6\omega_1^2\omega_2\omega_3^2 + 135\omega_1^3\omega_2\omega_3^2v_1^2 + 21\omega_1^3\omega_2\omega_3^2cs^2 - 27\omega_1\omega_2^2\omega_3^2v_1^2 - 12\omega_1\omega_2^2\omega_3^2cs^2 - 27\omega_1\omega_2^2\omega_3^2v_1^2v_2^2 + 216\omega_1^3\omega_2^2cs^2v_1^2 + 18\omega_1\omega_2^2\omega_3^2cs^2v_2^2 + 6\omega_1^3\omega_2\omega_3cs^4 + 198\omega_1^3\omega_2^2\omega_3cs^2v_1^2 - 18\omega_1^3\omega_2\omega_3v_1^4 + 3\omega_1^2\omega_2^3\omega_3^2v_2^2 + 6\omega_1\omega_2^2\omega_3^2 - 72\omega_1^3\omega_2^2\omega_3v_1^2 + 18\omega_1^3\omega_2^2\omega_3cs^2 + 18\omega_1^3\omega_2\omega_3^2v_2^2 - 36\omega_1^3\omega_2^2v_1^4 - 144\omega_1^2\omega_2^2\omega_3^2cs^2v_1^2 + 144\omega_1^2\omega_2^3\omega_3v_1^4 - 30\omega_1^2\omega_2^3\omega_3cs^4 - 6\omega_1^3\omega_2^2\omega_3^2cs^2v_2^2 + 18\omega_1^3\omega_3^2cs^2v_2^2 + 6\omega_1^3\omega_2^3 - 63\omega_1^3\omega_2\omega_3^2v_1^4 - 15\omega_1^3\omega_2\omega_3^2cs^4 + 72\omega_1^3\omega_2^2\omega_3^2v_1^2v_2^2 + 135\omega_1^3\omega_3^2v_1^2v_2^2 - 24\omega_1^3\omega_3^2cs^2 + 18\omega_2^3\omega_3^2cs^2v_2^2 + 36\omega_1^2\omega_2^2\omega_3cs^2v_2^2 - 108\omega_1^2\omega_2^3v_1^4 - 81\omega_1^3\omega_2^3\omega_3^2v_1^2 - 43\omega_1^3\omega_2^2\omega_3^2v_1^2 + 29\omega_1^2\omega_2^3\omega_3^2cs^4 + 7\omega_1^2\omega_2^3\omega_3^2v_1^4 - 135\omega_2^3\omega_3^2v_1^2v_2^2 + 72\omega_1^3\omega_2^2\omega_3v_1^4 + 84\omega_1^3\omega_2^2\omega_3^2cs^2v_1^2 + 189\omega_1^3\omega_3^2cs^2v_1^2 - 18\omega_1^3\omega_2^2\omega_3cs^4 + 36\omega_1^3\omega_2^2v_1^2 - 144\omega_1^2\omega_2^3\omega_3v_1^2 + 30\omega_1^2\omega_2^3\omega_3cs^2 + 63\omega_2^3\omega_3^2cs^2v_1^2 + 36\omega_1\omega_2^2\omega_3^2v_1^4 + 6\omega_1\omega_2^2\omega_3^2cs^4 - 18\omega_1^3\omega_3^2v_2^2 - 3\omega_1^2\omega_2^2\omega_3^2v_2^2 - 72\omega_1^2\omega_2^2\omega_3cs^2v_1^2 - 6\omega_1^3\omega_2\omega_3cs^2 + 18\omega_1^3\omega_2\omega_3v_1^2 - 12\omega_1^3\omega_2^3\omega_3cs^2 - 54\omega_1^2\omega_2\omega_3^2cs^2v_2^2 + 78\omega_1^3\omega_2^2\omega_3v_1^2 + 30\omega_2^3\omega_3^2cs^4 - 54\omega_1\omega_2^3\omega_3cs^2v_2^2 + 24\omega_1^2\omega_2^2\omega_3cs^4 + 24\omega_1^3\omega_2^3\omega_3^2cs^2v_1^2 - 36\omega_1^2\omega_2^2\omega_3v_1^4 + 27\omega_1^2\omega_2\omega_3^2v_1^2v_2^2 - 6\omega_2^3\omega_3^2 + 36\omega_2^3\omega_3^2v_1^4 + 15\omega_1\omega_2^3\omega_3^2cs^2 - 9\omega_1\omega_2^3\omega_3^2v_1^2 + 18\omega_1^3\omega_2\omega_3cs^2v_2^2 + 306\omega_1^2\omega_2^3\omega_3cs^2v_1^2 - 108\omega_1^3\omega_2^2cs^2v_1^2 - 30\omega_1^2\omega_2\omega_3^2cs^4 - 18\omega_1\omega_2^3\omega_3v_1^4 + 81\omega_1^2\omega_2\omega_3^2cs^2v_1^2 + 18\omega_1\omega_2^3\omega_3cs^4 - \omega_1^2\omega_2^3\omega_3^2 + 36\omega_1^2\omega_2\omega_3^2v_1^4 + 54\omega_1\omega_2^3\omega_3cs^2v_1^2 - 6\omega_1^3\omega_2\omega_3^2 + 8\omega_1^3\omega_2^3\omega_3^2v_1^4 - 72\omega_1^3\omega_2^3v_1^2 - 54\omega_1^3\omega_2\omega_3cs^2v_1^2 - 18\omega_1\omega_2^3\omega_3^2v_2^2 - 2\omega_1^3\omega_2^3\omega_3^2cs^4 + 36\omega_1^2\omega_2^3\omega_3cs^2v_2^2 + 54\omega_1^2\omega_2^2\omega_3^2v_1^2 - 12\omega_1^2\omega_2^2\omega_3^2cs^2$$

$$C_{14} = -12\omega_1^3\omega_2^3\omega_3cs^2v_1^2 + 63\omega_1\omega_2^3\omega_3^2cs^4 - 36\omega_1^2\omega_2^3cs^2v_1^2 + 189\omega_1\omega_2^3\omega_3^2cs^2v_2^2 - 45\omega_1\omega_2^3\omega_3^2v_1^2v_2^2 - 36\omega_1^3\omega_2^3\omega_3cs^4 + 99\omega_1^2\omega_2\omega_3^2v_2^2 - 45\omega_1^3\omega_2\omega_3^2v_1^2v_2^2 - 24\omega_1^2\omega_2^3\omega_3^2cs^2v_1^2 - 459\omega_1^3\omega_2\omega_3^2cs^2v_2^2 - 36\omega_1^2\omega_2^2\omega_3cs^2 - 6\omega_2^3\omega_3^2v_1^2 + 3\omega_1\omega_2^3\omega_3^2cs^2v_1^2 + 72\omega_1^3\omega_2^2cs^4 - 2\omega_1^3\omega_2^3\omega_3^2cs^2 + 54\omega_1\omega_2^3\omega_3^2v_2^4 - 6\omega_1\omega_2^3\omega_3^2 + 54\omega_1^2\omega_2^2\omega_3^2cs^4 + 24\omega_1^2\omega_2\omega_3^2cs^2 - 138\omega_1^2\omega_2^3\omega_3^2cs^2v_2^2 + 30\omega_1\omega_2^3\omega_3cs^2 + 6\omega_1^2\omega_2\omega_3^2v_1^2 - 21\omega_1^3\omega_2\omega_3^2cs^2v_1^2 + 9\omega_2^3\omega_3^2v_2^2 + 35\omega_1^3\omega_2^2\omega_3^2cs^4 + 90\omega_1^3\omega_3^2cs^4 - 9\omega_1\omega_2^2\omega_3^2v_2^2 + 36\omega_1^2\omega_2^3cs^2 - 30\omega_1\omega_2^2\omega_3^2cs^2v_1^2 + 41\omega_1^2\omega_2^3\omega_3^2cs^2 + 90\omega_1^2\omega_2^2\omega_3^2v_1^2v_2^2 + 270\omega_1^2\omega_2^2\omega_3^2cs^2v_2^2 - 6\omega_1^2\omega_2\omega_3^2 + 6\omega_1^3\omega_2\omega_3^2v_1^2 + 93\omega_1^3\omega_2\omega_3^2cs^2 + 6\omega_1\omega_2^2\omega_3^2v_1^2 + 27\omega_1^3\omega_2^2\omega_3^2v_2^2 + 54\omega_1^3\omega_3^2v_2^2 + 48\omega_1\omega_2^2\omega_3^2cs^2 - 45\omega_1\omega_2^2\omega_3^2v_1^2v_2^2 + 24\omega_1^3\omega_2^2cs^2v_1^2 + 27\omega_1\omega_2^2\omega_3^2cs^2v_2^2 - 18\omega_1^3\omega_2\omega_3cs^4 + 27\omega_1^2\omega_2^3\omega_3^2v_2^2 - 6\omega_1\omega_2^2\omega_3^2 + 99\omega_1^3\omega_2\omega_3^2v_2^2 + 18\omega_1^2\omega_2^2\omega_3^2cs^2v_1^2 + 144\omega_1^2\omega_2^3\omega_3cs^4 - 36\omega_1^3\omega_2^2cs^4 + 138\omega_1^3\omega_2^3\omega_3^2cs^2v_2^2 + 405\omega_1^3\omega_3^2cs^2v_2^2 + 6\omega_1^3\omega_2^3 - 117\omega_1^3\omega_2\omega_3^2cs^4 + 45\omega_1^3\omega_3^2v_1^2v_2^2 + 54\omega_1\omega_2^2\omega_3^2v_2^4 - 72\omega_1^3\omega_2^2cs^2 - 25\omega_1^3\omega_2^2\omega_3^2cs^2 - 135\omega_2^3\omega_3^2cs^2v_2^2 - 108\omega_1^2\omega_2^3cs^4 - 6\omega_1^3\omega_2^3v_1^2 - 91\omega_1^2\omega_2^3\omega_3^2cs^4 + 45\omega_2^3\omega_3^2v_1^2v_2^2 + 8\omega_1^3\omega_2^2\omega_3^2cs^2v_1^2 + 18\omega_1^3\omega_2^3cs^2v_1^2 - 54\omega_1^3\omega_2\omega_3^2v_2^4 - 48\omega_1^2\omega_2^3\omega_3cs^2 + 12\omega_1^3\omega_2^2cs^2 + 18\omega_2^3\omega_3^2cs^2v_1^2 - 90\omega_1\omega_2^3\omega_3^2cs^4 - 99\omega_1^3\omega_3^2v_2^2 - 27\omega_1^3\omega_2^2\omega_3^2v_2^2 + 36\omega_1^2\omega_2^2\omega_3cs^2v_1^2 + 6\omega_1^3\omega_2\omega_3cs^2 + 12\omega_1^2\omega_2^2\omega_3^2 - 27\omega_1^2\omega_2^3\omega_3^2v_2^4 + 12\omega_1^3\omega_2^2\omega_3cs^2 - 297\omega_1^2\omega_2\omega_3^2cs^2v_2^2 - 54\omega_1^2\omega_2\omega_3^2v_2^4 + 18\omega_2^3\omega_3^2cs^4 + 108\omega_1^2\omega_2^2\omega_3cs^4 + 2\omega_1^3\omega_2^3\omega_3^2cs^2v_1^2 - 45\omega_1^2\omega_2\omega_3^2v_1^2v_2^2 + 6\omega_2^3\omega_3^2 - 39\omega_1\omega_2^3\omega_3^2cs^2 + 6\omega_1\omega_2^3\omega_3^2v_1^2 - 90\omega_1^2\omega_2^2\omega_3^2v_2^2 + 48\omega_1^2\omega_2^3\omega_3cs^2v_1^2 - 12\omega_1^3\omega_2^2cs^2v_1^2 - 18\omega_1^2\omega_2\omega_3^2cs^4 - 6\omega_1^2\omega_2\omega_3^2cs^2v_1^2 - 90\omega_1\omega_2^3\omega_3cs^4 - 30\omega_1\omega_2^3\omega_3cs^2v_1^2 - 6\omega_1^3\omega_2\omega_3^2 - 54\omega_2^3\omega_3^2v_2^4 - 6\omega_1^3\omega_2\omega_3cs^2v_1^2 - 24\omega_1^3\omega_2^2cs^2 - 9\omega_1\omega_2^3\omega_3^2v_2^2 + 10\omega_1^3\omega_2^3\omega_3cs^4 - 12\omega_1^2\omega_2^2\omega_3^2v_1^2 - 54\omega_1^2\omega_2^2\omega_3^2cs^2$$

$$C_{15} = 72\omega_1^3\omega_2^3\omega_3cs^2v_1^2 + 45\omega_1\omega_2^3\omega_3^2cs^4 + 108\omega_1\omega_2^3\omega_3^2cs^2v_2^2 - 135\omega_1\omega_2^3\omega_3^2v_1^2v_2^2 + 24\omega_1^3\omega_2^3\omega_3cs^4 - 18\omega_1\omega_2^3\omega_3v_2^2 + 45\omega_1^2\omega_2\omega_3^2v_2^2 - 135\omega_1^3\omega_2\omega_3^2v_1^2v_2^2 - 6\omega_1^2\omega_2^3\omega_3^2cs^2v_1^2 - 216\omega_1^3\omega_2\omega_3^2cs^2v_2^2 - 60\omega_1^2\omega_2^2\omega_3cs^2 - 18\omega_2^3\omega_3^2v_1^2 + 9\omega_1\omega_2^3\omega_3^2cs^2v_1^2 + 108\omega_1^2\omega_2^3cs^2v_2^2 + 45\omega_1\omega_2^3\omega_3^2v_2^4 - 6\omega_1\omega_2^3\omega_3^2 + 30\omega_1^2\omega_2^2\omega_3^2cs^4 + 36\omega_1^2\omega_2\omega_3^2cs^2 - 30\omega_1^2\omega_2^3\omega_3^2cs^2v_2^2 - 30\omega_1\omega_2^3\omega_3cs^2 + 18\omega_1^2\omega_2\omega_3^2v_1^2 - 9\omega_1^3\omega_2\omega_3^2cs^2v_1^2 - 9\omega_2^3\omega_3^2v_2^2 + 2\omega_1^3\omega_2^2\omega_3^2cs^4 + 18\omega_1^3\omega_3^2cs^4 + 45\omega_1\omega_2^2\omega_3^2v_2^2 + \omega_1^3\omega_2^2\omega_3^2v_1^4 - 90\omega_1\omega_2^2\omega_3^2cs^2v_1^2 + 2\omega_1^2\omega_2^3\omega_3^2cs^2 + \omega_1^2\omega_2^3\omega_3^2v_1^2 - 18\omega_1^3\omega_2\omega_3v_2^4 + 144\omega_1^3\omega_2^2\omega_3cs^2v_2^2 - 54\omega_1^3\omega_2^2\omega_3v_2^2 +$$

$$270\omega_1^2\omega_2^2\omega_3^2v_1^2v_2^2 + 108\omega_1^2\omega_2^2\omega_3^2cs^2v_2^2 - 54\omega_1^2\omega_2^3\omega_3v_2^4 - 36\omega_1^3\omega_2^2v_2^4 - 6\omega_1^2\omega_2\omega_3^2 + 18\omega_1^3\omega_2\omega_3^2v_1^2 + 21\omega_1^3\omega_2\omega_3^2cs^2 + 18\omega_1\omega_2^2\omega_3^2v_1^2 + 9\omega_1^3\omega_2^2\omega_3^2v_2^4 + 36\omega_1^3\omega_3^2v_2^4 + 36\omega_1\omega_2^2\omega_3^2cs^2 - 135\omega_1\omega_2^2\omega_3^2v_1^2v_2^2 - 36\omega_1^2\omega_3^2v_2^2 - 45\omega_1\omega_2^2\omega_3^2cs^2v_2^2 + 6\omega_1^3\omega_2\omega_3cs^4 - 90\omega_1^3\omega_2^2\omega_3cs^2v_1^2 + 9\omega_1^2\omega_2^3\omega_3^2v_2^2 - 6\omega_1\omega_2^2\omega_3^2 + 36\omega_1^3\omega_2^2\omega_3cs^2 + 90\omega_1^3\omega_2\omega_3^2v_2^2 + 72\omega_1^2\omega_2^2\omega_3^2cs^2v_1^2 - 60\omega_1^2\omega_2^3\omega_3cs^4 + 30\omega_1^3\omega_2^2\omega_3^2cs^2v_2^2 + 189\omega_1^3\omega_3^2cs^2v_2^2 + 54\omega_1^3\omega_2^2\omega_3v_2^4 + 54\omega_1^2\omega_2^3\omega_3v_2^2 + 6\omega_1^3\omega_3^2 + 36\omega_1^3\omega_2^2v_2^2 - 15\omega_1^3\omega_2\omega_3^2cs^4 + 135\omega_1^3\omega_2^2v_1^2v_2^2 - 24\omega_1^3\omega_3^2cs^2 - 2\omega_1^3\omega_2^2\omega_3^2cs^2 - 63\omega_2^3\omega_3^2cs^2v_2^2 + 36\omega_1^2\omega_2^2\omega_3cs^2v_2^2 - 18\omega_1^3\omega_3^2v_1^2 - \omega_1^3\omega_2^2\omega_3^2v_1^2 - 10\omega_1^2\omega_2^3\omega_3^2cs^4 - \omega_1^2\omega_2^3\omega_3^2v_1^4 + 135\omega_2^3\omega_3^2v_1^2v_2^2 + 18\omega_1^3\omega_2\omega_3v_2^2 + 6\omega_1^3\omega_2^2\omega_3^2cs^2v_1^2 + 18\omega_1^3\omega_3^2cs^2v_1^2 - 36\omega_1^3\omega_2^2\omega_3cs^4 - 45\omega_1^3\omega_2\omega_3^2v_2^4 + 60\omega_1^2\omega_2^3\omega_3cs^2 - 18\omega_2^3\omega_3^2cs^2v_1^2 - 30\omega_1\omega_2^3\omega_3^2cs^4 - 81\omega_1^3\omega_3^2v_2^2 - 9\omega_1^3\omega_2^2\omega_3^2v_2^2 + 36\omega_1^2\omega_2^3v_2^4 + 144\omega_1^2\omega_2^2\omega_3cs^2v_1^2 - 6\omega_1^3\omega_2\omega_3cs^2 + 12\omega_1^2\omega_2^2\omega_3^2 - 9\omega_1^2\omega_2^3\omega_3^2v_2^4 + 18\omega_1\omega_2^3\omega_3v_2^4 - 24\omega_1^3\omega_2^3\omega_3cs^2 - 81\omega_1^2\omega_2\omega_3^2cs^2v_2^2 - 30\omega_2^3\omega_3^2cs^4 + 18\omega_1\omega_2^3\omega_3cs^2v_2^2 + 60\omega_1^2\omega_2^2\omega_3cs^4 - 135\omega_1^2\omega_2\omega_3^2v_1^2v_2^2 + 6\omega_2^3\omega_3^2 - 3\omega_1\omega_2^3\omega_3^2cs^2 + 18\omega_1\omega_2^3\omega_3^2v_1^2 - 54\omega_1^3\omega_2\omega_3cs^2v_2^2 - 90\omega_1^2\omega_2^2\omega_3^2v_2^2 - 198\omega_1^2\omega_2^3\omega_3cs^2v_1^2 - 30\omega_1^2\omega_2\omega_3^2cs^4 - 54\omega_1^2\omega_2\omega_3^2cs^2v_1^2 + 30\omega_1\omega_2^3\omega_3cs^4 + 126\omega_1\omega_2^3\omega_3cs^2v_1^2 - 6\omega_1^3\omega_2\omega_3^2 - 36\omega_2^3\omega_3^2v_2^4 + 18\omega_1^3\omega_2\omega_3cs^2v_1^2 - 2\omega_1^3\omega_2^3\omega_3^2cs^4 - 144\omega_1^2\omega_2^3\omega_3cs^2v_2^2 - 36\omega_1^2\omega_2^2\omega_3^2v_1^2 - 108\omega_1^3\omega_2^2cs^2v_2^2 - 42\omega_1^2\omega_2^2\omega_3^2cs^2$$

$$C_{16} = -18\omega_1\omega_2^2\omega_3 + 216\omega_1\omega_2^3\omega_3v_2^2 + 108\omega_1^2\omega_2^2cs^2 + 162\omega_1^2\omega_2^2\omega_3cs^2 + 54\omega_1^2\omega_2^2\omega_3v_1^2 + 36\omega_1^2\omega_2^2v_1^2 + 90\omega_1^2\omega_2\omega_3 - 27\omega_1\omega_2^3\omega_3v_1^2 + 135\omega_1\omega_2^3\omega_3cs^2 - 54\omega_1^3\omega_2cs^2 - 36\omega_1^2\omega_2^2 - 18\omega_1^3\omega_2v_1^2 + 198\omega_1^3\omega_3v_2^2 + 100\omega_1^3\omega_2^2\omega_3v_2^2 - 81\omega_1\omega_2^3\omega_3 + 18\omega_1^3\omega_2 + 36\omega_1^3\omega_3v_1^2 + 270\omega_1^3\omega_3cs^2 + 84\omega_1^3\omega_2^2\omega_3cs^2 - 46\omega_1^3\omega_2^2\omega_3 - 54\omega_1\omega_2^2\omega_3cs^2 - 36\omega_1\omega_2^2\omega_3v_1^2 + 18\omega_1\omega_2^3 - 100\omega_1^2\omega_2^3\omega_3v_2^2 - 18\omega_1\omega_2^3v_1^2 - 54\omega_1\omega_2^3cs^2 + 46\omega_1^2\omega_2^3\omega_3 - 216\omega_1^3\omega_2\omega_3v_2^2 + 135\omega_1^3\omega_2\omega_3 + 162\omega_1\omega_2^2\omega_3v_2^2 - 84\omega_1^2\omega_2^3\omega_3cs^2 - 297\omega_1^3\omega_2\omega_3cs^2 + 54\omega_2^3\omega_3 - 27\omega_1^3\omega_2\omega_3v_1^2 - 54\omega_1^2\omega_2^2\omega_3 - 36\omega_1^2\omega_2\omega_3v_1^2 - 162\omega_1^2\omega_2\omega_3cs^2 - 198\omega_2^3\omega_3v_2^2 - 162\omega_1^2\omega_2\omega_3v_2^2 + 36\omega_2^3\omega_3v_1^2 - 126\omega_1^3\omega_3 - 54\omega_2^3\omega_3cs^2$$

$$C_{17} = 225\omega_1\omega_2^3\omega_3^2cs^4 + 489\omega_1\omega_2^3\omega_3^2cs^2v_2^2 + 7\omega_1^3\omega_2^2\omega_3^2 - 18\omega_1^3\omega_2^3\omega_3cs^4 - 51\omega_1^2\omega_2\omega_3^2v_2^2 - 9\omega_1^2\omega_2^3\omega_3^2cs^2v_1^2 + 72\omega_2^3\omega_3^2cs^2 - 465\omega_1^3\omega_2\omega_3^2cs^2v_2^2 - 24\omega_1^2\omega_2^2\omega_3cs^2 - 6\omega_1^3\omega_2^3\omega_3cs^2v_2^2 + 36\omega_1^3\omega_2^3cs^4 - 24\omega_1^2\omega_2^3cs^2v_2^2 - 2\omega_1^3\omega_2^3\omega_3^2cs^2 + 90\omega_1\omega_2^3\omega_3^2v_2^4 + 12\omega_1\omega_2^3\omega_3^2 + 36\omega_1^2\omega_2^2\omega_3^2cs^4 - 24\omega_1^2\omega_2\omega_3^2cs^2 - 219\omega_1^2\omega_2^3\omega_3^2cs^2v_2^2 + 30\omega_1\omega_2^3\omega_3cs^2 + 51\omega_2^3\omega_3^2v_2^2 + 72\omega_1^3\omega_2^2\omega_3^2cs^4 + 90\omega_1^3\omega_2^3cs^4 + 51\omega_1\omega_2^2\omega_3^2v_2^2 + 24\omega_1^2\omega_2^3cs^2 + 3\omega_1^3\omega_2^2\omega_3^2v_1^4 + 81\omega_1^2\omega_2^3\omega_3^2cs^2 + 12\omega_1^3\omega_2^3cs^2v_2^2 + 3\omega_1^2\omega_2^3\omega_3^2v_1^2 - 18\omega_1^3\omega_2^2\omega_3cs^2v_2^2 + 12\omega_1^2\omega_2^2\omega_3^2cs^2v_2^2 + 6\omega_1^2\omega_2\omega_3^2 + 123\omega_1^3\omega_2\omega_3^2cs^2 + 39\omega_1^3\omega_2^2\omega_3^2v_2^4 + 45\omega_1^3\omega_2^3v_2^4 + 48\omega_1\omega_2^2\omega_3^2cs^2 - 165\omega_1\omega_2^2\omega_3^2cs^2v_2^2 + 18\omega_1^3\omega_2\omega_3cs^4 + 46\omega_1^2\omega_2^3\omega_3^2v_2^2 - 6\omega_1\omega_2^2\omega_3^2 + 18\omega_1^3\omega_2^2\omega_3cs^2 + 102\omega_1^3\omega_2\omega_3^2v_2^2 + 126\omega_1^2\omega_2^3\omega_3cs^4 + 197\omega_1^3\omega_2^2\omega_3^2cs^2v_2^2 + 261\omega_1^3\omega_2^3cs^2v_2^2 + 6\omega_1^3\omega_3^2 - 153\omega_1^3\omega_2\omega_3^2cs^4 - 45\omega_1^2\omega_2^2\omega_3^2v_2^4 - 72\omega_1^3\omega_2^3cs^2 - 59\omega_1^3\omega_2^2\omega_3^2cs^2 - 261\omega_2^3\omega_3^2cs^2v_2^2 - 72\omega_1^2\omega_2^3cs^4 + 24\omega_1^2\omega_2^2\omega_3cs^2v_2^2 - 3\omega_1^3\omega_2^2\omega_3^2v_1^2 - 138\omega_1^2\omega_2^3\omega_3^2cs^4 - 3\omega_1^2\omega_2^3\omega_3^2v_1^4 + 9\omega_1^3\omega_2^2\omega_3^2cs^2v_1^2 - 54\omega_1^3\omega_2^2\omega_3cs^4 - 90\omega_1^3\omega_2\omega_3^2v_2^4 - 42\omega_1^2\omega_2^3\omega_3cs^2 - 90\omega_1\omega_2^2\omega_3^2cs^4 - 51\omega_1^3\omega_3^2v_2^2 - 46\omega_1^3\omega_2^2\omega_3^2v_2^2 - 6\omega_1^3\omega_2\omega_3cs^2 - 39\omega_1^2\omega_2^3\omega_3^2v_2^4 + 6\omega_1^3\omega_2^3\omega_3cs^2 + 141\omega_1^2\omega_2\omega_3^2cs^2v_2^2 + 45\omega_1^2\omega_2\omega_3^2v_2^4 - 90\omega_2^3\omega_3^2cs^4 - 30\omega_1\omega_2^3\omega_3cs^2v_2^2 + 72\omega_1^2\omega_2^2\omega_3cs^4 - 6\omega_2^3\omega_3^2 - 147\omega_1\omega_2^3\omega_3^2cs^2 + 6\omega_1^3\omega_2\omega_3cs^2v_2^2 + 18\omega_1^2\omega_2\omega_3^2cs^4 - 90\omega_1\omega_2^3\omega_3cs^4 - 7\omega_1^2\omega_2^3\omega_3^2 - 12\omega_1^3\omega_2\omega_3^2 - 45\omega_2^3\omega_3^2v_2^4 + 2\omega_1^3\omega_2^3\omega_3^2cs^2v_2^2 - 12\omega_1^3\omega_2^3cs^2 - 102\omega_1\omega_2^3\omega_3^2v_2^2 + 6\omega_1^3\omega_2^3\omega_3^2cs^4 + 42\omega_1^2\omega_2^3\omega_3cs^2v_2^2 - 12\omega_1^2\omega_2^2\omega_3^2cs^2$$

$$C_{18} = 2\omega_2\omega_3 + 9\omega_1\omega_3v_1^2 + 6\omega_1\omega_3cs^2 - 6\omega_1\omega_2v_2^2 + \omega_1\omega_3v_2^2 - 18\omega_1\omega_2cs^2 - 4\omega_1\omega_3 + 6\omega_1\omega_2\omega_3cs^2 + 2\omega_1\omega_2\omega_3v_2^2 - 9\omega_2\omega_3v_1^2 + \omega_2\omega_3v_2^2 + 6\omega_1\omega_2 - 2\omega_1\omega_2\omega_3$$

$$C_{19} = -6\omega_1\omega_2^2\omega_3 + 6\omega_1^2\omega_2\omega_3cs^4 - 171\omega_2^3\omega_3v_2^4 + 63\omega_1^2\omega_2\omega_3cs^2v_2^2 - 2\omega_1^3\omega_2^3\omega_3cs^4 - 180\omega_1\omega_2^3\omega_3v_2^2 - 24\omega_1^2\omega_2^2cs^2 - 12\omega_1^2\omega_2^2\omega_3cs^2 + 135\omega_1^2\omega_2\omega_3v_2^4 + 12\omega_1^3\omega_2^3cs^4 - 90\omega_1^2\omega_2^3cs^2v_2^2 + 6\omega_1^2\omega_2\omega_3 - 42\omega_2^3\omega_3cs^4 + 18\omega_1^3\omega_2cs^2v_2^2 - 45\omega_1\omega_2^3\omega_3cs^2 + 30\omega_1^2\omega_2^3cs^2 - 6\omega_1^3\omega_2cs^2 + 36\omega_1^3\omega_3^2cs^2v_2^2 - 324\omega_1^3\omega_2\omega_3v_2^4 + 153\omega_1^3\omega_2^2\omega_3cs^2v_2^2 + 207\omega_1^3\omega_3cs^2v_2^2 - 99\omega_1^3\omega_3v_2^2 - 81\omega_1^3\omega_2^2\omega_3v_2^2 - 30\omega_1\omega_2^2\omega_3cs^4 + 12\omega_1\omega_2^3\omega_3 - 138\omega_1^2\omega_2^3\omega_3v_2^4 - 207\omega_2^3\omega_3cs^2v_2^2 + 18\omega_1\omega_2^3cs^4 - 33\omega_1^3\omega_2\omega_3cs^4 + 3\omega_1^3\omega_2^2\omega_3cs^2v_1^2 - \omega_1^3\omega_2^2\omega_3v_1^2 - 24\omega_1^3\omega_3cs^2 - 24\omega_1^3\omega_2^2\omega_3cs^2 - 135\omega_1\omega_2^2\omega_3v_2^4 + 7\omega_1^3\omega_2^2\omega_3 - \omega_1^2\omega_2^3\omega_3v_1^4 - 25\omega_1^2\omega_2^3\omega_3cs^4 - 18\omega_1^3\omega_2^2cs^4 + 36\omega_1\omega_2^2\omega_3cs^2 + 138\omega_1^3\omega_2^2\omega_3v_2^4 + 171\omega_1^3\omega_3v_2^4 + 81\omega_1^2\omega_2^3\omega_3v_2^2 - 18\omega_1\omega_2^3cs^2 + 72\omega_1^2\omega_2^2cs^2v_2^2 - 30\omega_1^2\omega_2^3cs^4 + 36\omega_1^2\omega_2^2\omega_3cs^2v_2^2 - 7\omega_1^2\omega_2^3\omega_3 + 6\omega_1^3\omega_2cs^4 + 180\omega_1^3\omega_2\omega_3v_2^2 - 12\omega_1^3\omega_2\omega_3 + \omega_1^3\omega_2^2\omega_3v_1^4 + 63\omega_1\omega_2^2\omega_3v_2^2 + 17\omega_1^3\omega_2^2\omega_3cs^4 + 18\omega_1^3\omega_3cs^4 - 135\omega_1\omega_2^2\omega_3cs^2v_2^2 + \omega_1^2\omega_2^3\omega_3v_1^2 + 24\omega_1^2\omega_2^3\omega_3cs^2 + 18\omega_1^3\omega_2^2cs^2 + 45\omega_1^3\omega_2\omega_3cs^2 - 6\omega_2^3\omega_3 + 54\omega_1\omega_2^3cs^2v_2^2 + 324\omega_1\omega_2^3\omega_3v_2^4 + 24\omega_1^2\omega_2^2cs^4 + 351\omega_1\omega_2^3\omega_3cs^2v_2^2 + 12\omega_1^2\omega_2^2\omega_3cs^4 - 12\omega_1^2\omega_2\omega_3cs^2 - 351\omega_1^3\omega_2\omega_3cs^2v_2^2 - 3\omega_1^2\omega_2^3\omega_3cs^2v_1^2 + 99\omega_2^3\omega_3v_2^2 + 69\omega_1\omega_2^3\omega_3cs^4 - 63\omega_1^2\omega_2\omega_3v_2^2 - 12\omega_1^3\omega_2^3cs^2 + 6\omega_1^3\omega_3 - 153\omega_1^2\omega_2^3\omega_3cs^2v_2^2 - 54\omega_1^3\omega_2^2cs^2v_2^2 + 24\omega_2^3\omega_3cs^2$$

$$C_{20} = \omega_2cs^4 + 12\omega_2cs^2v_2^2 + 3\omega_1\omega_2v_2^2 + 3\omega_2v_2^4 + \omega_1\omega_2cs^2 + \omega_1cs^4 + 3\omega_1v_2^4 + 12\omega_1cs^2v_2^2 - \omega_1cs^2 - 3\omega_1v_2^2 - 12\omega_1\omega_2cs^2v_2^2 - 3\omega_1\omega_2v_2^4 - \omega_2cs^2 - \omega_1\omega_2cs^4 - 3\omega_2v_2^2$$

$$C_{21} = 12\omega_1^2\omega_3^2v_2^2 - 36\omega_1^3v_2^2 - 24\omega_1\omega_3cs^2 - 24\omega_1^2\omega_3cs^4 + 144\omega_1^2\omega_3cs^2v_2^2 - 8\omega_1^2\omega_3^2cs^2 + 72\omega_1^2\omega_3v_2^4 - 48\omega_1\omega_3^2cs^4 - 3\omega_1^3\omega_3^2cs^4 - 216\omega_1^2cs^2v_2^2 - 72\omega_1^3\omega_3cs^2v_2^2 + 72\omega_1^2v_2^2 + 30\omega_1^3\omega_3v_2^2 + 3\omega_1^3\omega_3^2v_2^4 - 6\omega_1^3\omega_3cs^2 - 36\omega_1\omega_3^2cs^2v_2^2 - 72\omega_1^2v_2^4 + 6\omega_1^3\omega_3^2cs^2v_2^2 - 30\omega_1^3\omega_3v_2^4 + \omega_1^3\omega_3^2cs^2 + 6\omega_1^3\omega_3cs^4 - 3\omega_1^3\omega_3^2v_2^2 + 72\omega_1\omega_3cs^2v_2^2 + 24\omega_1^2\omega_3cs^2 - 12\omega_1^2\omega_3^2v_2^4 + 36\omega_1^3v_2^4 + 24\omega_1\omega_3cs^4 + 24\omega_3^2cs^4 - 72\omega_1^2\omega_3v_2^2 + 12\omega_1\omega_3^2cs^2 - 12\omega_1^2\omega_3^2cs^2v_2^2 + 24\omega_1^2\omega_3^2cs^4 + 108\omega_1^3cs^2v_2^2$$

2.7.4 Conservation of momentum: ρv_2

attached text file: `output_d2q9_nse_culbm2_symbolic_pde_02.txt`

$$v_2\frac{\partial\rho}{\partial t} + \rho\frac{\partial v_2}{\partial t} + \frac{\delta_l v_1 v_2}{\delta_t}\frac{\partial\rho}{\partial x_1} + \frac{\delta_l\rho v_2}{\delta_t}\frac{\partial v_1}{\partial x_1} + \frac{\delta_l\rho v_1}{\delta_t}\frac{\partial v_2}{\partial x_1} + (cs^2+v_2^2)\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \frac{2\delta_l\rho v_2}{\delta_t}\frac{\partial v_2}{\partial x_2} + (-2+\omega_1)\frac{cs^2\delta_l^2}{2\omega_1\delta_t}\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_1} +$$
$$(-\omega_1+3\omega_1cs^2-5cs^2\omega_2+\omega_2+3\omega_1v_1^2+\omega_1cs^2\omega_2-3\omega_2v_1^2)\frac{\delta_l^2}{2\omega_1\omega_2\delta_t}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_2} + (\omega_1-\omega_2)\frac{3\delta_l^2\rho v_1}{\omega_1\omega_2\delta_t}\frac{\partial v_1}{\partial x_1}\frac{\partial v_1}{\partial x_2} +$$
$$(-\omega_1+\omega_1cs^2-cs^2\omega_2+\omega_2+3\omega_1v_1^2-3\omega_2v_1^2)\frac{\delta_l^2}{2\omega_1\omega_2\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_1}{\partial x_1} +$$
$$(-3\omega_1\omega_2v_2^2-\omega_1+2\omega_1cs^2+2cs^2\omega_2-\omega_2-2\omega_1cs^2\omega_2+3\omega_1v_2^2+\omega_1\omega_2+3\omega_2v_2^2)\frac{\delta_l^2}{\omega_1\omega_2\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_2} +$$
$$(\omega_1+\omega_2-\omega_1\omega_2)\frac{3\delta_l^2\rho v_2}{\omega_1\omega_2\delta_t}\left(\frac{\partial v_2}{\partial x_2}\right)^2 + (-2+\omega_1)\frac{cs^2\delta_l^2\rho}{2\omega_1\delta_t}\frac{\partial^2 v_2}{\partial x_1^2} +$$
$$(-\omega_1+3\omega_1cs^2-3cs^2\omega_2+\omega_2+\omega_1v_1^2-\omega_2v_1^2)\frac{\delta_l^2 v_1}{2\omega_1\omega_2\delta_t}\frac{\partial^2\rho}{\partial x_1\partial x_2} +$$

$$(-\omega_1+\omega_1 cs^2-3cs^2\omega_2+\omega_2+3\omega_1 v_1^2+\omega_1 cs^2\omega_2-3\omega_2 v_1^2)\frac{\delta_l^2\rho}{2\omega_1\omega_2\delta_t}\frac{\partial^2 v_1}{\partial x_1\partial x_2}\ +$$
$$(-\omega_1\omega_2 v_2^2-\omega_1+3\omega_1 cs^2+3cs^2\omega_2-\omega_2-3\omega_1 cs^2\omega_2+\omega_1 v_2^2+\omega_1\omega_2+\omega_2 v_2^2)\frac{\delta_l^2 v_2}{2\omega_1\omega_2\delta_t}\frac{\partial^2\rho}{\partial x_2^2}\ +$$
$$(-3\omega_1\omega_2 v_2^2-\omega_1+\omega_1 cs^2+cs^2\omega_2-\omega_2-\omega_1 cs^2\omega_2+3\omega_1 v_2^2+\omega_1\omega_2+3\omega_2 v_2^2)\frac{\delta_l^2\rho}{2\omega_1\omega_2\delta_t}\frac{\partial^2 v_2}{\partial x_2^2}\ +$$
$$(-1+3cs^2+v_1^2)\frac{\delta_l^3 v_1 v_2}{12\delta_t}\frac{\partial^3\rho}{\partial x_1^3}+(-1+cs^2+3v_1^2)\frac{\delta_l^3\rho v_2}{12\delta_t}\frac{\partial^3 v_1}{\partial x_1^3}+C_1\frac{\delta_l^3\rho v_1}{6\omega_1\omega_3\delta_t}\frac{\partial^3 v_2}{\partial x_1^3}+C_2\frac{\delta_l^3}{12\omega_1^2\omega_2^2\delta_t}\frac{\partial^3\rho}{\partial x_1^2\partial x_2}+$$
$$C_3\frac{\delta_l^3\rho v_1}{4\omega_1^2\omega_2^2\delta_t}\frac{\partial^3 v_1}{\partial x_1^2\partial x_2}-\frac{cs^2\delta_l^3\rho v_2}{6\delta_t}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2}+C_4\frac{3\delta_l^3 v_1 v_2}{4\omega_1^2\omega_2^2\delta_t}\frac{\partial^3\rho}{\partial x_1\partial x_2^2}+C_5\frac{\delta_l^3\rho v_2}{12\omega_1^2\omega_2^2\omega_3\delta_t}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2}+C_6\frac{\delta_l^3\rho v_1}{4\omega_1^2\omega_2^2\omega_3\delta_t}\frac{\partial^3 v_2}{\partial x_1\partial x_2^2}+$$
$$C_7\frac{\delta_l^3}{12\omega_1^2\omega_2^2\delta_t}\frac{\partial^3\rho}{\partial x_2^3}+C_8\frac{\delta_l^3\rho v_2}{12\omega_1^2\omega_2^2\delta_t}\frac{\partial^3 v_2}{\partial x_2^3}+C_9\frac{\delta_l^4 v_2}{24\omega_1\omega_2\delta_t}\frac{\partial^4\rho}{\partial x_1^4}\ +$$
$$(-2\omega_1+3\omega_1 cs^2-5\omega_1\omega_2 v_1^2+3cs^2\omega_2-2\omega_2+5\omega_1 v_1^2-3\omega_1 cs^2\omega_2+5\omega_2 v_1^2+2\omega_1\omega_2)\frac{\delta_l^4\rho v_1 v_2}{12\omega_1\omega_2\delta_t}\frac{\partial^4 v_1}{\partial x_1^4}\ +$$
$$C_{10}\frac{\delta_l^4\rho}{24\omega_1^3\omega_2^2\delta_t}\frac{\partial^4 v_2}{\partial x_1^4}+C_{11}\frac{\delta_l^4 v_1}{24\omega_1^3\omega_2^3\omega_3^2\delta_t}\frac{\partial^4\rho}{\partial x_1^3\partial x_2}+C_{12}\frac{\delta_l^4\rho}{24\omega_1^3\omega_2^3\omega_3\delta_t}\frac{\partial^4 v_1}{\partial x_1^3\partial x_2}+C_{13}\frac{\delta_l^4\rho v_1 v_2}{24\omega_1\omega_2\omega_3\delta_t}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2}\ +$$
$$C_{14}\frac{\delta_l^4 v_2}{24\omega_1^3\omega_2^3\omega_3^2\delta_t}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2}+C_{15}\frac{\delta_l^4\rho v_1 v_2}{24\omega_1^3\omega_2^3\omega_3\delta_t}\frac{\partial^4 v_1}{\partial x_1^2\partial x_2^2}+C_{16}\frac{\delta_l^4\rho}{24\omega_1^3\omega_2^3\omega_3^2\delta_t}\frac{\partial^4 v_2}{\partial x_1^2\partial x_2^2}+C_{17}\frac{\delta_l^4 v_1}{24\omega_1^3\omega_2^3\omega_3^2\delta_t}\frac{\partial^4\rho}{\partial x_1\partial x_2^3}\ +$$
$$C_{18}\frac{\delta_l^4\rho}{24\omega_1^3\omega_2^3\omega_3^2\delta_t}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3}+C_{19}\frac{\delta_l^4\rho v_1 v_2}{24\omega_1^3\omega_2^3\omega_3\delta_t}\frac{\partial^4 v_2}{\partial x_1\partial x_2^3}+C_{20}\frac{\delta_l^4 v_2}{24\omega_1^3\omega_2^3\omega_3\delta_t}\frac{\partial^4\rho}{\partial x_2^4}+C_{21}\frac{\delta_l^4\rho}{24\omega_1^3\omega_2^3\omega_3\delta_t}\frac{\partial^4 v_2}{\partial x_2^4}=0,$$

where:

$$C_1=6-\omega_1\omega_3 v_1^2-3\omega_1+9\omega_1 cs^2-3\omega_1 cs^2\omega_3+\omega_1\omega_3-18cs^2+3\omega_1 v_1^2-3\omega_3+9cs^2\omega_3-6v_1^2+3\omega_3 v_1^2$$

$$C_2=6\omega_1^2 cs^4+9\omega_1\omega_2^2 v_1^4+45\omega_1^2 cs^2 v_1^2-9\omega_1^2\omega_2 v_1^4+45\omega_1 cs^2\omega_2^2 v_1^2+6cs^2\omega_2^2+9\omega_2^2 v_1^2-45\omega_1^2 cs^2\omega_2 v_1^2+6\omega_1^2 cs^2\omega_2-9\omega_1^2 v_1^2+30\omega_1 cs^4\omega_2^2-30cs^4\omega_2^2+9\omega_1^2 v_1^4-2\omega_1^2 cs^4\omega_2^2-6\omega_1^2 cs^4\omega_2-6\omega_1^2 cs^2-9\omega_1\omega_2^2 v_1^2-6\omega_1 cs^2\omega_2^2-9\omega_2^2 v_1^4-45cs^2\omega_2^2 v_1^2+9\omega_1^2\omega_2 v_1^2$$

$$C_3=-9cs^2\omega_2^2-11\omega_2^2 v_1^2+5\omega_1^2\omega_2-9\omega_1^2 cs^2\omega_2-5\omega_1^2+11\omega_1^2 v_1^2-5\omega_1\omega_2^2+5\omega_2^2+9\omega_1^2 cs^2+11\omega_1\omega_2^2 v_1^2+9\omega_1 cs^2\omega_2^2-11\omega_1^2\omega_2 v_1^2$$

$$C_4=\omega_2^2 v_2^2-2\omega_1\omega_2 v_2^2-\omega_2^2 v_1^2+\omega_1^2\omega_2+\omega_1^2 v_2^2-3\omega_1^2 cs^2\omega_2-2\omega_1^2+\omega_1^2 v_1^2-6\omega_1 cs^2\omega_2-\omega_1\omega_2^2+6\omega_1^2 cs^2+\omega_1\omega_2^2 v_1^2+3\omega_1 cs^2\omega_2^2+2\omega_1\omega_2-\omega_1^2\omega_2 v_1^2$$

$$C_5=-12\omega_1\omega_2^2\omega_3+36\omega_1^2 cs^2\omega_2^2+12\omega_1^2\omega_2\omega_3+9cs^2\omega_2^2\omega_3+6\omega_1^2\omega_2+12\omega_1^2\omega_2^2 v_2^2-3\omega_1^2\omega_2^2\omega_3 v_2^2-12\omega_1^2\omega_2^2-27\omega_2^2\omega_3 v_1^2-11\omega_1^2 cs^2\omega_2^2\omega_3-18\omega_1^2 cs^2\omega_2+6\omega_2^2\omega_3 v_2^2-18\omega_1^2 cs^2\omega_2\omega_3+27\omega_1\omega_2^2\omega_3 v_1^2-15\omega_1^2\omega_3+3\omega_1\omega_2^2\omega_3 v_2^2+18\omega_1\omega_2^2+27\omega_1^2\omega_3 v_1^2+3\omega_1^2\omega_2^2\omega_3-27\omega_1^2\omega_2\omega_3 v_1^2-54\omega_1 cs^2\omega_2^2-6\omega_1^2\omega_2 v_2^2+6\omega_1^2\omega_3 v_2^2+3\omega_2^2\omega_3-18\omega_1\omega_2^2 v_2^2-3\omega_1^2\omega_2\omega_3 v_2^2+27\omega_1^2 cs^2\omega_3+18\omega_1 cs^2\omega_2^2\omega_3$$

$$C_6=-\omega_1\omega_2^2\omega_3-6\omega_1 cs^2\omega_2\omega_3+\omega_1^2\omega_2\omega_3-3cs^2\omega_2^2\omega_3+2\omega_1^2\omega_2-2\omega_2^2\omega_3 v_1^2-6\omega_1^2 cs^2\omega_2-18\omega_1\omega_2\omega_3 v_2^2+9\omega_2^2\omega_3 v_2^2-3\omega_1^2 cs^2\omega_2\omega_3+\omega_1\omega_2^2\omega_3 v_1^2-5\omega_1^2\omega_3-2\omega_1\omega_2^2+2\omega_1^2\omega_3 v_1^2-\omega_1^2\omega_2\omega_3 v_1^2+2\omega_1\omega_2^2 v_1^2+6\omega_1 cs^2\omega_2^2+9\omega_1^2\omega_3 v_2^2+6\omega_1\omega_2\omega_3-\omega_2^2\omega_3+9\omega_1^2 cs^2\omega_3-2\omega_1^2\omega_2 v_1^2+3\omega_1 cs^2\omega_2^2\omega_3$$

$$C_7=6\omega_1^2 cs^4+45\omega_1^2 cs^2 v_2^2-18\omega_1^2\omega_2 v_2^4-72\omega_1 cs^2\omega_2^2 v_2^2-9\omega_2^2 v_2^2-18\omega_1\omega_2 v_2^2-\omega_1^2 cs^2\omega_2^2-18\omega_1\omega_2^2 v_2^4-6cs^2\omega_2^2-7\omega_1^2\omega_2^2 v_2^2-9\omega_1^2 v_2^2+6\omega_1^2 cs^2\omega_2-72\omega_1^2 cs^2\omega_2 v_2^2-6\omega_1 cs^4\omega_2^2+9\omega_1^2 v_2^4+6cs^4\omega_2^2+24\omega_1^2 cs^2\omega_2^2 v_2^2+\omega_1^2 cs^4\omega_2^2+45cs^2\omega_2^2 v_2^2+9\omega_2^2 v_2^4+18\omega_1\omega_2 v_2^4-6\omega_1^2 cs^4\omega_2-6\omega_1^2 cs^2+6\omega_1 cs^2\omega_2^2+18\omega_1^2\omega_2 v_2^2+54\omega_1 cs^2\omega_2 v_2^2+7\omega_1^2\omega_2^2 v_2^4+18\omega_1\omega_2^2 v_2^2$$

$$C_8=33\omega_2^2 v_2^2+54\omega_1\omega_2 v_2^2+10\omega_1^2 cs^2\omega_2^2+27cs^2\omega_2^2+24\omega_1^2\omega_2+22\omega_1^2\omega_2^2 v_2^2-8\omega_1^2\omega_2^2+33\omega_1^2 v_2^2-36\omega_1^2 cs^2\omega_2-15\omega_1^2+18\omega_1 cs^2\omega_2+24\omega_1\omega_2^2-15\omega_2^2+27\omega_1^2 cs^2-36\omega_1 cs^2\omega_2^2-18\omega_1\omega_2-60\omega_1^2\omega_2 v_2^2-60\omega_1\omega_2^2 v_2^2$$

$$C_9=3\omega_2 v_1^4+12cs^2\omega_2 v_1^2-\omega_1 cs^4\omega_2-\omega_1 cs^2+3\omega_1\omega_2 v_1^2-cs^2\omega_2+3\omega_1 v_1^4-3\omega_1 v_1^2+\omega_1 cs^2\omega_2-12\omega_1 cs^2\omega_2 v_1^2-3\omega_2 v_1^2+cs^4\omega_2+\omega_1 cs^4-3\omega_1\omega_2 v_1^4+12\omega_1 cs^2 v_1^2$$

$$C_{10}=-72\omega_1^3 cs^2\omega_3 v_1^2+24cs^4\omega_3^2-36\omega_1 cs^2\omega_3^2 v_1^2+72\omega_1^2\omega_3 v_1^4+12\omega_1^2\omega_3^2 v_1^2+24\omega_1^2 cs^4\omega_3^2-216\omega_1^2 cs^2 v_1^2-36\omega_1^3 v_1^2+\omega_1^3 cs^2\omega_3^2-24\omega_1 cs^2\omega_3-6\omega_1^3 cs^2\omega_3+3\omega_1^3\omega_3^2 v_1^4+12\omega_1 cs^2\omega_3^2-24\omega_1^2 cs^4\omega_3+144\omega_1^2 cs^2\omega_3 v_1^2+30\omega_1^3\omega_3 v_1^2+72\omega_1^2 v_1^2-8\omega_1^2 cs^2\omega_3^2-12\omega_1^2 cs^2\omega_3^2 v_1^2+108\omega_1^3 cs^2 v_1^2-3\omega_1^3 cs^4\omega_3^2-3\omega_1^3\omega_3^2 v_1^2+24\omega_1 cs^4\omega_3-30\omega_1^3\omega_3 v_1^4-72\omega_1^2 v_1^4-72\omega_1^2\omega_3 v_1^2+6\omega_1^3 cs^4\omega_3+6\omega_1^3 cs^2\omega_3^2 v_1^2-48\omega_1 cs^4\omega_3^2-12\omega_1^2\omega_3^2 v_1^4+72\omega_1 cs^2\omega_3 v_1^2+24\omega_1^2 cs^2\omega_3+36\omega_1^3 v_1^4$$

$$C_{11}=90\omega_1\omega_2^3\omega_3^2 v_1^4-138\omega_1^2 cs^4\omega_2^3\omega_3^2+18\omega_1^3 cs^2\omega_2^2\omega_3+7\omega_1^3\omega_2^2\omega_3^2-12\omega_1^2 cs^2\omega_2^2\omega_3^2-18\omega_1^3 cs^4\omega_2^3\omega_3-219\omega_1^2 cs^2\omega_2^3\omega_3^2 v_1^2+51\omega_2^3\omega_3^2 v_1^2+72cs^2\omega_2^3\omega_3^2-2\omega_1^3 cs^2\omega_2^3\omega_3^2+72\omega_1^2 cs^4\omega_2^2\omega_3+36\omega_1^3 cs^4\omega_2^2-6\omega_1^3 cs^2\omega_2^2\omega_3\omega_3 v_1^2+489\omega_1 cs^2\omega_2^2\omega_3^2 v_1^2+12\omega_1\omega_2^3\omega_3^2-72\omega_1^3 cs^2\omega_3^2-51\omega_1^2\omega_2\omega_3^2 v_1^2+24\omega_1^2 cs^2\omega_2^3-9\omega_1^2 cs^2\omega_2^3\omega_3^2 v_2^2+72\omega_1^3 cs^4\omega_2^2\omega_3^2-42\omega_1^2 cs^2\omega_2^3\omega_3+39\omega_1^3\omega_2^2\omega_3^2 v_1^4+45\omega_1^3\omega_3^2 v_1^4+24\omega_1^2 cs^2\omega_2^2\omega_3 v_1^2+46\omega_1^2\omega_2^3\omega_3^2 v_1^2+81\omega_1^2 cs^2\omega_2^3\omega_3^2-54\omega_1^3 cs^4\omega_2^2\omega_3+36\omega_1^2 cs^4\omega_2^2\omega_3^2+6\omega_1^3 cs^2\omega_2^3\omega_3+9\omega_1^3 cs^2\omega_2^2\omega_3^2 v_2^2-90cs^4\omega_2^3\omega_3^2+6\omega_1^2\omega_2\omega_3^2+102\omega_1^3\omega_2\omega_3^2 v_1^2+6\omega_1^3 cs^2\omega_2\omega_3 v_1^2+141\omega_1^2 cs^2\omega_2\omega_3^2 v_1^2+51\omega_1\omega_2^2\omega_3^2 v_1^2+6\omega_1^3 cs^4\omega_2^3\omega_3^2-24\omega_1^2 cs^2\omega_2^2\omega_3+3\omega_1^3\omega_2^2\omega_3^2 v_2^2+3\omega_1^2\omega_2^3\omega_3^2 v_2^2-6\omega_1\omega_2^2\omega_3^2+197\omega_1^3 cs^2\omega_2^2\omega_3^2 v_1^2-59\omega_1^3 cs^2\omega_2^2\omega_3^2+126\omega_1^2 cs^4\omega_2^3\omega_3-12\omega_1^3 cs^2\omega_2^3+12\omega_1^3 cs^2\omega_2^3 v_1^2+6\omega_1^3\omega_3^2-90\omega_1^3\omega_2\omega_3^2 v_1^4+48\omega_1 cs^2\omega_2^2\omega_3^2+90\omega_1^3 cs^4\omega_3^2+225\omega_1 cs^4\omega_2^3\omega_3^2-18\omega_1^3 cs^2\omega_2^2\omega_3 v_1^2-72\omega_1^2 cs^4\omega_3^2-51\omega_1^3\omega_2^3 v_1^2-46\omega_1^3\omega_2^2\omega_3^2 v_1^2-39\omega_1^2\omega_2^3\omega_3^2 v_1^4+123\omega_1^3 cs^2\omega_2\omega_3^2-165\omega_1 cs^2\omega_2^2\omega_3^2 v_1^2+30\omega_1 cs^2\omega_3^3\omega_3+18\omega_1^3 cs^4\omega_2\omega_3+12\omega_1^2 cs^2\omega_2^2\omega_3^2 v_1^2-45\omega_1\omega_2^3\omega_3^2 v_1^4-3\omega_1^3\omega_2^2\omega_3^2 v_2^2+18\omega_1^2 cs^4\omega_2\omega_3^2-465\omega_1^3 cs^2\omega_2\omega_3^2 v_1^2-261cs^2\omega_2^3\omega_3^2 v_1^2-3\omega_1^2\omega_2^3\omega_3^2 v_2^4+2\omega_1^3 cs^2\omega_2^3\omega_3^2 v_1^2-90\omega_1 cs^4\omega_2^3\omega_3^2-30\omega_1 cs^2\omega_2^3\omega_3 v_1^2-6\omega_2^3\omega_3^2-45\omega_2^3\omega_3^2 v_1^4-147\omega_1 cs^2\omega_2^3\omega_3^2-102\omega_1\omega_2^3\omega_3^2 v_1^2-153\omega_1^3 cs^4\omega_2\omega_3^2-90\omega_1 cs^4\omega_2^3\omega_3+261\omega_1^3 cs^2\omega_3^2 v_1^2-7\omega_1^2\omega_2^3\omega_3^2+45\omega_1^2\omega_2\omega_3^2 v_1^4-12\omega_1^3\omega_2\omega_3^2-6\omega_1^3 cs^2\omega_2\omega_3-24\omega_1^2 cs^2\omega_2^3 v_1^2-24\omega_1^2 cs^2\omega_2\omega_3^2+42\omega_1^2 cs^2\omega_2^2\omega_3 v_1^2$$

$C_{12} = 207\omega_1^3 cs^2\omega_3 v_1^2 + 135\omega_1^2\omega_2\omega_3 v_1^4 - 6\omega_1\omega_2^2\omega_3 - 24\omega_1^3 cs^2\omega_2^2\omega_3 - 18\omega_1^3 cs^4\omega_2^2 - 2\omega_1^3 cs^4\omega_2^3\omega_3 - 24\omega_1^2 cs^2\omega_2^2 + 12\omega_1^2 cs^4\omega_2^2\omega_3 + 12\omega_1^3 cs^4\omega_2^3 - 42cs^4\omega_2^3\omega_3 - 171\omega_2^3\omega_3 v_1^4 + 6\omega_1^2\omega_2\omega_3 - 180\omega_1\omega_2^3\omega_3 v_1^2 + 30\omega_1^2 cs^2\omega_2^3 + 24\omega_1^2 cs^2\omega_2^3\omega_3 + 18\omega_1^3 cs^2\omega_2 v_1^2 - 24\omega_1^3 cs^2\omega_3 + 36\omega_1^2 cs^2\omega_2^2\omega_3 v_1^2 + 17\omega_1^3 cs^4\omega_2^2\omega_3 - \omega_1^3\omega_2^2\omega_3 v_2^2 - 135\omega_1\omega_2^2\omega_3 v_1^4 + 12\omega_1\omega_2^3\omega_3 + 18\omega_1 cs^4\omega_2^3 - \omega_1^2\omega_2^3\omega_3 v_2^2 - 207cs^2\omega_2^3\omega_3 v_1^2 - 351\omega_1^3 cs^2\omega_2\omega_3 v_1^2 - 12\omega_1^2 cs^2\omega_2^2\omega_3 + 24cs^2\omega_2^3\omega_3 - 324\omega_1^3\omega_2\omega_3 v_1^4 - 99\omega_1^3\omega_3 v_1^2 - 81\omega_1^3\omega_2^2\omega_3 v_1^2 + 54\omega_1 cs^2\omega_2^3 v_1^2 + 7\omega_1^3\omega_2^2\omega_3 - 25\omega_1^2 cs^4\omega_2^3\omega_3 - 138\omega_1^2\omega_2^3\omega_3 v_1^4 - 135\omega_1 cs^2\omega_2^2\omega_3 v_1^2 + 6\omega_1^3 cs^4\omega_2 - 12\omega_1^3 cs^2\omega_2^3 + 36\omega_1^3 cs^2\omega_2^3 v_1^2 + \omega_1^3\omega_2^2\omega_3 v_2^2 - 12\omega_1^2 cs^2\omega_2\omega_3 + 63\omega_1\omega_2^2\omega_3 v_1^2 + 63\omega_1^2 cs^2\omega_2\omega_3 v_1^2 + \omega_1^2\omega_2^3\omega_3 v_2^2 + 153\omega_1^3 cs^2\omega_2^2\omega_3 v_1^2 - 7\omega_1^2\omega_2^3\omega_3 - 30\omega_1^2 cs^4\omega_2^3 - 12\omega_1^3\omega_2\omega_3 + 138\omega_1^3\omega_2^2\omega_3 v_1^4 + 171\omega_1^3\omega_3 v_1^4 - 45\omega_1 cs^2\omega_2^3\omega_3 + 81\omega_1^2\omega_2^3\omega_3 v_1^2 - 33\omega_1^3 cs^4\omega_2\omega_3 + 18\omega_1^3 cs^2\omega_2^2 + 3\omega_1^3 cs^2\omega_2^2\omega_3 v_2^2 + 72\omega_1^2 cs^2\omega_2^2 v_1^2 - 30\omega_1 cs^4\omega_2^2\omega_3 + 24\omega_1^2 cs^4\omega_2^2 - 6\omega_2^3\omega_3 + 180\omega_1^3\omega_2\omega_3 v_1^2 + 6\omega_1^2 cs^4\omega_2\omega_3 + 351\omega_1 cs^2\omega_2^3\omega_3 v_1^2 - 63\omega_1^2\omega_2\omega_3 v_1^2 - 54\omega_1^3 cs^2\omega_2^2 v_1^2 - 3\omega_1^2 cs^2\omega_2^3\omega_3 v_2^2 - 6\omega_1^3 cs^2\omega_2 + 324\omega_1\omega_2^3\omega_3 v_1^4 + 69\omega_1 cs^4\omega_2^3\omega_3 + 18\omega_1^3 cs^4\omega_3 + 45\omega_1^3 cs^2\omega_2\omega_3 - 90\omega_1^2 cs^2\omega_2^3 v_1^2 + 99\omega_2^3\omega_3 v_1^2 + 6\omega_1^3\omega_3 - 18\omega_1 cs^2\omega_2^3 + 36\omega_1 cs^2\omega_2^2\omega_3 - 153\omega_1^2 cs^2\omega_2^3\omega_3 v_1^2$

$C_{13} =$
$2\omega_2\omega_3 + \omega_1\omega_3 v_1^2 + 6\omega_1 cs^2\omega_2\omega_3 + 9\omega_1\omega_3 v_2^2 - 6\omega_1\omega_2 v_1^2 + 6\omega_1 cs^2\omega_3 - 4\omega_1\omega_3 + 2\omega_1\omega_2\omega_3 v_1^2 + \omega_2\omega_3 v_1^2 - 9\omega_2\omega_3 v_2^2 - 18\omega_1 cs^2\omega_2 + 6\omega_1\omega_2 - 2\omega_1\omega_2\omega_3$

$C_{14} = 54\omega_1\omega_2^3\omega_3^2 v_1^4 - 12\omega_1^3 cs^2\omega_2^3\omega_3 v_2^2 - 91\omega_1^2 cs^4\omega_2^3\omega_3^2 + 3\omega_1 cs^2\omega_2^3\omega_3^2 v_2^2 - 45\omega_1\omega_2^3\omega_3^2 v_1^2 v_2^2 - 36\omega_1^3 cs^4\omega_2^2 + 6\omega_1^2\omega_2\omega_3^2 v_2^2 - 45\omega_1^3\omega_2\omega_3^2 v_1^2 v_2^2 - 54\omega_1^2 cs^2\omega_2^2\omega_3^2 - 36\omega_1^3 cs^4\omega_2^3\omega_3 - 138\omega_1^2 cs^2\omega_2^3\omega_3^2 v_1^2 + 9\omega_2^3\omega_3^2 v_1^2 - 2\omega_1^3 cs^2\omega_2^3\omega_3^2 + 108\omega_1^2 cs^4\omega_2^2\omega_3 + 72\omega_1^3 cs^4\omega_2^3 + 189\omega_1 cs^2\omega_2^3\omega_3^2 v_1^2 - 6\omega_1\omega_2^3\omega_3^2 - 72\omega_1^3 cs^2\omega_3^2 + 99\omega_1^2\omega_2\omega_3^2 v_1^2 + 36\omega_1^2 cs^2\omega_2^3 - 24\omega_1^2 cs^2\omega_2^3\omega_3^2 v_2^2 - 6\omega_2^3\omega_3^2 v_2^2 + 35\omega_1^3 cs^4\omega_2^2\omega_3^2 - 48\omega_1^2 cs^2\omega_2^3\omega_3 - 6\omega_1^2 cs^2\omega_2\omega_3^2 v_2^2 + 6\omega_1\omega_2^2\omega_3^2 v_2^2 + 27\omega_1^3\omega_2^2\omega_3^2 v_1^4 + 54\omega_1^3\omega_3^2 v_1^4 + 27\omega_1^2\omega_2^3\omega_3^2 v_1^2 + 41\omega_1^2 cs^2\omega_2^3\omega_3^2 + 54\omega_1^2 cs^4\omega_2^2\omega_3^2 + 12\omega_1^3 cs^2\omega_3^2\omega_3 + 90\omega_1^2\omega_2^2\omega_3^2 v_1^2 v_2^2 + 8\omega_1^3 cs^2\omega_2^2\omega_3^2 v_2^2 + 18cs^4\omega_2^3\omega_3^2 - 6\omega_1^2\omega_2\omega_3^2 + 99\omega_1^3\omega_2\omega_3^2 v_1^2 - 297\omega_1^2 cs^2\omega_2\omega_3^2 v_1^2 - 9\omega_1\omega_2^2\omega_3^2 v_1^2 + 10\omega_1^3 cs^4\omega_2^3\omega_3^2 - 36\omega_1^2 cs^2\omega_2^2\omega_3 - 45\omega_1\omega_2^2\omega_3^2 v_1^2 v_2^2 + 36\omega_1^2 cs^2\omega_2^2\omega_3 v_2^2 - 6\omega_1\omega_2^2\omega_3^2 + 138\omega_1^3 cs^2\omega_2^2\omega_3^2 v_1^2 + 6\omega_1^3\omega_2\omega_3^2 v_2^2 - 25\omega_1^3 cs^2\omega_2^2\omega_3^2 + 144\omega_1^2 cs^4\omega_2^3\omega_3 - 6\omega_1^3 cs^2\omega_2\omega_3 v_2^2 - 24\omega_1^3 cs^2\omega_2^3 + 6\omega_1^3\omega_3^2 - 54\omega_1^3\omega_2\omega_3^2 v_1^4 + 18\omega_1^2 cs^2\omega_2^2\omega_3^2 v_2^2 + 45\omega_1^3\omega_3^2 v_1^2 v_2^2 + 48\omega_1 cs^2\omega_2^2\omega_3^2 + 90\omega_1^3 cs^4\omega_3^2 + 63\omega_1 cs^4\omega_2^3\omega_3^2 - 108\omega_1^2 cs^4\omega_2^2 - 99\omega_1^3\omega_3^2 v_1^2 - 27\omega_1^3\omega_2^2\omega_3^2 v_1^2 - 21\omega_1^3 cs^2\omega_2\omega_3^2 v_2^2 - 27\omega_1^2\omega_2^3\omega_3^2 v_1^4 + 93\omega_1^3 cs^2\omega_2\omega_3^2 + 45\omega_2^3\omega_3^2 v_1^2 v_2^2 + 27\omega_1 cs^2\omega_2^2\omega_3^2 v_1^2 + 18cs^2\omega_2^3\omega_3^2 v_2^2 + 24\omega_1^3 cs^2\omega_2^3 v_2^2 + 30\omega_1 cs^2\omega_2^3\omega_3 - 18\omega_1^3 cs^4\omega_2\omega_3 + 12\omega_1^3 cs^2\omega_2^2 + 270\omega_1^2 cs^2\omega_2^2\omega_3^2 v_1^2 + 54\omega_1\omega_2^2\omega_3^2 v_1^4 - 6\omega_1^3\omega_3^2 v_2^2 - 18\omega_1^2 cs^4\omega_2\omega_3^2 - 459\omega_1^3 cs^2\omega_2\omega_3^2 v_1^2 + 12\omega_1^2\omega_2^2\omega_3^2 - 135cs^2\omega_2^3\omega_3^2 v_1^2 - 30\omega_1 cs^2\omega_2^2\omega_3^2 v_2^2 + 18\omega_1^3 cs^2\omega_3^2 v_2^2 - 90\omega_1 cs^4\omega_2^2\omega_3^2 - 36\omega_1^2 cs^2\omega_2^3\omega_3^2 - 45\omega_1^2\omega_2\omega_3^2 v_1^2 v_2^2 + 6\omega_2^3\omega_3^2 - 54\omega_2^3\omega_3^2 v_1^4 - 39\omega_1 cs^2\omega_2^3\omega_3^2 - 9\omega_1\omega_2^3\omega_3^2 v_1^2 - 117\omega_1^3 cs^4\omega_2\omega_3^2 - 12\omega_1^2\omega_2^2\omega_3^2 v_2^2 + 48\omega_1^2 cs^2\omega_2^3\omega_3 v_2^2 + 2\omega_1^3 cs^2\omega_2^3\omega_3^2 v_2^2 - 90\omega_1 cs^4\omega_2^3\omega_3 + 405\omega_1^3 cs^2\omega_2^2 v_1^2 - 54\omega_1^2\omega_2\omega_3^2 v_1^4 - 6\omega_1^3\omega_2\omega_3^2 + 6\omega_1^3 cs^2\omega_2\omega_3 - 30\omega_1 cs^2\omega_2^3\omega_3 v_2^2 + 24\omega_1^2 cs^2\omega_2\omega_3^2 + 6\omega_1\omega_2^3\omega_3^2 v_2^2 - 90\omega_1^2\omega_2^2\omega_3^2 v_1^2 - 12\omega_1^3 cs^2\omega_2^2 v_2^2$

$C_{15} = -18\omega_1\omega_2^2\omega_3 + 84\omega_1^3 cs^2\omega_2^2\omega_3 - 27\omega_1\omega_2^3\omega_3 v_2^2 + 108\omega_1^2 cs^2\omega_2^2 + 90\omega_1^2\omega_2\omega_3 + 216\omega_1\omega_2^3\omega_3 v_1^2 + 36\omega_1^2\omega_2^2 v_2^2 - 84\omega_1^2 cs^2\omega_2^3\omega_3 + 54\omega_1^2\omega_2^2\omega_3 v_2^2 + 270\omega_1^3 cs^2\omega_3 - 36\omega_1^2\omega_2^2 + 36\omega_1^3\omega_3 v_2^2 - 81\omega_1\omega_2^3\omega_3 + 162\omega_1^2 cs^2\omega_2^2\omega_3 + 18\omega_1^3\omega_2 - 54cs^2\omega_2^3\omega_3 - 18\omega_1^3\omega_2 v_2^2 + 198\omega_1^3\omega_3 v_1^2 + 100\omega_1^3\omega_2^2\omega_3 v_1^2 - 46\omega_1^3\omega_2^2\omega_3 - 162\omega_1^2 cs^2\omega_2\omega_3 + 162\omega_1\omega_2^2\omega_3 v_1^2 + 18\omega_1\omega_2^3 + 46\omega_1^2\omega_2^3\omega_3 - 27\omega_1^3\omega_2\omega_3 v_2^2 + 135\omega_1^3\omega_2\omega_3 - 36\omega_1\omega_2^2\omega_3 v_2^2 + 135\omega_1 cs^2\omega_2^3\omega_3 - 100\omega_1^2\omega_2^3\omega_3 v_1^2 - 18\omega_1\omega_2^3 v_2^2 + 54\omega_2^3\omega_3 - 216\omega_1^3\omega_2\omega_3 v_1^2 - 54\omega_1^2\omega_2^2\omega_3 - 162\omega_1^2\omega_2\omega_3 v_1^2 + 36\omega_2^3\omega_3 v_2^2 - 54\omega_1^3 cs^2\omega_2 - 297\omega_1^3 cs^2\omega_2\omega_3 - 36\omega_1^2\omega_2\omega_3 v_2^2 - 198\omega_2^3\omega_3 v_1^2 - 126\omega_1^3\omega_3 - 54\omega_1 cs^2\omega_2^3 - 54\omega_1 cs^2\omega_2^2\omega_3$

$C_{16} = 45\omega_1\omega_2^3\omega_3^2 v_1^4 + 72\omega_1^3 cs^2\omega_2^3\omega_3 v_2^2 - 10\omega_1^2 cs^4\omega_2^3\omega_3^2 + 36\omega_1^3 cs^2\omega_2^2\omega_3 + 9\omega_1 cs^2\omega_2^3\omega_3^2 v_2^2 - 135\omega_1\omega_2^3\omega_3^2 v_1^2 v_2^2 + 18\omega_1^2\omega_2\omega_3^2 v_2^2 - 135\omega_1^3\omega_2\omega_3^2 v_1^2 v_2^2 - 42\omega_1^2 cs^2\omega_2^2\omega_3^2 + 24\omega_1^3 cs^4\omega_2^3\omega_3 - 30\omega_1^2 cs^2\omega_2^3\omega_3^2 v_1^2 - 9\omega_2^3\omega_3^2 v_1^2 + 60\omega_1^2 cs^4\omega_2^2\omega_3 + 108\omega_1 cs^2\omega_2^3\omega_3^2 v_1^2 - 6\omega_1\omega_2^3\omega_3^2 - 24\omega_1^3 cs^2\omega_3^2 - 18\omega_1\omega_2^2\omega_3\omega_3^2 v_1^2 + 45\omega_1^2\omega_2\omega_3^2 v_1^2 - 6\omega_1^2 cs^2\omega_2^3\omega_3^2 v_2^2 - 18\omega_2^3\omega_3^2 v_2^2 + 2\omega_1^3 cs^4\omega_2^2\omega_3^2 + 60\omega_1^2 cs^2\omega_2^3\omega_3 - 54\omega_1^2 cs^2\omega_2\omega_3^2 v_2^2 + 18\omega_1\omega_2^2\omega_3^2 v_2^2 - 36\omega_1^2\omega_2^3\omega_3^2 v_1^2 + 9\omega_1^3\omega_2^2\omega_3^2 v_1^4 + 36\omega_1^3\omega_3^2 v_1^4 + 36\omega_1^2 cs^2\omega_2^2\omega_3^2 v_1^2 + 9\omega_1^2\omega_2^3\omega_3^2 v_1^2 + 2\omega_1^2 cs^2\omega_2^3\omega_3^2 - 36\omega_1^3 cs^4\omega_2^2\omega_3 + 30\omega_1^2 cs^4\omega_2^2\omega_3^2 - 24\omega_1^3 cs^2\omega_2^3\omega_3 + 270\omega_1^2\omega_2^2\omega_3^2 v_1^2 v_2^2 + 6\omega_1^3 cs^2\omega_2^2\omega_3^2 v_2^2 - 30cs^4\omega_2^3\omega_3^2 - 6\omega_1^2\omega_2\omega_3^2 + 90\omega_1^3\omega_2\omega_3^2 v_1^2 - 54\omega_1^3 cs^2\omega_2\omega_3 v_1^2 - 81\omega_1^2 cs^2\omega_2\omega_3^2 v_1^2 + 45\omega_1\omega_2^2\omega_3^2 v_1^2 - 2\omega_1^3 cs^4\omega_2^3\omega_3^2 - 60\omega_1^2 cs^2\omega_2^2\omega_3 + \omega_1^3\omega_2^2\omega_3^2 v_2^2 - 135\omega_1\omega_2^2\omega_3^2 v_1^2 v_2^2 + 144\omega_1^2 cs^2\omega_2^2\omega_3 v_2^2 - 18\omega_1^3\omega_2\omega_3 v_1^4 + \omega_1^2\omega_2^3\omega_3^2 v_2^2 - 6\omega_1\omega_2^2\omega_3^2 - 54\omega_1^3\omega_2^2\omega_3 v_1^2 + 30\omega_1^3 cs^2\omega_2^2\omega_3^2 v_1^2 + 18\omega_1^3\omega_2\omega_3^2 v_2^2 - 36\omega_1^3\omega_2^2 v_1^4 - 2\omega_1^3 cs^2\omega_2^2\omega_3^2 - 60\omega_1^2 cs^4\omega_2^3\omega_3 - 54\omega_1^2\omega_2^3\omega_3 v_1^4 + 18\omega_1^3 cs^2\omega_2\omega_3 v_2^2 + 6\omega_1^3\omega_3^2 - 45\omega_1^3\omega_2\omega_3^2 v_1^4 + 72\omega_1^2 cs^2\omega_2^2\omega_3^2 v_2^2 + 135\omega_1^3\omega_3^2 v_1^2 v_2^2 + 36\omega_1 cs^2\omega_2^2\omega_3^2 + 18\omega_1^3 cs^4\omega_3^2 + 45\omega_1 cs^4\omega_2^3\omega_3^2 + 144\omega_1^3 cs^2\omega_2^2\omega_3 v_1^2 + 36\omega_1^2\omega_2^3\omega_3^2 v_1^4 - 81\omega_1^3\omega_2^3 v_1^2 - 9\omega_1^3\omega_2^2\omega_3^2 v_1^2 - 9\omega_1^3 cs^2\omega_2\omega_3^2 v_2^2 - 9\omega_1^2\omega_2^3\omega_3^2 v_1^4 + 21\omega_1^3 cs^2\omega_2\omega_3^2 + 135\omega_2^3\omega_3^2 v_1^2 v_2^2 - 45\omega_1 cs^2\omega_2^2\omega_3^2 v_1^2 - 18cs^2\omega_2^3\omega_3^2 v_2^2 + 54\omega_1^3\omega_2^2\omega_3 v_1^4 - 30\omega_1 cs^2\omega_2^3\omega_3 + 36\omega_1^3\omega_2^2 v_1^2 + 54\omega_1^2\omega_2^3\omega_3 v_1^2 + 6\omega_1^3 cs^4\omega_2\omega_3 + 108\omega_1^2 cs^2\omega_2^2\omega_3^2 v_1^2 - 90\omega_1^3 cs^2\omega_2^2\omega_3 v_2^2 - 18\omega_1^3\omega_3^2 v_2^2 - \omega_1^3\omega_2^2\omega_3^2 v_2^2 - 30\omega_1^2 cs^4\omega_2\omega_3^2 - 216\omega_1^3 cs^2\omega_2\omega_3^2 v_1^2 + 12\omega_1^2\omega_2^2\omega_3^2 - 63cs^2\omega_2^3\omega_3^2 v_1^2 + 18\omega_1^3\omega_2\omega_3 v_1^2 - 90\omega_1 cs^2\omega_2^2\omega_3^2 v_2^2 - \omega_1^2\omega_2^3\omega_3^2 v_2^4 + 18\omega_1^3 cs^2\omega_2^3\omega_3^2 v_2^2 - 30\omega_1 cs^4\omega_2^2\omega_3^2 + 18\omega_1 cs^2\omega_2^3\omega_3 v_1^2 - 135\omega_1^2\omega_2\omega_3^2 v_1^2 v_2^2 + 6\omega_2^3\omega_3^2 - 36\omega_2^3\omega_3^2 v_1^4 - 3\omega_1 cs^2\omega_2^3\omega_3^2 - 15\omega_1^3 cs^4\omega_2\omega_3^2 - 108\omega_1^3 cs^2\omega_2^2 v_1^2 - 36\omega_1^2\omega_2^2\omega_3^2 v_2^2 - 198\omega_1^2 cs^2\omega_2^3\omega_3 v_2^2 + 18\omega_1\omega_2^3\omega_3 v_1^4 + 30\omega_1 cs^4\omega_2^3\omega_3 + 189\omega_1^3 cs^2\omega_2^3 v_1^2 - 6\omega_1^3\omega_2\omega_3^2 - 6\omega_1^3 cs^2\omega_2\omega_3 + 126\omega_1 cs^2\omega_2^3\omega_3 v_2^2 + 108\omega_1^2 cs^2\omega_2^3 v_1^2 + 36\omega_1^2 cs^2\omega_2\omega_3^2 + 18\omega_1\omega_2^3\omega_3^2 v_2^2 - 90\omega_1^2\omega_2^2\omega_3^2 v_1^2 - 144\omega_1^2 cs^2\omega_2^2\omega_3 v_1^2$

$C_{17} = -6\omega_1^2 cs^4\omega_2^3\omega_3^2 - 18\omega_1^3 cs^2\omega_2^2\omega_3 + 108\omega_1^2\omega_2^2\omega_3^2 v_2^4 - 54\omega_1 cs^2\omega_2^3\omega_3^2 v_2^2 + \omega_1^3\omega_2^2\omega_3^2 + 72\omega_1\omega_2^3\omega_3^2 v_1^2 v_2^2 - 36\omega_1^3 cs^4\omega_2^2 + 45\omega_1^2\omega_2\omega_3^2 v_2^2 - 72\omega_1^3\omega_2\omega_3^2 v_1^2 v_2^2 - 72\omega_1^2 cs^2\omega_2^2\omega_3^2 - 2\omega_1^2 cs^2\omega_2^3\omega_3^2 v_1^2 + 6\omega_2^3\omega_3^2 v_1^2 - 54\omega_1\omega_2^3\omega_3^2 v_2^4 + 21\omega_1 cs^2\omega_2^2\omega_3^2 v_1^2 + 6\omega_1\omega_2^3\omega_3^2 - 72\omega_1^3 cs^2\omega_3^2 + 6\omega_1^2\omega_2\omega_3^2 v_1^2 - 12\omega_1^2 cs^2\omega_2^3 - 24\omega_1^2\omega_2^3\omega_3^2 v_1^2 v_2^2 - 72\omega_1^2 cs^2\omega_2^3\omega_3^2 v_2^2 - 9\omega_2^3\omega_3^2 v_2^2 + 6\omega_1^3 cs^4\omega_2^2\omega_3^2 + 18\omega_1^2 cs^2\omega_2^3\omega_3 - 243\omega_1^2 cs^2\omega_2\omega_3^2 v_2^2 + 63\omega_1\omega_2^2\omega_3^2 v_2^2 + \omega_1^2\omega_2^3\omega_3^2 v_1^2 + 5\omega_1^2 cs^2\omega_2^3\omega_3^2 + 54\omega_1^3 cs^4\omega_2^2\omega_3 + 72\omega_1^2 cs^4\omega_2^2\omega_3^2 + 72\omega_1^3 cs^2\omega_2^2\omega_3^2 v_2^2 - 18cs^4\omega_2^3\omega_3^2 - 6\omega_1^2\omega_2\omega_3^2 + 6\omega_1^3\omega_2\omega_3^2 v_1^2 - 6\omega_1^3 cs^2\omega_2\omega_3 v_1^2 - 6\omega_1^2 cs^2\omega_2\omega_3^2 v_1^2 - 6\omega_1^2\omega_2^2\omega_3^2 v_1^2 + 54\omega_1^3\omega_2^3\omega_3^2 v_2^2 - 9\omega_1\omega_2^2\omega_3^2 v_1^2 v_2^2 + 24\omega_1^2\omega_2^3\omega_3^2 v_2^2 + 6\omega_1^2\omega_2^2\omega_3^2 + 2\omega_1^3 cs^2\omega_2^2\omega_3^2 v_1^2 + 126\omega_1^3\omega_2\omega_3^2 v_2^2 - 5\omega_1^3 cs^2\omega_2^2\omega_3^2 - 54\omega_1^2 cs^4\omega_2^3\omega_3 + 6\omega_1^3\omega_3^2 + 540\omega_1^2 cs^2\omega_2^2\omega_3^2 v_2^2 + 24\omega_1^3\omega_2^2\omega_3^2 v_1^2 v_2^2 + 45\omega_1^3\omega_2^2 v_1^2 v_2^2 + 12\omega_1 cs^2\omega_2^2\omega_3^2 + 90\omega_1^3 cs^4\omega_3^2 + 27\omega_1 cs^4\omega_2^3\omega_3^2 - 54\omega_1\omega_2^2\omega_3^2 v_2^4 + 18\omega_1^3 cs^2\omega_2^2\omega_3 v_1^2 + 36\omega_1^2 cs^4\omega_3^2 - 6\omega_1^3\omega_2^3 v_1^2 - \omega_1^3\omega_2^2\omega_3^2 v_1^2 - 486\omega_1^3 cs^2\omega_2\omega_3^2 v_2^2 + 75\omega_1^3 cs^2\omega_2\omega_3^2 - 45\omega_2^3\omega_3^2 v_1^2 v_2^2 + 6\omega_1 cs^2\omega_2^2\omega_3^2 v_1^2 + 135cs^2\omega_2^3\omega_3^2 v_2^2 - 6\omega_1 cs^2\omega_2^3\omega_3 - 54\omega_1^3\omega_2\omega_3^2 v_2^4 - 18\omega_1^3 cs^4\omega_2\omega_3 + 12\omega_1^3 cs^2\omega_2^2 - 99\omega_1^3\omega_3^2 v_2^2 - 24\omega_1^3\omega_2^2\omega_3^2 v_2^2 - 54\omega_1^2 cs^4\omega_2\omega_3^2 - 21\omega_1^3 cs^2\omega_2\omega_3^2 v_1^2 - 18cs^2\omega_2^3\omega_3^2 v_1^2 - 297\omega_1 cs^2\omega_2^2\omega_3^2 v_2^2 - 54\omega_1^2\omega_2\omega_3^2 v_2^4 + 405\omega_1^3 cs^2\omega_3^2 v_2^2 - 18\omega_1 cs^4\omega_2^2\omega_3^2 + 6\omega_1 cs^2\omega_2^3\omega_3 v_1^2 + 9\omega_1^2\omega_2\omega_3^2 v_1^2 v_2^2 - 6\omega_2^3\omega_3^2 - 3\omega_1 cs^2\omega_2^3\omega_3^2 - 6\omega_1\omega_2^3\omega_3^2 v_1^2 - 99\omega_1^3 cs^4\omega_2\omega_3^2 - 12\omega_1^3 cs^2\omega_2^2 v_1^2 - 108\omega_1^2\omega_2^2\omega_3^2 v_2^2 + 18\omega_1 cs^4\omega_2^3\omega_3 + 18\omega_1^3 cs^2\omega_3^2 v_1^2 - \omega_1^2\omega_2^3\omega_3^2 - 6\omega_1^3\omega_2\omega_3^2 + 54\omega_2^3\omega_3^2 v_2^4 + 6\omega_1^3 cs^2\omega_2\omega_3 + 12\omega_1^2 cs^2\omega_2^3 v_1^2 + 60\omega_1^2 cs^2\omega_2\omega_3^2 - 18\omega_1\omega_2^3\omega_3^2 v_2^2 - 18\omega_1^2 cs^2\omega_2^3\omega_3 v_1^2$

$C_{18} = 72\omega_1^3\omega_2^3 v_2^4 - 8\omega_1^3\omega_2^3\omega_3 v_2^2 - 198\omega_1^3 cs^2\omega_2^3\omega_3 v_2^2 + 29\omega_1^2 cs^4\omega_2^3\omega_3^2 + 18\omega_1^3 cs^2\omega_2^2\omega_3 - 54\omega_1^2\omega_2^2\omega_3^2 v_2^4 - 171\omega_1 cs^2\omega_2^3\omega_3^2 v_2^2 + \omega_1^3\omega_2^2\omega_3^2 + 216\omega_1\omega_2^3\omega_3^2 v_1^2 v_2^2 + 18\omega_1\omega_2^3\omega_3 v_2^2 - 45\omega_1^2\omega_2\omega_3^2 v_2^2 - 216\omega_1^3\omega_2\omega_3^2 v_1^2 v_2^2 - 12\omega_1^2 cs^2\omega_2^2\omega_3^2 + 12\omega_1^3 cs^4\omega_2^3\omega_3 + 6\omega_1^2 cs^2\omega_2^3\omega_3^2 v_1^2 + 18\omega_2^3\omega_3^2 v_1^2 + 24\omega_1^2 cs^4\omega_2^2\omega_3 - 63\omega_1\omega_2^3\omega_3^2 v_2^4 - 9\omega_1 cs^2\omega_2^3\omega_3^2 v_1^2 + 6\omega_1\omega_2^3\omega_3^2 - 24\omega_1^3 cs^2\omega_3^2 - 78\omega_1^3\omega_2^3\omega_3 v_2^4 + 18\omega_1^2\omega_2\omega_3^2 v_1^2 - 72\omega_1^2\omega_2^3\omega_3^2 v_1^2 v_2^2 + 30\omega_1^2 cs^2\omega_2^3\omega_3^2 v_2^2 + 9\omega_2^3\omega_3^2 v_2^2 - \omega_1^3 cs^4\omega_2^2\omega_3^2 + 30\omega_1^2 cs^2\omega_2^3\omega_3 + 36\omega_1^2\omega_2^2\omega_3 v_2^2 + 81\omega_1^2 cs^2\omega_2\omega_3^2 v_2^2 - 27\omega_1\omega_2^2\omega_3^2 v_2^2 + 36\omega_1^2 cs^2\omega_2^2\omega_3 v_1^2 + 3\omega_1^2\omega_2^3\omega_3^2 v_1^2 - 12\omega_1^2 cs^2\omega_2^3\omega_3^2 - 18\omega_1^3 cs^4\omega_2^2\omega_3 - 18\omega_1^3\omega_2\omega_3 v_2^4 - 72\omega_1^3\omega_2^2\omega_3 v_2^2 + 12\omega_1^2 cs^4\omega_2^2\omega_3^2 - 12\omega_1^3 cs^2\omega_2^3\omega_3 + 84\omega_1^3 cs^2\omega_2^2\omega_3^2 v_2^2 + 144\omega_1^2\omega_2^3\omega_3 v_2^4 + 30cs^4\omega_2^3\omega_3^2 - 36\omega_1^3\omega_2^2 v_2^4 - 6\omega_1^2\omega_2\omega_3^2 + 18\omega_1^3\omega_2\omega_3^2 v_1^2 + 18\omega_1^3 cs^2\omega_2\omega_3 v_1^2 - 54\omega_1^2 cs^2\omega_2\omega_3^2 v_1^2 - 18\omega_1\omega_2^2\omega_3^2 v_1^2 - 2\omega_1^3 cs^4\omega_2^3\omega_3^2 - 24\omega_1^2 cs^2\omega_2^2\omega_3 + 19\omega_1^3\omega_2^2\omega_3^2 v_2^4 + 36\omega_1^3\omega_2^2 v_2^4 - 27\omega_1\omega_2^2\omega_3^2 v_1^2 v_2^2 + 108\omega_1^2\omega_2^3 v_2^2 - 72\omega_1^2 cs^2\omega_2^2\omega_3 v_2^2 + 17\omega_1^2\omega_2^3\omega_3^2 v_2^2 + 6\omega_1\omega_2^2\omega_3^2 - 6\omega_1^3 cs^2\omega_2^2\omega_3^2 v_1^2 + 135\omega_1^3\omega_2\omega_3^2 v_2^2 - 30\omega_1^2 cs^4\omega_2^3\omega_3 - 54\omega_1^3 cs^2\omega_2\omega_3 v_2^2 + 72\omega_1^3\omega_2^2\omega_3 v_2^4 -$

$$144\omega_1^2\omega_2^3\omega_3v_2^2 + 6\omega_1^3\omega_3^2 + 36\omega_1^3\omega_2^2v_2^2 - 144\omega_1^2cs^2\omega_2^2\omega_3^2v_2^2 + 72\omega_1^3\omega_2^2\omega_3^2v_1^2v_2^2 + 135\omega_1^3\omega_3^2v_1^2v_2^2 - 12\omega_1cs^2\omega_2^2\omega_3^2 + 18\omega_1^3cs^4\omega_3^2 - 57\omega_1cs^4\omega_2^3\omega_3^2 + 36\omega_1\omega_2^2\omega_3^2v_2^4 - 36\omega_1^3cs^2\omega_2^2\omega_3v_2^2 - 18\omega_1^3\omega_3^2v_1^2 - 3\omega_1^3\omega_2^2\omega_3^2v_1^2 - 297\omega_1^3cs^2\omega_2\omega_3^2v_2^2 + 21\omega_1^3cs^2\omega_2\omega_3^2 - 135\omega_2^3\omega_3^2v_1^2v_2^2 + 18\omega_1cs^2\omega_2^2\omega_3^2v_1^2 + 18\omega_1^3\omega_2\omega_3v_2^2 + 63cs^2\omega_2^3\omega_3^2v_2^2 + 216\omega_1^3cs^2\omega_2^3v_2^2 - 18\omega_1cs^2\omega_2^3\omega_3 - 63\omega_1^3\omega_2\omega_3^2v_2^4 + 6\omega_1^3cs^4\omega_2\omega_3 + 18\omega_1^2cs^2\omega_2^2\omega_3^2v_1^2 + 198\omega_1^3cs^2\omega_2^2\omega_3v_2^2 - 81\omega_1^3\omega_3^2v_2^2 - 43\omega_1^3\omega_2^2\omega_3^2v_2^2 - 30\omega_1^2cs^4\omega_2\omega_3^2 - 108\omega_1^2\omega_2^3v_2^4 - 9\omega_1^3cs^2\omega_2\omega_3^2v_1^2 + 18cs^2\omega_2^3\omega_3^2v_1^2 + 99\omega_1cs^2\omega_2^2\omega_3^2v_2^2 + 7\omega_1^2\omega_2^3\omega_3^2v_2^2 - 18\omega_1\omega_2^3\omega_3v_2^4 + 36\omega_1^2\omega_2\omega_3^2v_2^4 + 189\omega_1^3cs^2\omega_3^2v_2^2 + 6\omega_1cs^4\omega_2^2\omega_3^2 - 324\omega_1^2cs^2\omega_2^3v_2^2 - 54\omega_1cs^2\omega_2^3\omega_3v_1^2 + 27\omega_1^2\omega_2\omega_3^2v_1^2v_2^2 - 6\omega_2^3\omega_3^2 - 72\omega_1^3\omega_2^3v_2^2 + 8\omega_1^3\omega_2^3\omega_3^2v_2^2 + 15\omega_1cs^2\omega_2^3\omega_3^2 - 18\omega_1\omega_2^3\omega_3^2v_1^2 - 15\omega_1^3cs^4\omega_2\omega_3^2 + 54\omega_1^2\omega_2^2\omega_3^2v_2^2 + 306\omega_1^2cs^2\omega_2^2\omega_3v_2^2 + 24\omega_1^3cs^2\omega_2^3\omega_3^2v_2^2 + 18\omega_1cs^4\omega_2^3\omega_3 + 78\omega_1^3\omega_2^3\omega_3v_2^2 + 18\omega_1^3cs^2\omega_3^2v_1^2 - \omega_1^2\omega_2^3\omega_3^2 - 6\omega_1^3\omega_2\omega_3^2 + 36\omega_2^3\omega_3^2v_2^4 - 36\omega_1^2\omega_2^2\omega_3v_2^4 - 6\omega_1^3cs^2\omega_2\omega_3 + 54\omega_1cs^2\omega_2^3\omega_3v_2^2 + 36\omega_1^2cs^2\omega_2\omega_3^2 - 9\omega_1\omega_2^3\omega_3^2v_2^2 - 108\omega_1^3cs^2\omega_2^2v_2^2 + 36\omega_1^2cs^2\omega_2^3\omega_3v_1^2$$

$$C_{19} = 90\omega_1\omega_2^2\omega_3 + 30\omega_1^3cs^2\omega_2^2\omega_3 - 198\omega_1\omega_2^3\omega_3v_2^2 - 18\omega_1^3\omega_2^2 + 90\omega_1^2\omega_2\omega_3 + 45\omega_1\omega_2^2\omega_3v_1^2 - 54\omega_1^2cs^2\omega_2^3 - 30\omega_1^2cs^2\omega_2^3\omega_3 + 396\omega_1^2\omega_2^2\omega_3v_2^2 + 270\omega_1^3cs^2\omega_3 - 18\omega_1^2\omega_2^3v_1^2 - 18\omega_1^3\omega_2v_1^2 + 198\omega_1^3\omega_3v_2^2 + 45\omega_1\omega_2^3\omega_3 + 18\omega_1^2\omega_2^3 + 324\omega_1^2cs^2\omega_2^2\omega_3 + 18\omega_1^3\omega_2 + 54cs^2\omega_2^3\omega_3 + 36\omega_1^3\omega_3v_1^2 + 10\omega_1^3\omega_2^2\omega_3v_1^2 - 10\omega_1^3\omega_2^2\omega_3 - 162\omega_1^2cs^2\omega_2\omega_3 - 18\omega_1\omega_2^3 + 18\omega_1\omega_2^3v_1^2 + 10\omega_1^2\omega_2^3\omega_3 - 198\omega_1^3\omega_2\omega_3v_2^2 + 135\omega_1^3\omega_2\omega_3 - 198\omega_1\omega_2^2\omega_3v_2^2 - 27\omega_1cs^2\omega_2^3\omega_3 + 18\omega_1^3\omega_2^2v_1^2 - 10\omega_1^2\omega_2^3\omega_3v_1^2 + 54\omega_1^3cs^2\omega_2^2 - 54\omega_2^3\omega_3 - 45\omega_1^3\omega_2\omega_3v_1^2 - 180\omega_1^2\omega_2^2\omega_3 + 198\omega_2^3\omega_3v_2^2 - 54\omega_1^3cs^2\omega_2 - 297\omega_1^3cs^2\omega_2\omega_3 - 198\omega_1^2\omega_2\omega_3v_2^2 - 36\omega_2^3\omega_3v_1^2 - 126\omega_1^3\omega_3 + 54\omega_1cs^2\omega_2^3 - 162\omega_1cs^2\omega_2^2\omega_3$$

$$C_{20} = 6\omega_1\omega_2^2\omega_3 - 68\omega_1^3cs^2\omega_2^3\omega_3v_2^2 - 78\omega_1^3cs^2\omega_2^2\omega_3 + 45\omega_2^3\omega_3v_2^4 + 129\omega_1\omega_2^3\omega_3v_2^2 - 10\omega_1^3cs^4\omega_2^3\omega_3 + 12\omega_1^2cs^2\omega_2^2 + 6\omega_1^3cs^2\omega_2v_2^2 - 90\omega_1^2cs^4\omega_2^2\omega_3 + 99\omega_1^2\omega_2\omega_3v_2^4 - 2\omega_1^3\omega_2^3\omega_3 + 261\omega_1^3cs^2\omega_3v_2^2 + 90cs^4\omega_2^3\omega_3 + 6\omega_1^2\omega_2\omega_3 - 18\omega_1^3\omega_2^3\omega_3v_2^2 - 78\omega_1^2cs^2\omega_2^3\omega_3 + 210\omega_1^2\omega_2^2\omega_3v_2^2 - 72\omega_1^3cs^2\omega_3 + 82\omega_1^3cs^4\omega_2^2\omega_3 - 117\omega_1^3\omega_2\omega_3v_2^4 - 51\omega_1^3\omega_3v_2^2 - 98\omega_1^3\omega_2^2\omega_3v_2^2 + 12\omega_1^3cs^2\omega_2^3\omega_3 + 6\omega_1cs^2\omega_2^3v_2^2 + 411\omega_1cs^2\omega_2^2\omega_3v_2^2 - 12\omega_1\omega_2^3\omega_3 + 18\omega_1cs^4\omega_2^3 + 90\omega_1^2\omega_2^3\omega_3v_2^4 + 114\omega_1^2cs^2\omega_2^2\omega_3 - 816\omega_1^2cs^2\omega_2^2\omega_3v_2^2 - 72cs^2\omega_2^3\omega_3 + 99\omega_1\omega_2^2\omega_3v_2^4 + 261cs^2\omega_2^3\omega_3v_2^2 + 8\omega_1^3\omega_2^2\omega_3 + 82\omega_1^2cs^4\omega_2^3\omega_3 + 18\omega_1^3cs^4\omega_2 - 600\omega_1^3cs^2\omega_2\omega_3v_2^2 + 90\omega_1^3\omega_2^2\omega_3v_2^4 - 60\omega_1^2cs^2\omega_2\omega_3 + 45\omega_1^3\omega_3v_2^4 - 98\omega_1^2\omega_2^3\omega_3v_2^2 + 8\omega_1^2\omega_2^3\omega_3 - 12\omega_1^2cs^2\omega_2^2v_2^2 + 129\omega_1^3\omega_2\omega_3v_2^2 - 12\omega_1^3\omega_2\omega_3 - 105\omega_1\omega_2^2\omega_3v_2^2 + 411\omega_1^2cs^2\omega_2\omega_3v_2^2 + 141\omega_1cs^2\omega_2^3\omega_3 - 171\omega_1^3cs^4\omega_2\omega_3 + 404\omega_1^3cs^2\omega_2^2\omega_3v_2^2 + 54\omega_1cs^4\omega_2^2\omega_3 - 36\omega_1^2cs^4\omega_2^2 + 6\omega_2^3\omega_3 - 117\omega_1\omega_2^3\omega_3v_2^4 + 54\omega_1^2cs^4\omega_2\omega_3 - 12\omega_1^2\omega_2^2\omega_3 - 51\omega_2^3\omega_3v_2^2 + 404\omega_1^2cs^2\omega_2^3\omega_3v_2^2 - 6\omega_1^3cs^2\omega_2 - 171\omega_1cs^4\omega_2^3\omega_3 + 90\omega_1^3cs^4\omega_3 + 20\omega_1^3\omega_2^3\omega_3v_2^2 - 198\omega_1^2\omega_2^2\omega_3v_2^4 + 141\omega_1^3cs^2\omega_2\omega_3 - 600\omega_1cs^2\omega_2^3\omega_3v_2^2 - 105\omega_1^2\omega_2\omega_3v_2^2 + 6\omega_1^3\omega_3 - 6\omega_1cs^2\omega_2^3 - 60\omega_1cs^2\omega_2^2\omega_3$$

$$C_{21} = 6\omega_1\omega_2^2\omega_3 - 36\omega_1^3cs^2\omega_2^3\omega_3v_2^2 - 22\omega_1^3cs^2\omega_2^2\omega_3 + 171\omega_2^3\omega_3v_2^4 + 225\omega_1\omega_2^3\omega_3v_2^2 - 2\omega_1^3cs^4\omega_2^3\omega_3 + 12\omega_1^2cs^2\omega_2^2 + 18\omega_1^3cs^2\omega_2v_2^2 - 6\omega_1^2cs^4\omega_2^2\omega_3 + 333\omega_1^2\omega_2\omega_3v_2^4 - 2\omega_1^3\omega_2^3\omega_3 + 207\omega_1^3cs^2\omega_3v_2^2 + 18cs^4\omega_2^3\omega_3 + 6\omega_1^2\omega_2\omega_3 - 58\omega_1^3\omega_2^3\omega_3v_2^2 - 22\omega_1^2cs^2\omega_2^3\omega_3 + 306\omega_1^2\omega_2^2\omega_3v_2^2 - 24\omega_1^3cs^2\omega_3 + 14\omega_1^3cs^4\omega_2^2\omega_3 - 423\omega_1^3\omega_2\omega_3v_2^4 - 99\omega_1^3\omega_3v_2^2 - 154\omega_1^3\omega_2^2\omega_3v_2^2 + 4\omega_1^3cs^2\omega_2^3\omega_3 + 18\omega_1cs^2\omega_2^3v_2^2 + 225\omega_1cs^2\omega_2^2\omega_3v_2^2 - 12\omega_1\omega_2^3\omega_3 + 6\omega_1cs^4\omega_2^3 + 310\omega_1^2\omega_2^3\omega_3v_2^4 + 18\omega_1^2cs^2\omega_2^2\omega_3 - 432\omega_1^2cs^2\omega_2^2\omega_3v_2^2 - 24cs^2\omega_2^3\omega_3 + 333\omega_1\omega_2^2\omega_3v_2^4 + 207cs^2\omega_2^3\omega_3v_2^2 + 8\omega_1^3\omega_2^2\omega_3 + 14\omega_1^2cs^4\omega_2^2\omega_3 + 6\omega_1^3cs^4\omega_2 - 432\omega_1^3cs^2\omega_2\omega_3v_2^2 + 310\omega_1^3\omega_2^2\omega_3v_2^4 - 12\omega_1^2cs^2\omega_2\omega_3 + 171\omega_1^3\omega_3v_2^4 - 154\omega_1^2\omega_2^3\omega_3v_2^2 + 8\omega_1^2\omega_2^3\omega_3 - 36\omega_1^2cs^2\omega_2^2v_2^2 + 225\omega_1^3\omega_2\omega_3v_2^2 - 12\omega_1^3\omega_2\omega_3 - 153\omega_1\omega_2^2\omega_3v_2^2 + 225\omega_1^2cs^2\omega_2\omega_3v_2^2 + 45\omega_1cs^2\omega_2^3\omega_3 - 33\omega_1^3cs^4\omega_2\omega_3 + 252\omega_1^3cs^2\omega_2^2\omega_3v_2^2 + 6\omega_1cs^4\omega_2^2\omega_3 - 12\omega_1^2cs^4\omega_2^2 + 6\omega_2^3\omega_3 - 423\omega_1\omega_2^3\omega_3v_2^4 + 6\omega_1^2cs^4\omega_2\omega_3 - 12\omega_1^2\omega_2^2\omega_3 - 99\omega_2^3\omega_3v_2^2 + 252\omega_1^2cs^2\omega_2^3\omega_3v_2^2 - 6\omega_1^3cs^2\omega_2 - 33\omega_1cs^4\omega_2^3\omega_3 + 18\omega_1^3cs^4\omega_3 + 28\omega_1^3\omega_2^3\omega_3v_2^2 - 666\omega_1^2\omega_2^2\omega_3v_2^4 + 45\omega_1^3cs^2\omega_2\omega_3 - 432\omega_1cs^2\omega_2^3\omega_3v_2^2 - 153\omega_1^2\omega_2\omega_3v_2^2 + 6\omega_1^3\omega_3 - 6\omega_1cs^2\omega_2^3 - 12\omega_1cs^2\omega_2^2\omega_3$$

3 Comparison of SRT, MRT, CLBM, and CuLBM

3.1 Conservation of mass: ρ

$$\frac{\partial\rho}{\partial t} + v_1\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1} + \rho\frac{\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1} + v_2\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \rho\frac{\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2} + C^{(0)}_{\mathrm{D}_x^3\rho}\frac{\delta_l^3}{\delta_t}\frac{\partial^3\rho}{\partial x_1^3} + C^{(0)}_{\mathrm{D}_x^3v_1}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_1}{\partial x_1^3} + C^{(0)}_{\mathrm{D}_x^2\mathrm{D}_yv_2}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_2}{\partial x_1^2\partial x_2} + C^{(0)}_{\mathrm{D}_x\mathrm{D}_y^2v_1}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_1}{\partial x_1\partial x_2^2} + C^{(0)}_{\mathrm{D}_y^3\rho}\frac{\delta_l^3}{\delta_t}\frac{\partial^3\rho}{\partial x_2^3} + C^{(0)}_{\mathrm{D}_y^3v_2}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_2}{\partial x_2^3} + C^{(0)}_{\mathrm{D}_x^4\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1^4} + C^{(0)}_{\mathrm{D}_x^4v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_1}{\partial x_1^4} + C^{(0)}_{\mathrm{D}_x^3\mathrm{D}_y\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1^3\partial x_2} + C^{(0)}_{\mathrm{D}_x^3\mathrm{D}_yv_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_1}{\partial x_1^3\partial x_2} + C^{(0)}_{\mathrm{D}_x^3\mathrm{D}_yv_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_2}{\partial x_1^3\partial x_2} + C^{(0)}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2} + C^{(0)}_{\mathrm{D}_x^2\mathrm{D}_y^2v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_1}{\partial x_1^2\partial x_2^2} + C^{(0)}_{\mathrm{D}_x^2\mathrm{D}_y^2v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_2}{\partial x_1^2\partial x_2^2} + C^{(0)}_{\mathrm{D}_x\mathrm{D}_y^3\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1\partial x_2^3} + C^{(0)}_{\mathrm{D}_x\mathrm{D}_y^3v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_1}{\partial x_1\partial x_2^3} + C^{(0)}_{\mathrm{D}_x\mathrm{D}_y^3v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_2}{\partial x_1\partial x_2^3} + C^{(0)}_{\mathrm{D}_y^4\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_2^4} + C^{(0)}_{\mathrm{D}_y^4v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_2}{\partial x_2^4} = 0,$$

where:

coefficient $C^{(0)}_{\mathrm{D}_x^3\rho}$ at $\frac{\partial^3\rho}{\partial x_1^3}$:

$$C^{(0),\mathrm{SRT}}_{\mathrm{D}_x^3\rho} = (-1 + v_1^2 + 3cs^2)\tfrac{v_1}{12}$$

$$C^{(0),\mathrm{MRT1}}_{\mathrm{D}_x^3\rho} = (-1 + 3cs^2 + v_1^2)\tfrac{v_1}{12}$$

$$C^{(0),\mathrm{MRT2}}_{\mathrm{D}_x^3\rho} = (-1 + v_1^2 + 3cs^2)\tfrac{v_1}{12}$$

$$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}_x^3\rho} = (-1 + v_1^2 + 3cs^2)\tfrac{v_1}{12}$$

$$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}_x^3\rho} = (-1 + v_1^2 + 3cs^2)\tfrac{v_1}{12}$$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}_x^3\rho} = (-1+v_1^2+3cs^2)\frac{v_1}{12}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}_x^3\rho} = (-1+v_1^2+3cs^2)\frac{v_1}{12}$

coefficient $C^{(0)}_{\mathrm{D}_x^3 v_1}$ **at** $\frac{\partial^3 v_1}{\partial x_1^3}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}_x^3 v_1} = (-1+3v_1^2+cs^2)\frac{\rho}{12}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}_x^3 v_1} = (-1+cs^2+3v_1^2)\frac{\rho}{12}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}_x^3 v_1} = (-1+3v_1^2+cs^2)\frac{\rho}{12}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}_x^3 v_1} = (-1+3v_1^2+cs^2)\frac{\rho}{12}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}_x^3 v_1} = (-1+3v_1^2+cs^2)\frac{\rho}{12}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}_x^3 v_1} = (-1+3v_1^2+cs^2)\frac{\rho}{12}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}_x^3 v_1} = (-1+3v_1^2+cs^2)\frac{\rho}{12}$

coefficient $C^{(0)}_{\mathrm{D}_x^2\mathrm{D}_y v_2}$ **at** $\frac{\partial^3 v_2}{\partial x_1^2\partial x_2}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-\rho cs^2}{6}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-\rho cs^2}{6}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-\rho cs^2}{6}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-\rho cs^2}{6}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-cs^2\rho}{6}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-\rho cs^2}{6}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-\rho cs^2}{6}$

coefficient $C^{(0)}_{\mathrm{D}_x\mathrm{D}_y^2 v_1}$ **at** $\frac{\partial^3 v_1}{\partial x_1\partial x_2^2}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-\rho cs^2}{6}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-\rho cs^2}{6}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-\rho cs^2}{6}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-\rho cs^2}{6}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-cs^2\rho}{6}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-\rho cs^2}{6}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-\rho cs^2}{6}$

coefficient $C^{(0)}_{\mathrm{D}^3_y\rho}$ at $\frac{\partial^3\rho}{\partial x_2^3}$:

$C^{(0),\mathrm{SRT}}_{\mathrm{D}^3_y\rho} = (-1+3cs^2+v_2^2)\frac{v_2}{12}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}^3_y\rho} = (-1+3cs^2+v_2^2)\frac{v_2}{12}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}^3_y\rho} = (-1+v_2^2+3cs^2)\frac{v_2}{12}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}^3_y\rho} = (-1+3cs^2+v_2^2)\frac{v_2}{12}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}^3_y\rho} = (-1+3cs^2+v_2^2)\frac{v_2}{12}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}^3_y\rho} = (-1+3cs^2+v_2^2)\frac{v_2}{12}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}^3_y\rho} = (-1+3cs^2+v_2^2)\frac{v_2}{12}$

coefficient $C^{(0)}_{\mathrm{D}^3_y v_2}$ at $\frac{\partial^3 v_2}{\partial x_2^3}$:

$C^{(0),\mathrm{SRT}}_{\mathrm{D}^3_y v_2} = (-1+cs^2+3v_2^2)\frac{\rho}{12}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}^3_y v_2} = (-1+cs^2+3v_2^2)\frac{\rho}{12}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}^3_y v_2} = (-1+3v_2^2+cs^2)\frac{\rho}{12}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}^3_y v_2} = (-1+cs^2+3v_2^2)\frac{\rho}{12}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}^3_y v_2} = (-1+cs^2+3v_2^2)\frac{\rho}{12}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}^3_y v_2} = (-1+cs^2+3v_2^2)\frac{\rho}{12}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}^3_y v_2} = (-1+cs^2+3v_2^2)\frac{\rho}{12}$

coefficient $C^{(0)}_{\mathrm{D}^4_x\rho}$ at $\frac{\partial^4\rho}{\partial x_1^4}$:

$C^{(0),\mathrm{SRT}}_{\mathrm{D}^4_x\rho} = (-12v_1^2\omega cs^2-6v_1^2+3v_1^2\omega-\omega cs^4+24v_1^2cs^2-2cs^2+2cs^4+\omega cs^2-3v_1^4\omega+6v_1^4)\frac{1}{24\omega}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}^4_x\rho} = (24v_1^2cs^2-2cs^2+cs^2\omega_5-6v_1^2+3v_1^2\omega_5-cs^4\omega_5-12v_1^2cs^2\omega_5+2cs^4-3v_1^4\omega_5+6v_1^4)\frac{1}{24\omega_5}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}^4_x\rho} = (2cs^4-6v_1^2+3v_1^2\omega_5-12v_1^2cs^2\omega_5-cs^4\omega_5-3v_1^4\omega_5+cs^2\omega_5-2cs^2+24v_1^2cs^2+6v_1^4)\frac{1}{24\omega_5}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}^4_x\rho} = (-\omega_5cs^4-6v_1^2+24v_1^2cs^2-2cs^2+3v_1^2\omega_5-12v_1^2\omega_5cs^2+2cs^4+\omega_5cs^2-3v_1^4\omega_5+6v_1^4)\frac{1}{24\omega_5}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}^4_x\rho} = (-6v_1^2-2cs^2+24v_1^2cs^2+3v_1^2\omega_5+cs^2\omega_5-cs^4\omega_5-3v_1^4\omega_5-12v_1^2cs^2\omega_5+2cs^4+6v_1^4)\frac{1}{24\omega_5}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}^4_x\rho} = (-12v_1^2cs^2\omega_1-cs^4\omega_1-6v_1^2-3v_1^4\omega_1+2cs^4-2cs^2+24v_1^2cs^2+cs^2\omega_1+3v_1^2\omega_1+6v_1^4)\frac{1}{24\omega_1}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}^4_x\rho} = (-3v_1^2\omega_2+3v_1^2\omega_1\omega_2+12v_1^2cs^2\omega_2+\omega_1cs^2\omega_2+cs^4\omega_2+\omega_1cs^4+12v_1^2\omega_1cs^2+3v_1^4\omega_1-3v_1^4\omega_1\omega_2-12v_1^2\omega_1cs^2\omega_2-\omega_1cs^4\omega_2-cs^2\omega_2+3v_1^4\omega_2-\omega_1cs^2-3v_1^2\omega_1)\frac{1}{24\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}^4_x v_1}$ at $\frac{\partial^4 v_1}{\partial x_1^4}$:

$C^{(0),\mathrm{SRT}}_{\mathrm{D}^4_x v_1} = (-4 + 10v_1^2 - 5v_1^2\omega + 6cs^2 - 3\omega cs^2 + 2\omega)\frac{v_1\rho}{12\omega}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}^4_x v_1} = (-4 + 6cs^2 - 3cs^2\omega_5 + 10v_1^2 - 5v_1^2\omega_5 + 2\omega_5)\frac{v_1\rho}{12\omega_5}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}^4_x v_1} = (-4 + 10v_1^2 - 5v_1^2\omega_5 - 3cs^2\omega_5 + 2\omega_5 + 6cs^2)\frac{v_1\rho}{12\omega_5}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}^4_x v_1} = (-4 + 10v_1^2 + 6cs^2 - 5v_1^2\omega_5 - 3\omega_5 cs^2 + 2\omega_5)\frac{v_1\rho}{12\omega_5}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}^4_x v_1} = (-4 + 10v_1^2 + 6cs^2 - 5v_1^2\omega_5 - 3cs^2\omega_5 + 2\omega_5)\frac{v_1\rho}{12\omega_5}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}^4_x v_1} = (-4 + 10v_1^2 + 6cs^2 + 2\omega_1 - 3cs^2\omega_1 - 5v_1^2\omega_1)\frac{v_1\rho}{12\omega_1}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}^4_x v_1} = (5v_1^2\omega_2 - 5v_1^2\omega_1\omega_2 - 3\omega_1 cs^2\omega_2 + 3cs^2\omega_2 + 2\omega_1\omega_2 - 2\omega_1 + 3\omega_1 cs^2 + 5v_1^2\omega_1 - 2\omega_2)\frac{v_1\rho}{12\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}^3_x \mathrm{D}_y \rho}$ **at** $\frac{\partial^4 \rho}{\partial x_1^3 \partial x_2}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}^3_x \mathrm{D}_y \rho} = 0$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}^3_x \mathrm{D}_y \rho} = (-3cs^2\omega_5 + v_1^2\omega_7 + 3cs^2\omega_7 - v_1^2\omega_5 - \omega_7 + \omega_5)\frac{v_1 v_2}{4\omega_7\omega_5}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}^3_x \mathrm{D}_y \rho} = (v_1^2\omega_7 - v_1^2\omega_5 - \omega_7 - 3cs^2\omega_5 + \omega_5 + 3\omega_7 cs^2)\frac{v_1 v_2}{4\omega_7\omega_5}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}^3_x \mathrm{D}_y \rho} = 0$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}^3_x \mathrm{D}_y \rho} = 0$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}^3_x \mathrm{D}_y \rho} = 0$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}^3_x \mathrm{D}_y \rho} = (\omega_1 v_2^2 - 3cs^2\omega_2 - \omega_1 - v_2^2\omega_2 + 3\omega_1 cs^2 + \omega_2)\frac{v_1 v_2}{8\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}^3_x \mathrm{D}_y v_1}$ **at** $\frac{\partial^4 v_1}{\partial x_1^3 \partial x_2}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}^3_x \mathrm{D}_y v_1} = 0$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}^3_x \mathrm{D}_y v_1} = (-cs^2\omega_5 + 3v_1^2\omega_7 + cs^2\omega_7 - 3v_1^2\omega_5 - \omega_7 + \omega_5)\frac{\rho v_2}{4\omega_7\omega_5}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}^3_x \mathrm{D}_y v_1} = (3v_1^2\omega_7 - 3v_1^2\omega_5 - \omega_7 - cs^2\omega_5 + \omega_5 + \omega_7 cs^2)\frac{\rho v_2}{4\omega_7\omega_5}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}^3_x \mathrm{D}_y v_1} = 0$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}^3_x \mathrm{D}_y v_1} = 0$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}^3_x \mathrm{D}_y v_1} = 0$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}^3_x \mathrm{D}_y v_1} = (\omega_1 v_2^2 - 3cs^2\omega_2 - \omega_1 - v_2^2\omega_2 + 3\omega_1 cs^2 + \omega_2)\frac{\rho v_2}{24\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}^3_x \mathrm{D}_y v_2}$ **at** $\frac{\partial^4 v_2}{\partial x_1^3 \partial x_2}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}^3_x \mathrm{D}_y v_2} = (2 - 2v_1^2 + v_1^2\omega - 6cs^2 + 3\omega cs^2 - \omega)\frac{v_1\rho}{12\omega}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}^3_x \mathrm{D}_y v_2} = (-3v_1^2\omega_4\omega_5 - \omega_7\omega_4\omega_5 - 6cs^2\omega_7\omega_5 + v_1^2\omega_7\omega_4\omega_5 + v_1^2\omega_7\omega_4 + 3cs^2\omega_7\omega_4 + 3\omega_4\omega_5 + 3cs^2\omega_7\omega_4\omega_5 - \omega_7\omega_4 - 3cs^2\omega_4\omega_5)\frac{v_1\rho}{12\omega_7\omega_4\omega_5}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}^3_x \mathrm{D}_y v_2} = (-3v_1^2\omega_4\omega_5 - \omega_7\omega_4\omega_5 - 6\omega_7 cs^2\omega_5 + v_1^2\omega_7\omega_4\omega_5 + v_1^2\omega_7\omega_4 + 3\omega_4\omega_5 + 3\omega_7\omega_4 cs^2 + 3\omega_7\omega_4 cs^2\omega_5 - \omega_7\omega_4 - 3\omega_4 cs^2\omega_5)\frac{v_1\rho}{12\omega_7\omega_4\omega_5}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (v_1^2\omega_7 + 3\omega_7 cs^2 + 3\omega_7\omega_5 cs^2 - 3v_1^2\omega_5 - \omega_7 - \omega_7\omega_5 - 9\omega_5 cs^2 + v_1^2\omega_7\omega_5 + 3\omega_5)\frac{v_1\rho}{12\omega_7\omega_5}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (v_1^2\omega_7 + 3cs^2\omega_7 - 3v_1^2\omega_5 - 9cs^2\omega_5 - \omega_7 - \omega_7\omega_5 + v_1^2\omega_7\omega_5 + 3cs^2\omega_7\omega_5 + 3\omega_5)\frac{v_1\rho}{12\omega_7\omega_5}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (-\omega_4\omega_1 + 3\omega_4 cs^2 - \omega_4 + v_1^2\omega_4\omega_1 + 3\omega_4 cs^2\omega_1 + 3\omega_1 - 9cs^2\omega_1 + v_1^2\omega_4 - 3v_1^2\omega_1)\frac{v_1\rho}{12\omega_4\omega_1}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (2\omega_3\omega_2 - 6v_1^2\omega_1\omega_2 - 18\omega_1 cs^2\omega_2 - 2\omega_3\omega_1\omega_2 + 2\omega_3 v_1^2\omega_1\omega_2 + 6\omega_3\omega_1 cs^2\omega_2 + 6\omega_3\omega_1 cs^2 + \omega_3 v_1^2\omega_1 - 9\omega_3 v_2^2\omega_2 + 6\omega_1\omega_2 + \omega_3 v_1^2\omega_2 - 4\omega_3\omega_1 + 9\omega_3\omega_1 v_2^2)\frac{v_1\rho}{24\omega_3\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}^2_x\mathrm{D}^2_y\rho}$ **at** $\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}^2_x\mathrm{D}^2_y\rho} = (-2+\omega)\frac{cs^4}{6\omega}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}^2_x\mathrm{D}^2_y\rho} = (-2+\omega_4)\frac{cs^4}{6\omega_4}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}^2_x\mathrm{D}^2_y\rho} = (-2+\omega_4)\frac{cs^4}{6\omega_4}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}^2_x\mathrm{D}^2_y\rho} = (-2+\omega_4)\frac{cs^4}{6\omega_4}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}^2_x\mathrm{D}^2_y\rho} = (-2+\omega_4)\frac{cs^4}{6\omega_4}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}^2_x\mathrm{D}^2_y\rho} = (-2+\omega_3)\frac{cs^4}{6\omega_3}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}^2_x\mathrm{D}^2_y\rho} = (-3v_1^2\omega_2 + 4\omega_1 cs^2\omega_2 + 3\omega_1 v_2^2 - 10cs^2\omega_2 - 2\omega_1 - 3v_2^2\omega_2 + 2\omega_1 cs^2 + 3v_1^2\omega_1 + 2\omega_2)\frac{cs^2}{24\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}^2_x\mathrm{D}^2_y v_1}$ **at** $\frac{\partial^4 v_1}{\partial x_1^2\partial x_2^2}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_1} = 0$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_1} = (-\omega_7+\omega_4)\frac{v_1\rho cs^2}{2\omega_7\omega_4}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_1} = (-\omega_7+\omega_4)\frac{v_1\rho cs^2}{2\omega_7\omega_4}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_1} = 0$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_1} = 0$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_1} = 0$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_1} = (-v_1^2\omega_2 - 3cs^2\omega_2 - \omega_1 + 3\omega_1 cs^2 + v_1^2\omega_1 + \omega_2)\frac{v_1\rho}{24\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}^2_x\mathrm{D}^2_y v_2}$ **at** $\frac{\partial^4 v_2}{\partial x_1^2\partial x_2^2}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_2} = 0$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_2} = (\omega_4-\omega_8)\frac{\rho cs^2 v_2}{2\omega_4\omega_8}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_2} = (\omega_4-\omega_8)\frac{\rho cs^2 v_2}{2\omega_4\omega_8}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}^2_x\mathrm{D}^2_y v_2} = 0$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_2} = 0$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_2} = 0$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_2} = (\omega_1 v_2^2 - 3cs^2\omega_2 - \omega_1 - v_2^2\omega_2 + 3\omega_1 cs^2 + \omega_2)\frac{\rho v_2}{24\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}_x\mathrm{D}_y^3\rho}$ **at** $\frac{\partial^4\rho}{\partial x_1\partial x_2^3}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = 0$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = (\omega_6 + 3cs^2\omega_8 - 3\omega_6 cs^2 + v_2^2\omega_8 - \omega_6 v_2^2 - \omega_8)\frac{v_1 v_2}{4\omega_6\omega_8}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = (\omega_6 + v_2^2\omega_8 - \omega_6 v_2^2 - 3\omega_6 cs^2 - \omega_8 + 3cs^2\omega_8)\frac{v_1 v_2}{4\omega_6\omega_8}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = 0$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = 0$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = 0$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = (-v_1^2\omega_2 - 3cs^2\omega_2 - \omega_1 + 3\omega_1 cs^2 + v_1^2\omega_1 + \omega_2)\frac{v_1 v_2}{8\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}_x\mathrm{D}_y^3 v_1}$ **at** $\frac{\partial^4 v_1}{\partial x_1\partial x_2^3}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^3 v_1} = (2 - 6cs^2 + v_2^2\omega + 3\omega cs^2 - 2v_2^2 - \omega)\frac{\rho v_2}{12\omega}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^3 v_1} = (-3\omega_6\omega_4 v_2^2 - 6\omega_6 cs^2\omega_8 - \omega_6\omega_4\omega_8 - \omega_4\omega_8 + 3\omega_6\omega_4 + \omega_6\omega_4 v_2^2\omega_8 - 3\omega_6 cs^2\omega_4 + \omega_4 v_2^2\omega_8 + 3cs^2\omega_4\omega_8 + 3\omega_6 cs^2\omega_4\omega_8)\frac{\rho v_2}{12\omega_6\omega_4\omega_8}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^3 v_1} = (-3\omega_6\omega_4 v_2^2 - 3\omega_6\omega_4 cs^2 - \omega_6\omega_4\omega_8 - \omega_4\omega_8 + 3\omega_6\omega_4 + \omega_6\omega_4 v_2^2\omega_8 + \omega_4 v_2^2\omega_8 + 3\omega_4 cs^2\omega_8 + 3\omega_6\omega_4 cs^2\omega_8 - 6\omega_6 cs^2\omega_8)\frac{\rho v_2}{12\omega_6\omega_4\omega_8}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3 v_1} = (-9\omega_6 cs^2 - \omega_6\omega_8 + 3\omega_6 + v_2^2\omega_8 + 3\omega_6\omega_8 cs^2 + \omega_6 v_2^2\omega_8 + 3\omega_8 cs^2 - 3\omega_6 v_2^2 - \omega_8)\frac{\rho v_2}{12\omega_6\omega_8}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3 v_1} = (-\omega_6\omega_8 + 3\omega_6 + 3cs^2\omega_8 + 3\omega_6 cs^2\omega_8 - 9\omega_6 cs^2 + v_2^2\omega_8 + \omega_6 v_2^2\omega_8 - 3\omega_6 v_2^2 - \omega_8)\frac{\rho v_2}{12\omega_6\omega_8}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3 v_1} = (-\omega_6 + 3\omega_6 cs^2\omega_2 - 9cs^2\omega_2 - \omega_6\omega_2 + \omega_6 v_2^2 + \omega_6 v_2^2\omega_2 - 3v_2^2\omega_2 + 3\omega_6 cs^2 + 3\omega_2)\frac{\rho v_2}{12\omega_6\omega_2}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3 v_1} = (2\omega_3\omega_2 + 2\omega_3\omega_1 v_2^2\omega_2 - 18\omega_1 cs^2\omega_2 - 2\omega_3\omega_1\omega_2 + 6\omega_3\omega_1 cs^2\omega_2 + 6\omega_3\omega_1 cs^2 + 9\omega_3 v_1^2\omega_1 - 6\omega_1 v_2^2\omega_2 + \omega_3 v_2^2\omega_2 + 6\omega_1\omega_2 - 9\omega_3 v_1^2\omega_2 - 4\omega_3\omega_1 + \omega_3\omega_1 v_2^2)\frac{\rho v_2}{24\omega_3\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}_x\mathrm{D}_y^3 v_2}$ **at** $\frac{\partial^4 v_2}{\partial x_1\partial x_2^3}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^3 v_2} = 0$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^3 v_2} = (\omega_6 + cs^2\omega_8 - \omega_6 cs^2 + 3v_2^2\omega_8 - 3\omega_6 v_2^2 - \omega_8)\frac{v_1\rho}{4\omega_6\omega_8}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^3 v_2} = (\omega_6 + 3v_2^2\omega_8 - 3\omega_6 v_2^2 - \omega_6 cs^2 - \omega_8 + cs^2\omega_8)\frac{v_1\rho}{4\omega_6\omega_8}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3 v_2} = 0$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3 v_2} = 0$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3 v_2} = 0$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3 v_2} = (-v_1^2\omega_2 - 3cs^2\omega_2 - \omega_1 + 3\omega_1 cs^2 + v_1^2\omega_1 + \omega_2)\frac{v_1\rho}{24\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}_y^4\rho}$ **at** $\frac{\partial^4\rho}{\partial x_2^4}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}_y^4\rho} = (6v_2^4 - 3v_2^4\omega - \omega cs^4 - 2cs^2 + 3v_2^2\omega - 12v_2^2\omega cs^2 + 2cs^4 + \omega cs^2 + 24v_2^2cs^2 - 6v_2^2)\frac{1}{24\omega}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}_y^4\rho} = (-2cs^2 + 6v_2^4 + \omega_6 cs^2 - 3\omega_6 v_2^4 - \omega_6 cs^4 + 3\omega_6 v_2^2 - 12\omega_6 cs^2 v_2^2 + 24cs^2 v_2^2 + 2cs^4 - 6v_2^2)\frac{1}{24\omega_6}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}_y^4\rho} = (6v_2^4 + 2cs^4 - 3\omega_6 v_2^4 + 24cs^2v_2^2 - \omega_6 cs^4 - 12\omega_6 cs^2 v_2^2 + 3\omega_6 v_2^2 + \omega_6 cs^2 - 6v_2^2 - 2cs^2)\frac{1}{24\omega_6}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}_y^4\rho} = (\omega_6 cs^2 + 6v_2^4 - 3\omega_6 v_2^4 - 2cs^2 + 2cs^4 + 24v_2^2cs^2 - 12\omega_6 v_2^2 cs^2 + 3\omega_6 v_2^2 - 6v_2^2 - \omega_6 cs^4)\frac{1}{24\omega_6}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}_y^4\rho} = (6v_2^4 - 2cs^2 - 3\omega_6 v_2^4 + \omega_6 cs^2 + 3\omega_6 v_2^2 - \omega_6 cs^4 - 12\omega_6 cs^2 v_2^2 - 6v_2^2 + 24cs^2v_2^2 + 2cs^4)\frac{1}{24\omega_6}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}_y^4\rho} = (6v_2^4 + cs^2\omega_2 + 2cs^4 - 3v_2^4\omega_2 + 24cs^2v_2^2 - 2cs^2 + 3v_2^2\omega_2 - 6v_2^2 - 12cs^2v_2^2\omega_2 - cs^4\omega_2)\frac{1}{24\omega_2}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}_y^4\rho} = (12\omega_1 v_2^2 cs^2 + \omega_1 cs^2\omega_2 + cs^4\omega_2 + \omega_1 cs^4 - 3\omega_1 v_2^2 + 3\omega_1 v_2^2\omega_2 + 3v_2^4\omega_2 - \omega_1 cs^4\omega_2 - cs^2\omega_2 + 3\omega_1 v_2^4 + 12v_2^2cs^2\omega_2 - 3\omega_1 v_2^4\omega_2 - 3v_2^2\omega_2 - \omega_1 cs^2 - 12\omega_1 v_2^2 cs^2\omega_2)\frac{1}{24\omega_1\omega_2}$

coefficient $C^{(0)}_{\mathrm{D}_y^4 v_2}$ **at** $\frac{\partial^4 v_2}{\partial x_2^4}$**:**

$C^{(0),\mathrm{SRT}}_{\mathrm{D}_y^4 v_2} = (-4 + 6cs^2 - 5v_2^2\omega - 3\omega cs^2 + 10v_2^2 + 2\omega)\frac{\rho v_2}{12\omega}$

$C^{(0),\mathrm{MRT1}}_{\mathrm{D}_y^4 v_2} = (-4 + 6cs^2 + 2\omega_6 - 3\omega_6 cs^2 - 5\omega_6 v_2^2 + 10v_2^2)\frac{\rho v_2}{12\omega_6}$

$C^{(0),\mathrm{MRT2}}_{\mathrm{D}_y^4 v_2} = (-4 + 2\omega_6 - 5\omega_6 v_2^2 - 3\omega_6 cs^2 + 10v_2^2 + 6cs^2)\frac{\rho v_2}{12\omega_6}$

$C^{(0),\mathrm{CLBM1}}_{\mathrm{D}_y^4 v_2} = (-4 - 3\omega_6 cs^2 + 2\omega_6 + 6cs^2 - 5\omega_6 v_2^2 + 10v_2^2)\frac{\rho v_2}{12\omega_6}$

$C^{(0),\mathrm{CLBM2}}_{\mathrm{D}_y^4 v_2} = (-4 + 6cs^2 + 2\omega_6 - 3\omega_6 cs^2 - 5\omega_6 v_2^2 + 10v_2^2)\frac{\rho v_2}{12\omega_6}$

$C^{(0),\mathrm{CuLBM1}}_{\mathrm{D}_y^4 v_2} = (-4 - 3cs^2\omega_2 + 6cs^2 - 5v_2^2\omega_2 + 10v_2^2 + 2\omega_2)\frac{\rho v_2}{12\omega_2}$

$C^{(0),\mathrm{CuLBM2}}_{\mathrm{D}_y^4 v_2} = (-3\omega_1 cs^2\omega_2 + 5\omega_1 v_2^2 - 5\omega_1 v_2^2\omega_2 + 3cs^2\omega_2 + 2\omega_1\omega_2 - 2\omega_1 + 5v_2^2\omega_2 + 3\omega_1 cs^2 - 2\omega_2)\frac{\rho v_2}{12\omega_1\omega_2}$

3.2 Conservation of momentum: ρv_1

$$v_1\frac{\partial\rho}{\partial t} + \rho\frac{\partial v_1}{\partial t} + C^{(1)}_{\mathrm{D}_x\rho}\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1} + 2v_1\rho\frac{\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1} + v_1v_2\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2} + \rho v_2\frac{\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_2} + v_1\rho\frac{\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2} + C^{(1)}_{\mathrm{D}_x\rho,\mathrm{D}_x v_1}\frac{\delta_l^2}{\delta_t}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_1} +$$
$$C^{(1)}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1}\frac{\delta_l^2}{\delta_t}\left(\frac{\partial v_1}{\partial x_1}\right)^2 + C^{(1)}_{\mathrm{D}_x\rho,\mathrm{D}_y v_2}\frac{\delta_l^2}{\delta_t}\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_2} + C^{(1)}_{\mathrm{D}_x v_2,\mathrm{D}_y v_2}\frac{\delta_l^2}{\delta_t}\frac{\partial v_2}{\partial x_1}\frac{\partial v_2}{\partial x_2} + C^{(1)}_{\mathrm{D}_y\rho,\mathrm{D}_x v_2}\frac{\delta_l^2}{\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_1} +$$
$$C^{(1)}_{\mathrm{D}_y\rho,\mathrm{D}_y v_1}\frac{\delta_l^2}{\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_1}{\partial x_2} + C^{(1)}_{\mathrm{D}_x^2\rho}\frac{\delta_l^2}{\delta_t}\frac{\partial^2\rho}{\partial x_1^2} + C^{(1)}_{\mathrm{D}_x^2 v_1}\frac{\delta_l^2}{\delta_t}\frac{\partial^2 v_1}{\partial x_1^2} + C^{(1)}_{\mathrm{D}_x\mathrm{D}_y\rho}\frac{\delta_l^2}{\delta_t}\frac{\partial^2\rho}{\partial x_1\partial x_2} + C^{(1)}_{\mathrm{D}_x\mathrm{D}_y v_2}\frac{\delta_l^2}{\delta_t}\frac{\partial^2 v_2}{\partial x_1\partial x_2} + C^{(1)}_{\mathrm{D}_y^2 v_1}\frac{\delta_l^2}{\delta_t}\frac{\partial^2 v_1}{\partial x_2^2}$$
$$+ C^{(1)}_{\mathrm{D}_x^3\rho}\frac{\delta_l^3}{\delta_t}\frac{\partial^3\rho}{\partial x_1^3} + C^{(1)}_{\mathrm{D}_x^3 v_1}\frac{\delta_l^3}{\delta_t}\frac{\partial^3 v_1}{\partial x_1^3} + C^{(1)}_{\mathrm{D}_x^2\mathrm{D}_y\rho}\frac{\delta_l^3}{\delta_t}\frac{\partial^3\rho}{\partial x_1^2\partial x_2} + C^{(1)}_{\mathrm{D}_x^2\mathrm{D}_y v_1}\frac{\delta_l^3}{\delta_t}\frac{\partial^3 v_1}{\partial x_1^2\partial x_2} + C^{(1)}_{\mathrm{D}_x^2\mathrm{D}_y v_2}\frac{\delta_l^3}{\delta_t}\frac{\partial^3 v_2}{\partial x_1^2\partial x_2} +$$
$$C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^2\rho}\frac{\delta_l^3}{\delta_t}\frac{\partial^3\rho}{\partial x_1\partial x_2^2} + C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^2 v_1}\frac{\delta_l^3}{\delta_t}\frac{\partial^3 v_1}{\partial x_1\partial x_2^2} + C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^2 v_2}\frac{\delta_l^3}{\delta_t}\frac{\partial^3 v_2}{\partial x_1\partial x_2^2} + C^{(1)}_{\mathrm{D}_y^3\rho}\frac{\delta_l^3}{\delta_t}\frac{\partial^3\rho}{\partial x_2^3} + C^{(1)}_{\mathrm{D}_y^3 v_1}\frac{\delta_l^3}{\delta_t}\frac{\partial^3 v_1}{\partial x_2^3} + C^{(1)}_{\mathrm{D}_y^3 v_2}\frac{\delta_l^3}{\delta_t}\frac{\partial^3 v_2}{\partial x_2^3} +$$
$$C^{(1)}_{\mathrm{D}_x^4\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1^4} + C^{(1)}_{\mathrm{D}_x^4 v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4 v_1}{\partial x_1^4} + C^{(1)}_{\mathrm{D}_x^3\mathrm{D}_y\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1^3\partial x_2} + C^{(1)}_{\mathrm{D}_x^3\mathrm{D}_y v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4 v_1}{\partial x_1^3\partial x_2} + C^{(1)}_{\mathrm{D}_x^3\mathrm{D}_y v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4 v_2}{\partial x_1^3\partial x_2} + C^{(1)}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2}$$
$$+ C^{(1)}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4 v_1}{\partial x_1^2\partial x_2^2} + C^{(1)}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4 v_2}{\partial x_1^2\partial x_2^2} + C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^3\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1\partial x_2^3} + C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^3 v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4 v_1}{\partial x_1\partial x_2^3} + C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^3 v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4 v_2}{\partial x_1\partial x_2^3} +$$

$$C^{(1)}_{\mathrm{D}^4_y\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_2^4} + C^{(1)}_{\mathrm{D}^4_y v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4 v_1}{\partial x_2^4} + C^{(1)}_{\mathrm{D}^4_y v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4 v_2}{\partial x_2^4} = 0,$$

where:

coefficient $C^{(1)}_{\mathrm{D}_x\rho}$ at $\frac{\partial\rho}{\partial x_1}$:

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\rho} = (v_1^2 + cs^2)$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\rho} = (v_1^2 + cs^2)$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\rho} = (v_1^2 + cs^2)$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\rho} = (v_1^2 + cs^2)$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\rho} = (v_1^2 + cs^2)$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\rho} = (v_1^2 + cs^2)$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\rho} = (v_1^2 + cs^2)$

coefficient $C^{(1)}_{\mathrm{D}_x\rho,\mathrm{D}_x v_1}$ at $\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_1}$:

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_1} = (-2 - 2cs^2\omega + 6v_1^2 - 3v_1^2\omega + 4cs^2 + \omega)\frac{1}{\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_1} = (-2 + 6v_1^2 - 3v_1^2\omega_5 + 4cs^2 + \omega_5 - 2cs^2\omega_5)\frac{1}{\omega_5}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_1} = (-2 + 6v_1^2 + 4cs^2 - 2cs^2\omega_5 - 3v_1^2\omega_5 + \omega_5)\frac{1}{\omega_5}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_1} = (-2 - 2cs^2\omega_5 + 6v_1^2 - 3v_1^2\omega_5 + 4cs^2 + \omega_5)\frac{1}{\omega_5}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_1} = (-2 + 6v_1^2 - 3v_1^2\omega_5 + 4cs^2 - 2cs^2\omega_5 + \omega_5)\frac{1}{\omega_5}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_1} = (-2 + 6v_1^2 - 2\omega_1 cs^2 + \omega_1 + 4cs^2 - 3v_1^2\omega_1)\frac{1}{\omega_1}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_1} = (3v_1^2\omega_2 - 3v_1^2\omega_1\omega_2 + 2cs^2\omega_2 - 2cs^2\omega_1\omega_2 + \omega_1\omega_2 - \omega_1 + 2cs^2\omega_1 + 3v_1^2\omega_1 - \omega_2)\frac{1}{\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1}$ at $\left(\frac{\partial v_1}{\partial x_1}\right)^2$:

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1} = (2 - \omega)\frac{3v_1\rho}{\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1} = (2 - \omega_5)\frac{3v_1\rho}{\omega_5}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1} = C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1} = C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1} = C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1} = (2 - \omega_1)\frac{3v_1\rho}{\omega_1}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x v_1,\mathrm{D}_x v_1} = (-\omega_1\omega_2 + \omega_1 + \omega_2)\frac{3v_1\rho}{\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}_x\rho,\mathrm{D}_y v_2}$ at $\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_2}$:

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_2} = (-cs^2\omega_2 + 3\omega_1 v_2^2 - \omega_1 - 3v_2^2\omega_2 + cs^2\omega_1 + \omega_2)\frac{1}{2\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}_x v_2,\mathrm{D}_y v_2}$ **at** $\frac{\partial v_2}{\partial x_1}\frac{\partial v_2}{\partial x_2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x v_2,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x v_2,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x v_2,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x v_2,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x v_2,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x v_2,\mathrm{D}_y v_2} = 0$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x v_2,\mathrm{D}_y v_2} = (\omega_1 - \omega_2)\frac{3\rho v_2}{\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}_y\rho,\mathrm{D}_x v_2}$ **at** $\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_1}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_y\rho,\mathrm{D}_x v_2} = (-2+\omega)\frac{cs^2}{2\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_y\rho,\mathrm{D}_x v_2} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_y\rho,\mathrm{D}_x v_2} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_y\rho,\mathrm{D}_x v_2} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_y\rho,\mathrm{D}_x v_2} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_y\rho,\mathrm{D}_x v_2} = (-2+\omega_3)\frac{cs^2}{2\omega_3}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_y\rho,\mathrm{D}_x v_2} = (-5cs^2\omega_2 + 3\omega_1 v_2^2 + cs^2\omega_1\omega_2 - \omega_1 - 3v_2^2\omega_2 + 3cs^2\omega_1 + \omega_2)\frac{1}{2\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}_y\rho,\mathrm{D}_y v_1}$ **at** $\frac{\partial\rho}{\partial x_2}\frac{\partial v_1}{\partial x_2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_y\rho,\mathrm{D}_y v_1} = (-2+\omega)\frac{cs^2}{2\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_y\rho,\mathrm{D}_y v_1} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_y\rho,\mathrm{D}_y v_1} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_y\rho,\mathrm{D}_y v_1} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_y\rho,\mathrm{D}_y v_1} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_y\rho,\mathrm{D}_y v_1} = (-2+\omega_3)\frac{cs^2}{2\omega_3}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_y\rho,\mathrm{D}_y v_1} = (-2+\omega_1)\frac{cs^2}{2\omega_1}$

coefficient $C^{(1)}_{\mathrm{D}_x^2\rho}$ **at** $\frac{\partial^2\rho}{\partial x_1^2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x^2\rho} = (-2-3cs^2\omega+2v_1^2-v_1^2\omega+6cs^2+\omega)\frac{v_1}{2\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x^2\rho} = (-2+2v_1^2-v_1^2\omega_5+6cs^2+\omega_5-3cs^2\omega_5)\frac{v_1}{2\omega_5}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x^2\rho} = (-2+2v_1^2+6cs^2-3cs^2\omega_5-v_1^2\omega_5+\omega_5)\frac{v_1}{2\omega_5}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x^2\rho} = (-2-3cs^2\omega_5+2v_1^2-v_1^2\omega_5+6cs^2+\omega_5)\frac{v_1}{2\omega_5}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x^2\rho} = (-2+2v_1^2-v_1^2\omega_5+6cs^2-3cs^2\omega_5+\omega_5)\frac{v_1}{2\omega_5}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\rho} = (-2+2v_1^2-3\omega_1cs^2+\omega_1+6cs^2-v_1^2\omega_1)\frac{v_1}{2\omega_1}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\rho} = (v_1^2\omega_2-v_1^2\omega_1\omega_2+3cs^2\omega_2-3cs^2\omega_1\omega_2+\omega_1\omega_2-\omega_1+3cs^2\omega_1+v_1^2\omega_1-\omega_2)\frac{v_1}{2\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}_x^2 v_1}$ **at** $\frac{\partial^2 v_1}{\partial x_1^2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x^2 v_1} = (-2-cs^2\omega+6v_1^2-3v_1^2\omega+2cs^2+\omega)\frac{\rho}{2\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x^2 v_1} = (-2+6v_1^2-3v_1^2\omega_5+2cs^2+\omega_5-cs^2\omega_5)\frac{\rho}{2\omega_5}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x^2 v_1} = (-2+6v_1^2+2cs^2-cs^2\omega_5-3v_1^2\omega_5+\omega_5)\frac{\rho}{2\omega_5}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x^2 v_1} = (-2-cs^2\omega_5+6v_1^2-3v_1^2\omega_5+2cs^2+\omega_5)\frac{\rho}{2\omega_5}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x^2 v_1} = (-2+6v_1^2-3v_1^2\omega_5+2cs^2-cs^2\omega_5+\omega_5)\frac{\rho}{2\omega_5}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x^2 v_1} = (-2+6v_1^2-\omega_1cs^2+\omega_1+2cs^2-3v_1^2\omega_1)\frac{\rho}{2\omega_1}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x^2 v_1} = (3v_1^2\omega_2-3v_1^2\omega_1\omega_2+cs^2\omega_2-cs^2\omega_1\omega_2+\omega_1\omega_2-\omega_1+cs^2\omega_1+3v_1^2\omega_1-\omega_2)\frac{\rho}{2\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}_x\mathrm{D}_y\rho}$ **at** $\frac{\partial^2\rho}{\partial x_1\partial x_2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y\rho} = (-3cs^2\omega_2+\omega_1v_2^2-\omega_1-v_2^2\omega_2+3cs^2\omega_1+\omega_2)\frac{v_2}{2\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}_x\mathrm{D}_y v_2}$ **at** $\frac{\partial^2 v_2}{\partial x_1\partial x_2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y v_2} = (-2+\omega)\frac{cs^2\rho}{2\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y v_2} = (-2+\omega_4)\frac{\rho c s^2}{2\omega_4}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y v_2} = (-2+\omega_4)\frac{\rho c s^2}{2\omega_4}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y v_2} = (-2+\omega_4)\frac{c s^2 \rho}{2\omega_4}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y v_2} = (-2+\omega_4)\frac{\rho c s^2}{2\omega_4}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y v_2} = (-2+\omega_3)\frac{\rho c s^2}{2\omega_3}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y v_2} = (-3cs^2\omega_2 + 3\omega_1 v_2^2 + cs^2\omega_1\omega_2 - \omega_1 - 3v_2^2\omega_2 + cs^2\omega_1 + \omega_2)\frac{\rho}{2\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}^2_y v_1}$ **at** $\frac{\partial^2 v_1}{\partial x_2^2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}^2_y v_1} = (-2+\omega)\frac{c s^2 \rho}{2\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^2_y v_1} = (-2+\omega_4)\frac{\rho c s^2}{2\omega_4}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^2_y v_1} = (-2+\omega_4)\frac{\rho c s^2}{2\omega_4}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^2_y v_1} = (-2+\omega_4)\frac{c s^2 \rho}{2\omega_4}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^2_y v_1} = (-2+\omega_4)\frac{\rho c s^2}{2\omega_4}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^2_y v_1} = (-2+\omega_3)\frac{\rho c s^2}{2\omega_3}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}^2_y v_1} = (-2+\omega_1)\frac{c s^2 \rho}{2\omega_1}$

coefficient $C^{(1)}_{\mathrm{D}^3_x \rho}$ **at** $\frac{\partial^3 \rho}{\partial x_1^3}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}^3_x \rho} =$
$(12cs^2\omega + 24cs^2v_1^2\omega^2 - 36v_1^2 - 7v_1^2\omega^2 + 36v_1^2\omega + 12cs^4 - 144cs^2v_1^2\omega - cs^2\omega^2 + 144cs^2v_1^2 - 12cs^2 + 7v_1^4\omega^2 - 12cs^4\omega + cs^4\omega^2 - 36v_1^4\omega + 36v_1^4)\frac{1}{12\omega^2}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^3_x \rho} = (-7v_1^2\omega_5^2 + 24v_1^2cs^2\omega_5^2 - 36v_1^2 + cs^4\omega_5^2 - 144v_1^2cs^2\omega_5 - 12cs^4\omega_5 + 36v_1^2\omega_5 - 12cs^2 + 144v_1^2cs^2 - cs^2\omega_5^2 + 7v_1^4\omega_5^2 + 12cs^4 - 36v_1^4\omega_5 + 12cs^2\omega_5 + 36v_1^4)\frac{1}{12\omega_5^2}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^3_x \rho} = (-7v_1^2\omega_5^2 - 36v_1^2 + 144v_1^2cs^2 - cs^2\omega_5^2 - 12cs^2 + 12cs^2\omega_5 + 36v_1^2\omega_5 + 24v_1^2cs^2\omega_5^2 + cs^4\omega_5^2 + 7v_1^4\omega_5^2 - 36v_1^4\omega_5 - 144v_1^2cs^2\omega_5 - 12cs^4\omega_5 + 12cs^4 + 36v_1^4)\frac{1}{12\omega_5^2}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^3_x \rho} = (-7v_1^2\omega_5^2 + 12cs^2\omega_5 - 36v_1^2 - 144cs^2v_1^2\omega_5 + 12cs^4 + 144cs^2v_1^2 + 24cs^2v_1^2\omega_5^2 + 36v_1^2\omega_5 - cs^2\omega_5^2 - 12cs^2 - 12cs^4\omega_5 + 7v_1^4\omega_5^2 + cs^4\omega_5^2 - 36v_1^4\omega_5 + 36v_1^4)\frac{1}{12\omega_5^2}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^3_x \rho} =$
$(cs^4\omega_5^2 + 24v_1^2cs^2\omega_5^2 - 7v_1^2\omega_5^2 - 36v_1^2 + 36v_1^2\omega_5 + 144v_1^2cs^2 - 12cs^2 - 12cs^4\omega_5 - 144v_1^2cs^2\omega_5 + 12cs^4 - cs^2\omega_5^2 + 7v_1^4\omega_5^2 - 36v_1^4\omega_5 + 12cs^2\omega_5 + 36v_1^4)\frac{1}{12\omega_5^2}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^3_x \rho} =$
$(12cs^4 + 24v_1^2\omega_1^2cs^2 - 36v_1^2 + 7v_1^4\omega_1^2 - 36v_1^4\omega_1 + 12\omega_1cs^2 + \omega_1^2cs^4 - 12\omega_1cs^4 - 7v_1^2\omega_1^2 - \omega_1^2cs^2 + 144v_1^2cs^2 - 12cs^2 + 36v_1^2\omega_1 + 36v_1^4 - 144v_1^2\omega_1cs^2)\frac{1}{12\omega_1^2}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}^3_x \rho} = (6cs^4\omega_1^2 + 24cs^2v_1^2\omega_1^2\omega_2^2 - 18v_1^4\omega_1\omega_2^2 - 18v_1^2\omega_1\omega_2 + 6cs^2\omega_1\omega_2^2 + 9v_1^4\omega_1^2 + 45cs^2v_1^2\omega_1^2 - 6cs^2\omega_2^2 + 18v_1^2\omega_1\omega_2^2 + 18v_1^4\omega_1\omega_2 - 6cs^4\omega_1\omega_2^2 - 9v_1^2\omega_2^2 - 72cs^2v_1^2\omega_1^2\omega_2 + cs^4\omega_1^2\omega_2^2 - 18v_1^4\omega_1^2\omega_2 + 54cs^2v_1^2\omega_1\omega_2 - 9v_1^2\omega_1^2 - 6cs^2\omega_1^2 + 45cs^2v_1^2\omega_2^2 - 7v_1^2\omega_1^2\omega_2^2 + 6cs^2\omega_1^2\omega_2 - cs^2\omega_1^2\omega_2^2 + 18v_1^2\omega_1^2\omega_2 + 9v_1^4\omega_2^2 + 6cs^4\omega_2^2 - 72cs^2v_1^2\omega_1\omega_2^2 + 7v_1^4\omega_1^2\omega_2^2 - 6cs^4\omega_1^2\omega_2)\frac{1}{12\omega_1^2\omega_2^2}$

coefficient $C^{(1)}_{\mathrm{D}^3_x v_1}$ **at** $\frac{\partial^3 v_1}{\partial x_1^3}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}^3_x v_1} = (-24 - 36cs^2\omega + 60v_1^2 - 4\omega^2 + 11v_1^2\omega^2 - 60v_1^2\omega + 5cs^2\omega^2 + 36cs^2 + 24\omega)\frac{v_1\rho}{6\omega^2}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^3_x v_1} = (-24 - 4\omega_5^2 + 11v_1^2\omega_5^2 + 60v_1^2 - 60v_1^2\omega_5 + 36cs^2 + 5cs^2\omega_5^2 + 24\omega_5 - 36cs^2\omega_5)\frac{v_1\rho}{6\omega_5^2}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^3_x v_1} = (-24 - 4\omega_5^2 + 11v_1^2\omega_5^2 + 60v_1^2 + 5cs^2\omega_5^2 + 36cs^2 - 36cs^2\omega_5 - 60v_1^2\omega_5 + 24\omega_5)\frac{v_1\rho}{6\omega_5^2}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^3_x v_1} = (-24 - 4\omega_5^2 + 11v_1^2\omega_5^2 - 36cs^2\omega_5 + 60v_1^2 - 60v_1^2\omega_5 + 5cs^2\omega_5^2 + 36cs^2 + 24\omega_5)\frac{v_1\rho}{6\omega_5^2}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^3_x v_1} = (-24 - 4\omega_5^2 + 11v_1^2\omega_5^2 + 60v_1^2 - 60v_1^2\omega_5 + 36cs^2 + 5cs^2\omega_5^2 - 36cs^2\omega_5 + 24\omega_5)\frac{v_1\rho}{6\omega_5^2}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^3_x v_1} = (-24 + 60v_1^2 - 36\omega_1 cs^2 + 11v_1^2\omega_1^2 - 4\omega_1^2 + 24\omega_1 + 5\omega_1^2 cs^2 + 36cs^2 - 60v_1^2\omega_1)\frac{v_1\rho}{6\omega_1^2}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}^3_x v_1} = (-8\omega_1^2\omega_2^2 + 54v_1^2\omega_1\omega_2 - 36cs^2\omega_1\omega_2^2 + 27cs^2\omega_2^2 + 18cs^2\omega_1\omega_2 - 60v_1^2\omega_1\omega_2^2 + 24\omega_1^2\omega_2 - 15\omega_2^2 + 33v_1^2\omega_2^2 - 18\omega_1\omega_2 + 33v_1^2\omega_1^2 - 15\omega_1^2 + 27cs^2\omega_1^2 + 22v_1^2\omega_1^2\omega_2^2 - 36cs^2\omega_1^2\omega_2 + 10cs^2\omega_1^2\omega_2^2 - 60v_1^2\omega_1^2\omega_2 + 24\omega_1\omega_2^2)\frac{v_1\rho}{12\omega_1^2\omega_2^2}$

coefficient $C^{(1)}_{\mathrm{D}^2_x \mathrm{D}_y \rho}$ **at** $\frac{\partial^3 \rho}{\partial x_1^2 \partial x_2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = 0$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = (-3cs^2\omega_7\omega_4\omega_5 - v_1^2\omega_4\omega_5 + \omega_5^2 - v_1^2\omega_5^2 - 3cs^2\omega_4\omega_5 + \omega_7\omega_4\omega_5 + 3cs^2\omega_4\omega_5^2 + 3cs^2\omega_7\omega_4 - v_1^2\omega_7\omega_4\omega_5 + v_1^2\omega_4\omega_5^2 + v_1^2\omega_7\omega_4 - \omega_7\omega_5 - 3cs^2\omega_5^2 + \omega_4\omega_5 - \omega_7\omega_4 + v_1^2\omega_7\omega_5 - \omega_4\omega_5^2 + 3cs^2\omega_7\omega_5)\frac{v_1 v_2}{\omega_7\omega_4\omega_5^2}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = (3\omega_4 cs^2\omega_5^2 - v_1^2\omega_4\omega_5 + \omega_5^2 - v_1^2\omega_5^2 + \omega_7\omega_4\omega_5 - 3cs^2\omega_5^2 - 3\omega_7\omega_4 cs^2\omega_5 - v_1^2\omega_7\omega_4\omega_5 + 3\omega_7\omega_4 cs^2 + v_1^2\omega_4\omega_5^2 - 3\omega_4 cs^2\omega_5 + v_1^2\omega_7\omega_4 - \omega_7\omega_5 + \omega_4\omega_5 - \omega_7\omega_4 + v_1^2\omega_7\omega_5 - \omega_4\omega_5^2 + 3\omega_7 cs^2\omega_5)\frac{v_1 v_2}{\omega_7\omega_4\omega_5^2}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = 0$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = 0$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = 0$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} =$
$(\omega_1 v_2^2\omega_2^2 - 2v_1^2\omega_1\omega_2 + 3cs^2\omega_1\omega_2^2 - 6cs^2\omega_1\omega_2 + \omega_1^2\omega_2 + v_1^2\omega_2^2 + 2\omega_1\omega_2 + v_1^2\omega_1^2 - 2\omega_1^2 + 6cs^2\omega_1^2 - \omega_1^2 v_2^2\omega_2 + \omega_1^2 v_2^2 - 3cs^2\omega_1^2\omega_2 - v_2^2\omega_2^2 - \omega_1\omega_2^2)\frac{3v_1 v_2}{4\omega_1^2\omega_2^2}$

coefficient $C^{(1)}_{\mathrm{D}^2_x \mathrm{D}_y v_1}$ **at** $\frac{\partial^3 v_1}{\partial x_1^2 \partial x_2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = 0$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = (-cs^2\omega_7\omega_4\omega_5 - 3v_1^2\omega_4\omega_5 + \omega_5^2 - 3v_1^2\omega_5^2 - cs^2\omega_4\omega_5 + \omega_7\omega_4\omega_5 + cs^2\omega_4\omega_5^2 + cs^2\omega_7\omega_4 - 3v_1^2\omega_7\omega_4\omega_5 + 3v_1^2\omega_4\omega_5^2 + 3v_1^2\omega_7\omega_4 - \omega_7\omega_5 - cs^2\omega_5^2 + \omega_4\omega_5 - \omega_7\omega_4 + 3v_1^2\omega_7\omega_5 - \omega_4\omega_5^2 + cs^2\omega_7\omega_5)\frac{\rho v_2}{\omega_7\omega_4\omega_5^2}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = (\omega_4 cs^2\omega_5^2 - 3v_1^2\omega_4\omega_5 + \omega_5^2 - 3v_1^2\omega_5^2 + \omega_7\omega_4\omega_5 - cs^2\omega_5^2 - \omega_7\omega_4 cs^2\omega_5 - 3v_1^2\omega_7\omega_4\omega_5 + \omega_7\omega_4 cs^2 + 3v_1^2\omega_4\omega_5^2 - \omega_4 cs^2\omega_5 + 3v_1^2\omega_7\omega_4 - \omega_7\omega_5 + \omega_4\omega_5 - \omega_7\omega_4 + 3v_1^2\omega_7\omega_5 - \omega_4\omega_5^2 + \omega_7 cs^2\omega_5)\frac{\rho v_2}{\omega_7\omega_4\omega_5^2}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = 0$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = 0$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = 0$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y v_1} =$
$(-2\omega_3 v_2^2\omega_2^2 + 2\omega_1 v_2^2\omega_2^2 + 2\omega_3\omega_1^2 v_2^2 + 6cs^2\omega_1\omega_2^2 + 9\omega_3 v_1^2\omega_1^2 + 6\omega_3\omega_1\omega_2 - 18\omega_3 v_1^2\omega_1\omega_2 + 9cs^2\omega_3\omega_1^2 - \omega_3\omega_1\omega_2^2 - 3cs^2\omega_3\omega_1^2\omega_2 + 2\omega_1^2\omega_2 - \omega_3\omega_2^2 + \omega_3\omega_1 v_2^2\omega_2^2 - 6cs^2\omega_3\omega_1\omega_2 - 5\omega_3\omega_1^2 - 2\omega_1^2 v_2^2\omega_2 - 3cs^2\omega_3\omega_2^2 - 6cs^2\omega_1^2\omega_2 - \omega_3\omega_1^2 v_2^2\omega_2 + 9\omega_3 v_1^2\omega_2^2 + \omega_3\omega_1^2\omega_2 + 3cs^2\omega_3\omega_1\omega_2^2 - 2\omega_1\omega_2^2)\frac{\rho v_2}{4\omega_3\omega_1^2\omega_2^2}$

coefficient $C^{(1)}_{\mathrm{D}_x^2\mathrm{D}_y v_2}$ **at** $\frac{\partial^3 v_2}{\partial x_1^2\partial x_2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = (12 + 36cs^2\omega - 12v_1^2 + 3\omega^2 - 3v_1^2\omega^2 + 12v_1^2\omega - 11cs^2\omega^2 - 36cs^2 - 12\omega)\frac{v_1\rho}{12\omega^2}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = (-24cs^2\omega_7\omega_4\omega_5 + 12v_1^2\omega_7\omega_4^2 + 6v_1^2\omega_7\omega_4\omega_5^2 + 36cs^2\omega_7\omega_4^2 - 12\omega_4^2\omega_5^2 - 12cs^2\omega_4\omega_5^2 - 6\omega_7\omega_4\omega_5^2 + 12\omega_4^2\omega_5 + 42cs^2\omega_7\omega_4\omega_5^2 - 12v_1^2\omega_4\omega_5^2 - 6v_1^2\omega_7\omega_4^2\omega_5 - 24cs^2\omega_7\omega_5^2 + 12v_1^2\omega_4^2\omega_5^2 - 11cs^2\omega_7\omega_4^2\omega_5^2 + 12cs^2\omega_4^2\omega_5^2 - 12\omega_7\omega_4^2 + 3\omega_7\omega_4^2\omega_5^2 - 12cs^2\omega_4^2\omega_5 + 12\omega_4\omega_5^2 + 6\omega_7\omega_4^2\omega_5 - 12v_1^2\omega_4^2\omega_5 - 18cs^2\omega_7\omega_4^2\omega_5 - 3v_1^2\omega_7\omega_4^2\omega_5^2)\frac{v_1\rho}{12\omega_7\omega_4^2\omega_5^2}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = (-12\omega_4 cs^2\omega_5^2 + 12v_1^2\omega_7\omega_4^2 + 6v_1^2\omega_7\omega_4\omega_5^2 + 42\omega_7\omega_4 cs^2\omega_5^2 - 12\omega_4^2\omega_5^2 - 6\omega_7\omega_4\omega_5^2 + 12\omega_4^2\omega_5 - 24\omega_7\omega_4 cs^2\omega_5 - 12v_1^2\omega_4\omega_5^2 + 36\omega_7\omega_4^2 cs^2 - 6v_1^2\omega_7\omega_4^2\omega_5 + 12v_1^2\omega_4^2\omega_5^2 - 18\omega_7\omega_4^2 cs^2\omega_5 - 12\omega_7\omega_4^2 + 3\omega_7\omega_4^2\omega_5^2 - 24\omega_7 cs^2\omega_5^2 - 12\omega_4^2 cs^2\omega_5 + 12\omega_4^2 cs^2\omega_5^2 + 12\omega_4\omega_5^2 + 6\omega_7\omega_4^2\omega_5 - 12v_1^2\omega_4^2\omega_5 - 11\omega_7\omega_4^2 cs^2\omega_5^2 - 3v_1^2\omega_7\omega_4^2\omega_5^2)\frac{v_1\rho}{12\omega_7\omega_4^2\omega_5^2}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = (-12v_1^2\omega_4\omega_5 - 6\omega_7\omega_5^2 + 12\omega_5^2 - 12v_1^2\omega_5^2 - 3v_1^2\omega_7\omega_4\omega_5^2 + 6\omega_7\omega_4\omega_5 + 18cs^2\omega_7\omega_5^2 + 3\omega_7\omega_4\omega_5^2 - 6v_1^2\omega_7\omega_4\omega_5 - 36cs^2\omega_5^2 + 12v_1^2\omega_4\omega_5^2 + 12v_1^2\omega_7\omega_4 + 36cs^2\omega_4\omega_5^2 + 36cs^2\omega_7\omega_4 + 6v_1^2\omega_7\omega_5^2 + 12\omega_4\omega_5 - 18cs^2\omega_7\omega_4\omega_5 - 12\omega_7\omega_4 - 12\omega_4\omega_5^2 - 11cs^2\omega_7\omega_4\omega_5^2 - 36cs^2\omega_4\omega_5)\frac{v_1\rho}{12\omega_7\omega_4\omega_5^2}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = (-12v_1^2\omega_4\omega_5 - 6\omega_7\omega_5^2 + 12\omega_5^2 - 12v_1^2\omega_5^2 + 36cs^2\omega_7\omega_4 - 3v_1^2\omega_7\omega_4\omega_5^2 + 36cs^2\omega_4\omega_5^2 + 6\omega_7\omega_4\omega_5 + 3\omega_7\omega_4\omega_5^2 - 6v_1^2\omega_7\omega_4\omega_5 - 36cs^2\omega_4\omega_5 + 12v_1^2\omega_4\omega_5^2 + 12v_1^2\omega_7\omega_4 + 6v_1^2\omega_7\omega_5^2 - 36cs^2\omega_5^2 + 12\omega_4\omega_5 - 18cs^2\omega_7\omega_4\omega_5 + 18cs^2\omega_7\omega_5^2 - 11cs^2\omega_7\omega_4\omega_5^2 - 12\omega_7\omega_4 - 12\omega_4\omega_5^2)\frac{v_1\rho}{12\omega_7\omega_4\omega_5^2}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = (36\omega_3\omega_1^2 cs^2 - 18\omega_3\omega_4\omega_1 cs^2 + 12\omega_3 v_1^2\omega_1^2 - 6\omega_4\omega_1^2 - 12\omega_3 v_1^2\omega_1 + 12\omega_3 v_1^2\omega_4 + 18\omega_4\omega_1^2 cs^2 + 6\omega_3\omega_4\omega_1 - 12\omega_3\omega_1^2 - 12v_1^2\omega_1^2 + 12\omega_1^2 - 3\omega_3 v_1^2\omega_4\omega_1^2 + 36\omega_3\omega_4 cs^2 - 36\omega_1^2 cs^2 - 12\omega_3\omega_4 - 36\omega_3\omega_1 cs^2 + 3\omega_3\omega_4\omega_1^2 + 12\omega_3\omega_1 - 11\omega_3\omega_4\omega_1^2 cs^2 - 6\omega_3 v_1^2\omega_4\omega_1 + 6v_1^2\omega_4\omega_1^2)\frac{v_1\rho}{12\omega_3\omega_4\omega_1^2}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = (-27\omega_3 v_2^2\omega_2^2 - 11cs^2\omega_3\omega_1^2\omega_2^2 - 12\omega_1^2\omega_2^2 + 27\omega_3\omega_1^2 v_2^2 - 54cs^2\omega_1\omega_2^2 + 6\omega_3 v_1^2\omega_1^2 + 3\omega_3 v_1^2\omega_1\omega_2^2 + 27cs^2\omega_3\omega_1^2 - 12\omega_3\omega_1\omega_2^2 - 18v_1^2\omega_1\omega_2^2 - 18cs^2\omega_3\omega_1^2\omega_2 + 6\omega_1^2\omega_2 + 3\omega_3\omega_2^2 + 27\omega_3\omega_1 v_2^2\omega_2^2 - 15\omega_3\omega_1^2 - 3\omega_3 v_1^2\omega_1^2\omega_2 + 3\omega_3\omega_1^2\omega_2^2 + 9cs^2\omega_3\omega_2^2 + 12v_1^2\omega_1^2\omega_2^2 - 18cs^2\omega_1^2\omega_2 + 36cs^2\omega_1^2\omega_2^2 - 6v_1^2\omega_1^2\omega_2 - 27\omega_3\omega_1^2 v_2^2\omega_2 + 6\omega_3 v_1^2\omega_2^2 - 3\omega_3 v_1^2\omega_1^2\omega_2^2 + 12\omega_3\omega_1^2\omega_2 + 18cs^2\omega_3\omega_1\omega_2^2 + 18\omega_1\omega_2^2)\frac{v_1\rho}{12\omega_3\omega_1^2\omega_2^2}$

coefficient $C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^2\rho}$ **at** $\frac{\partial^3\rho}{\partial x_1\partial x_2^2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = (-12 - \omega^2 + 12\omega)\frac{cs^4}{6\omega^2}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = (-12 + 12\omega_4 - \omega_4^2)\frac{cs^4}{6\omega_4^2}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = (-12 + 12\omega_4 - \omega_4^2)\frac{cs^4}{6\omega_4^2}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = (-12 + 12\omega_4 - \omega_4^2)\frac{cs^4}{6\omega_4^2}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = (-12 + 12\omega_4 - \omega_4^2)\frac{cs^4}{6\omega_4^2}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = (-12 + 12\omega_3 - \omega_3^2)\frac{cs^4}{6\omega_3^2}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = (6cs^4\omega_1^2 - 9\omega_1^2 v_2^4\omega_2 - 45cs^2\omega_1^2 v_2^2\omega_2 - 9\omega_1 v_2^2\omega_2^2 - 9v_2^4\omega_2^2 - 6cs^2\omega_1\omega_2^2 + 6cs^2\omega_2^2 - 45cs^2 v_2^2\omega_2^2 + 30cs^4\omega_1\omega_2^2 + 45cs^2\omega_1^2 v_2^2 + 9\omega_1^2 v_2^4 - 2cs^4\omega_1^2\omega_2^2 - 6cs^2\omega_1^2 + 9\omega_1^2 v_2^2\omega_2 + 45cs^2\omega_1 v_2^2\omega_2^2 - 9\omega_1^2 v_2^2 + 9\omega_1 v_2^4\omega_2^2 + 6cs^2\omega_1^2\omega_2 + 9v_2^2\omega_2^2 - 30cs^4\omega_2^2 - 6cs^4\omega_1^2\omega_2)\frac{1}{12\omega_1^2\omega_2^2}$

coefficient $C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^2 v_1}$ **at** $\frac{\partial^3 v_1}{\partial x_1\partial x_2^2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-cs^2 v_1\rho}{6}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = (12\omega_7\omega_4\omega_5 - 12\omega_4^2\omega_5 - 12\omega_7\omega_5 + 12\omega_4\omega_5 + 12\omega_4^2 - 12\omega_7\omega_4 - \omega_7\omega_4^2\omega_5)\frac{v_1\rho {cs}^2}{6\omega_7\omega_4^2\omega_5}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = (12\omega_7\omega_4\omega_5 - 12\omega_4^2\omega_5 - 12\omega_7\omega_5 + 12\omega_4\omega_5 + 12\omega_4^2 - 12\omega_7\omega_4 - \omega_7\omega_4^2\omega_5)\frac{v_1\rho {cs}^2}{6\omega_7\omega_4^2\omega_5}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-{cs}^2 v_1\rho}{6}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-v_1\rho {cs}^2}{6}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-v_1\rho {cs}^2}{6}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = \frac{-{cs}^2 v_1\rho}{6}$

coefficient $C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^2 v_2}$ **at** $\frac{\partial^3 v_2}{\partial x_1 \partial x_2^2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = 0$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = (2\omega_4 + \omega_4\omega_8 - \omega_4^2 - 2\omega_8)\frac{\rho {cs}^2 v_2}{\omega_4^2\omega_8}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = (2\omega_4 + \omega_4\omega_8 - \omega_4^2 - 2\omega_8)\frac{\rho v_2 {cs}^2}{\omega_4^2\omega_8}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = 0$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = 0$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = 0$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = (11\omega_1 v_2^2\omega_2^2 + 9{cs}^2\omega_1\omega_2^2 - 9{cs}^2\omega_2^2 + 5\omega_1^2\omega_2 + 5\omega_2^2 - 5\omega_1^2 + 9{cs}^2\omega_1^2 - 11\omega_1^2 v_2^2\omega_2 + 11\omega_1^2 v_2^2 - 9{cs}^2\omega_1^2\omega_2 - 11 v_2^2\omega_2^2 - 5\omega_1\omega_2^2)\frac{\rho v_2}{4\omega_1^2\omega_2^2}$

coefficient $C^{(1)}_{\mathrm{D}_y^3\rho}$ **at** $\frac{\partial^3\rho}{\partial x_2^3}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_y^3\rho} = (-1 + 3{cs}^2 + v_2^2)\frac{v_1 v_2}{12}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_y^3\rho} = (3\omega_6{cs}^2\omega_4\omega_8 + 6\omega_6\omega_4 v_2^2 - 18{cs}^2\omega_4\omega_8 + 12\omega_6 - 36\omega_6{cs}^2 + 18\omega_6{cs}^2\omega_4 + 12 v_2^2\omega_8 - \omega_6\omega_4\omega_8 + 6\omega_4\omega_8 - 12\omega_6 v_2^2 - 6\omega_6\omega_4 + \omega_6\omega_4 v_2^2\omega_8 - 6\omega_4 v_2^2\omega_8 - 12\omega_8 + 36{cs}^2\omega_8)\frac{v_1 v_2}{12\omega_6\omega_4\omega_8}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_y^3\rho} = (6\omega_6\omega_4 v_2^2 + 12\omega_6 - 36\omega_6{cs}^2 + 12 v_2^2\omega_8 - \omega_6\omega_4\omega_8 + 6\omega_4\omega_8 - 12\omega_6 v_2^2 - 6\omega_6\omega_4 + \omega_6\omega_4 v_2^2\omega_8 - 6\omega_4 v_2^2\omega_8 - 12\omega_8 + 3\omega_6\omega_4\omega_8{cs}^2 - 18\omega_4\omega_8{cs}^2 + 36\omega_8{cs}^2 + 18\omega_6\omega_4{cs}^2)\frac{v_1 v_2}{12\omega_6\omega_4\omega_8}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_y^3\rho} = (-1 + 3{cs}^2 + v_2^2)\frac{v_1 v_2}{12}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_y^3\rho} = (-1 + 3{cs}^2 + v_2^2)\frac{v_1 v_2}{12}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_y^3\rho} = (-1 + v_2^2 + 3{cs}^2)\frac{v_1 v_2}{12}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_y^3\rho} = (-1 + 3{cs}^2 + v_2^2)\frac{v_1 v_2}{12}$

coefficient $C^{(1)}_{\mathrm{D}_y^3 v_1}$ **at** $\frac{\partial^3 v_1}{\partial x_2^3}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_y^3 v_1} = (6 + 18{cs}^2\omega + \omega^2 - 3{cs}^2\omega^2 - 18{cs}^2 + 6 v_2^2\omega - 6 v_2^2 - 6\omega - v_2^2\omega^2)\frac{\rho v_2}{6\omega^2}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^3_y v_1} = (-6\omega_4 v_2^2 + 15cs^2\omega_4\omega_8 + 3cs^2\omega_4^2 - 6cs^2\omega_4 + \omega_4^2\omega_8 - \omega_4^2 v_2^2\omega_8 + 6\omega_4 - 3\omega_4\omega_8 + 3\omega_4 v_2^2\omega_8 - 3\omega_4^2 - 12cs^2\omega_8 + 3\omega_4^2 v_2^2 - 3cs^2\omega_4^2\omega_8)\frac{\rho v_2}{6\omega_4^2\omega_8}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^3_y v_1} = (-6\omega_4 v_2^2 + 3\omega_4^2 cs^2 - 3\omega_4^2\omega_8 cs^2 + \omega_4^2\omega_8 - \omega_4^2 v_2^2\omega_8 + 6\omega_4 - 3\omega_4\omega_8 + 3\omega_4 v_2^2\omega_8 - 3\omega_4^2 + 15\omega_4\omega_8 cs^2 + 3\omega_4^2 v_2^2 - 12\omega_8 cs^2 - 6\omega_4 cs^2)\frac{\rho v_2}{6\omega_4^2\omega_8}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^3_y v_1} = (6 + 3\omega_4 v_2^2 + 9cs^2\omega_8 + 3v_2^2\omega_8 - 3\omega_4 + \omega_4\omega_8 - 18cs^2 - \omega_4 v_2^2\omega_8 + 9cs^2\omega_4 - 3cs^2\omega_4\omega_8 - 3\omega_8 - 6v_2^2)\frac{\rho v_2}{6\omega_4\omega_8}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^3_y v_1} = (6 + 3\omega_4 v_2^2 - 3cs^2\omega_4\omega_8 - 18cs^2 + 9cs^2\omega_4 + 3v_2^2\omega_8 - 3\omega_4 + \omega_4\omega_8 - \omega_4 v_2^2\omega_8 - 3\omega_8 - 6v_2^2 + 9cs^2\omega_8)\frac{\rho v_2}{6\omega_4\omega_8}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^3_y v_1} = (6 - 3\omega_6 - 3\omega_3 + 9\omega_6 cs^2 + 3\omega_6 v_2^2 + 3\omega_3 v_2^2 - 6v_2^2 - \omega_6\omega_3 v_2^2 - 18cs^2 - 3\omega_6\omega_3 cs^2 + 9\omega_3 cs^2 + \omega_6\omega_3)\frac{\rho v_2}{6\omega_6\omega_3}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}^3_y v_1} = (6 - 3cs^2\omega_3\omega_1 - 3\omega_3 + 3\omega_1 v_2^2 + 9cs^2\omega_3 - 3\omega_1 - 18cs^2 + 3\omega_3 v_2^2 - 6v_2^2 + 9cs^2\omega_1 + \omega_3\omega_1 - \omega_3\omega_1 v_2^2)\frac{\rho v_2}{6\omega_3\omega_1}$

coefficient $C^{(1)}_{\mathrm{D}^3_y v_2}$ **at** $\frac{\partial^3 v_2}{\partial x_2^3}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}^3_y v_2} = (-1 + cs^2 + 3v_2^2)\frac{v_1\rho}{12}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^3_y v_2} = (\omega_6 cs^2\omega_4\omega_8 + 18\omega_6\omega_4 v_2^2 - 6cs^2\omega_4\omega_8 + 12\omega_6 - 12\omega_6 cs^2 + 6\omega_6 cs^2\omega_4 + 36v_2^2\omega_8 - \omega_6\omega_4\omega_8 + 6\omega_4\omega_8 - 36\omega_6 v_2^2 - 6\omega_6\omega_4 + 3\omega_6\omega_4 v_2^2\omega_8 - 18\omega_4 v_2^2\omega_8 - 12\omega_8 + 12cs^2\omega_8)\frac{v_1\rho}{12\omega_6\omega_4\omega_8}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^3_y v_2} = (18\omega_6\omega_4 v_2^2 + 12\omega_6 - 12\omega_6 cs^2 + 36v_2^2\omega_8 - \omega_6\omega_4\omega_8 + 6\omega_4\omega_8 - 36\omega_6 v_2^2 - 6\omega_6\omega_4 + 3\omega_6\omega_4 v_2^2\omega_8 - 18\omega_4 v_2^2\omega_8 - 12\omega_8 + \omega_6\omega_4\omega_8 cs^2 - 6\omega_4\omega_8 cs^2 + 12\omega_8 cs^2 + 6\omega_6\omega_4 cs^2)\frac{v_1\rho}{12\omega_6\omega_4\omega_8}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^3_y v_2} = (-1 + cs^2 + 3v_2^2)\frac{v_1\rho}{12}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^3_y v_2} = (-1 + cs^2 + 3v_2^2)\frac{v_1\rho}{12}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^3_y v_2} = (-1 + 3v_2^2 + cs^2)\frac{v_1\rho}{12}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}^3_y v_2} = (-1 + cs^2 + 3v_2^2)\frac{v_1\rho}{12}$

coefficient $C^{(1)}_{\mathrm{D}^4_x \rho}$ **at** $\frac{\partial^4 \rho}{\partial x_1^4}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}^4_x \rho} = (12 - 34cs^2 v_1^2\omega^3 - \omega^3 + 10v_1^2\omega^3 + 198cs^2\omega + 404cs^2 v_1^2\omega^2 - 156v_1^2 + 8\omega^2 - 98v_1^2\omega^2 + 6cs^2\omega^3 + 234v_1^2\omega + 144cs^4 - 1008cs^2 v_1^2\omega - 78cs^2\omega^2 + 672cs^2 v_1^2 - 132cs^2 + 90v_1^4\omega^2 - 9v_1^4\omega^3 - 216cs^4\omega + 82cs^4\omega^2 - 18\omega - 5cs^4\omega^3 - 216v_1^4\omega + 144v_1^4)\frac{v_1}{12\omega^3}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^4_x \rho} = (12 - 5cs^4\omega_5^3 - 34v_1^2 cs^2\omega_5^3 + 8\omega_5^2 - 98v_1^2\omega_5^2 + 404v_1^2 cs^2\omega_5^2 - 156v_1^2 + 82cs^4\omega_5^2 - \omega_5^3 + 10v_1^2\omega_5^3 - 1008v_1^2 cs^2\omega_5 - 216cs^4\omega_5 + 234v_1^2\omega_5 - 132cs^2 + 672v_1^2 cs^2 - 78cs^2\omega_5^2 - 9v_1^4\omega_5^3 + 6cs^2\omega_5^3 + 90v_1^4\omega_5^2 + 144cs^4 - 216v_1^4\omega_5 - 18\omega_5 + 198cs^2\omega_5 + 144v_1^4)\frac{v_1}{12\omega_5^3}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^4_x \rho} = (12 + 8\omega_5^2 + 6cs^2\omega_5^3 - 98v_1^2\omega_5^2 - 156v_1^2 + 672v_1^2 cs^2 - 78cs^2\omega_5^2 - \omega_5^3 + 10v_1^2\omega_5^3 - 132cs^2 + 198cs^2\omega_5 + 234v_1^2\omega_5 + 404v_1^2 cs^2\omega_5^2 - 9v_1^4\omega_5^3 + 82cs^4\omega_5^2 + 90v_1^4\omega_5^2 - 5cs^4\omega_5^3 - 34v_1^2 cs^2\omega_5^3 - 216v_1^4\omega_5 - 18\omega_5 - 1008v_1^2 cs^2\omega_5 - 216cs^4\omega_5 + 144cs^4 + 144v_1^4)\frac{v_1}{12\omega_5^3}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^4_x \rho} = (12 + 8\omega_5^2 - 98v_1^2\omega_5^2 + 198cs^2\omega_5 - 156v_1^2 - 1008cs^2 v_1^2\omega_5 - \omega_5^3 + 10v_1^2\omega_5^3 + 144cs^4 + 6cs^2\omega_5^3 + 672cs^2 v_1^2 + 404cs^2 v_1^2\omega_5^2 + 234v_1^2\omega_5 - 78cs^2\omega_5^2 - 34cs^2 v_1^2\omega_5^3 - 132cs^2 - 9v_1^4\omega_5^3 - 216cs^4\omega_5 + 90v_1^4\omega_5^2 + 82cs^4\omega_5^2 - 216v_1^4\omega_5 - 18\omega_5 - 5cs^4\omega_5^3 + 144v_1^4)\frac{v_1}{12\omega_5^3}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^4_x \rho} = (12 + 82cs^4\omega_5^2 + 404v_1^2 cs^2\omega_5^2 + 8\omega_5^2 - 98v_1^2\omega_5^2 - 34v_1^2 cs^2\omega_5^3 - 156v_1^2 - 5cs^4\omega_5^3 - \omega_5^3 + 10v_1^2\omega_5^3 + 234v_1^2\omega_5 + 672v_1^2 cs^2 - 132cs^2 - 216cs^4\omega_5 - 1008v_1^2 cs^2\omega_5 + 6cs^2\omega_5^3 - 9v_1^4\omega_5^3 + 144cs^4 - 78cs^2\omega_5^2 + 90v_1^4\omega_5^2 - 216v_1^4\omega_5 + 198cs^2\omega_5 - 18\omega_5 + 144v_1^4)\frac{v_1}{12\omega_5^3}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^4_x \rho} = (12 + 144cs^4 - 9v_1^4\omega_1^3 + 404v_1^2\omega_1^2 cs^2 - 156v_1^2 + 90v_1^4\omega_1^2 - 5\omega_1^3 cs^4 - 34v_1^2\omega_1^3 cs^2 - 216v_1^4\omega_1 + 198\omega_1 cs^2 + 82\omega_1^2 cs^4 - 216\omega_1 cs^4 - 98v_1^2\omega_1^2 + 8\omega_1^2 - 18\omega_1 + 10v_1^2\omega_1^3 - \omega_1^3 - 78\omega_1^2 cs^2 + 672v_1^2 cs^2 - 132cs^2 + 234v_1^2\omega_1 + 6\omega_1^3 cs^2 + 144v_1^4 - 1008v_1^2\omega_1 cs^2)\frac{v_1}{12\omega_1^3}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}^4_x \rho} = (-51\omega_3 v_1^2\omega_1^3 - 12cs^2 v_1^2\omega_1^2\omega_2^2 - 6cs^2\omega_1\omega_2^3 + 114cs^2\omega_3\omega_1^2\omega_2^2 + 129\omega_3 v_1^2\omega_1\omega_2^3 + 90cs^4\omega_3\omega_1^3 + 6cs^2 v_1^2\omega_1^3\omega_2 - 105\omega_3 v_1^2\omega_1\omega_2^2 +$

$141cs^2\omega_3\omega_1^3\omega_2 - 78cs^2\omega_3\omega_1^2\omega_2^3 + 45\omega_3v_1^4\omega_2^3 + 411cs^2\omega_3v_1^2\omega_1\omega_2^2 - 78cs^2\omega_3\omega_1^3\omega_2^2 + 18cs^4\omega_1\omega_2^3 + 6\omega_3\omega_1\omega_2^2 - 171cs^4\omega_3\omega_1\omega_2^3 - 117\omega_3v_1^4\omega_1\omega_2^3 + 261cs^2\omega_3v_1^2\omega_2^3 + 6\omega_3\omega_2^3 - 12\omega_3\omega_1\omega_2^2 - 60cs^2\omega_3\omega_1^2\omega_2 + 12cs^2\omega_3\omega_1^3\omega_2^3 - 72cs^2\omega_3\omega_1^3 - 600cs^2\omega_3v_1^2\omega_1\omega_2^3 + 99\omega_3v_1^4\omega_1\omega_2^2 + 54cs^4\omega_3\omega_1\omega_2^2 - 12\omega_3\omega_1^3\omega_2 - 36cs^4\omega_1^2\omega_2^2 - 72cs^2\omega_3\omega_2^3 + 8\omega_3\omega_1^2\omega_2^3 + 404cs^2\omega_3v_1^2\omega_1^2\omega_2^3 - 98\omega_3v_1^2\omega_1^3\omega_2^2 - 600cs^2\omega_3v_1^2\omega_1^3\omega_2 - 198\omega_3v_1^4\omega_1^2\omega_2^2 - 90cs^4\omega_3\omega_1^2\omega_2^2 + 20\omega_3v_1^2\omega_1^3\omega_2^3 - 105\omega_3v_1^2\omega_1^2\omega_2 + 45\omega_3v_1^4\omega_1^3 - 816cs^2\omega_3v_1^2\omega_1^2\omega_2^2 + 18cs^4\omega_1^3\omega_2 - 12\omega_3\omega_1^2\omega_2^2 - 171cs^4\omega_3\omega_1^3\omega_2 + 82cs^4\omega_3\omega_1^2\omega_2^3 - 117\omega_3v_1^4\omega_1^3\omega_2 + 6\omega_3\omega_1^3 + 261cs^2\omega_3v_1^2\omega_1^3 + 90\omega_3v_1^4\omega_1^2\omega_2^3 + 82cs^4\omega_3\omega_1^3\omega_2^2 + 90cs^4\omega_3\omega_2^3 + 12cs^2\omega_1^2\omega_2^2 + 6cs^2v_1^2\omega_1\omega_2^3 + 90\omega_3v_1^4\omega_1^3\omega_2^2 - 68cs^2\omega_3v_1^2\omega_1^3\omega_2^3 + 411cs^2\omega_3v_1^2\omega_1^2\omega_2 + 210\omega_3v_1^2\omega_1^2\omega_2^2 + 141cs^2\omega_3\omega_1\omega_2^3 + 6\omega_3\omega_1^2\omega_2 - 2\omega_3\omega_1^3\omega_2^3 + 99\omega_3v_1^4\omega_1^2\omega_2 - 51\omega_3v_1^2\omega_2^3 - 18\omega_3v_1^4\omega_1^3\omega_2^3 + 54cs^4\omega_3\omega_1^2\omega_2 - 6cs^2\omega_1^3\omega_2 - 10cs^4\omega_3\omega_1^3\omega_2^3 + 8\omega_3\omega_1^3\omega_2^2 - 60cs^2\omega_3\omega_1\omega_2^2 - 98\omega_3v_1^2\omega_1^2\omega_2^3 + 404cs^2\omega_3v_1^2\omega_1^3\omega_2^2 + 129\omega_3v_1^2\omega_1^3\omega_2)\frac{v_1}{24\omega_3\omega_1^3\omega_2^3}$

coefficient $C^{(1)}_{\mathrm{D}_x^4 v_1}$ **at** $\frac{\partial^4 v_1}{\partial x_1^4}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x^4 v_1} = (12 - 18cs^2v_1^2\omega^3 - \omega^3 + 14v_1^2\omega^3 + 54cs^2\omega + 252cs^2v_1^2\omega^2 - 252v_1^2 + 8\omega^2 - 154v_1^2\omega^2 + 2cs^2\omega^3 + 378v_1^2\omega + 24cs^4 - 648cs^2v_1^2\omega - 22cs^2\omega^2 + 432cs^2v_1^2 - 36cs^2 + 310v_1^4\omega^2 - 29v_1^4\omega^3 - 36cs^4\omega + 14cs^4\omega^2 - 18\omega - cs^4\omega^3 - 756v_1^4\omega + 504v_1^4)\frac{\rho}{12\omega^3}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x^4 v_1} = (12 - cs^4\omega_5^3 - 18v_1^2cs^2\omega_5^3 + 8\omega_5^2 - 154v_1^2\omega_5^2 + 252v_1^2cs^2\omega_5^2 - 252v_1^2 + 14cs^4\omega_5^2 - \omega_5^3 + 14v_1^2\omega_5^3 - 648v_1^2cs^2\omega_5 - 36cs^4\omega_5 + 378v_1^2\omega_5 - 36cs^2 + 432v_1^2cs^2 - 22cs^2\omega_5^2 - 29v_1^4\omega_5^3 + 2cs^2\omega_5^3 + 310v_1^4\omega_5^2 + 24cs^4 - 756v_1^4\omega_5 - 18\omega_5 + 54cs^2\omega_5 + 504v_1^4)\frac{\rho}{12\omega_5^3}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x^4 v_1} = (12 + 8\omega_5^2 + 2cs^2\omega_5^3 - 154v_1^2\omega_5^2 - 252v_1^2 + 432v_1^2cs^2 - 22cs^2\omega_5^2 - \omega_5^3 + 14v_1^2\omega_5^3 - 36cs^2 + 54cs^2\omega_5 + 378v_1^2\omega_5 + 252v_1^2cs^2\omega_5^2 - 29v_1^4\omega_5^3 + 14cs^4\omega_5^2 + 310v_1^4\omega_5^2 - cs^4\omega_5^3 - 18v_1^2cs^2\omega_5^3 - 756v_1^4\omega_5 - 18\omega_5 - 648v_1^2cs^2\omega_5 - 36cs^4\omega_5 + 24cs^4 + 504v_1^4)\frac{\rho}{12\omega_5^3}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x^4 v_1} = (12 + 8\omega_5^2 - 154v_1^2\omega_5^2 + 54cs^2\omega_5 - 252v_1^2 - 648cs^2v_1^2\omega_5 - \omega_5^3 + 14v_1^2\omega_5^3 + 24cs^4 + 2cs^2\omega_5^3 + 432cs^2v_1^2 + 252cs^2v_1^2\omega_5^2 + 378v_1^2\omega_5 - 22cs^2\omega_5^2 - 18cs^2v_1^2\omega_5^3 - 36cs^2 - 29v_1^4\omega_5^3 - 36cs^4\omega_5 + 310v_1^4\omega_5^2 + 14cs^4\omega_5^2 - 756v_1^4\omega_5 - 18\omega_5 - cs^4\omega_5^3 + 504v_1^4)\frac{\rho}{12\omega_5^3}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x^4 v_1} = (12 + 14cs^4\omega_5^2 + 252v_1^2cs^2\omega_5^2 + 8\omega_5^2 - 154v_1^2\omega_5^2 - 18v_1^2cs^2\omega_5^3 - 252v_1^2 - cs^4\omega_5^3 - \omega_5^3 + 14v_1^2\omega_5^3 + 378v_1^2\omega_5 + 432v_1^2cs^2 - 36cs^2 - 36cs^4\omega_5 - 648v_1^2cs^2\omega_5 + 2cs^2\omega_5^3 - 29v_1^4\omega_5^3 + 24cs^4 - 22cs^2\omega_5^2 + 310v_1^4\omega_5^2 - 756v_1^4\omega_5 + 54cs^2\omega_5 - 18\omega_5 + 504v_1^4)\frac{\rho}{12\omega_5^3}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x^4 v_1} = (12 + 24cs^4 - 29v_1^4\omega_1^3 + 252v_1^2\omega_1^2cs^2 - 252v_1^2 + 310v_1^4\omega_1^2 - \omega_1^3cs^4 - 18v_1^2\omega_1^3cs^2 - 756v_1^4\omega_1 + 54\omega_1cs^2 + 14\omega_1^2cs^4 - 36\omega_1cs^4 - 154v_1^2\omega_1^2 + 8\omega_1^2 - 18\omega_1 + 14v_1^2\omega_1^3 - \omega_1^3 - 22\omega_1^2cs^2 + 432v_1^2cs^2 - 36cs^2 + 378v_1^2\omega_1 + 2\omega_1^3cs^2 + 504v_1^4 - 648v_1^2\omega_1cs^2)\frac{\rho}{12\omega_1^3}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x^4 v_1} = (-99\omega_3v_1^2\omega_1^3 - 36cs^2v_1^2\omega_1^2\omega_2^2 - 6cs^2\omega_1\omega_2^3 + 18cs^2\omega_3\omega_1^2\omega_2^2 + 225\omega_3v_1^2\omega_1\omega_2^3 + 18cs^4\omega_3\omega_1^3 + 18cs^2v_1^2\omega_1^3\omega_2 - 153\omega_3v_1^2\omega_1\omega_2^2 + 45cs^2\omega_3\omega_1^3\omega_2 - 22cs^2\omega_3\omega_1^2\omega_2^3 + 171\omega_3v_1^4\omega_2^3 + 225cs^2\omega_3v_1^2\omega_1\omega_2^2 - 22cs^2\omega_3\omega_1^3\omega_2^2 + 6cs^4\omega_1\omega_2^3 + 6\omega_3\omega_1\omega_2^2 - 33cs^4\omega_3\omega_1\omega_2^3 - 423\omega_3v_1^4\omega_1\omega_2^3 + 207cs^2\omega_3v_1^2\omega_2^3 + 6\omega_3\omega_2^3 - 12\omega_3\omega_1\omega_2^2 - 12cs^2\omega_3\omega_1^2\omega_2 + 4cs^2\omega_3\omega_1^3\omega_2^3 - 24cs^2\omega_3\omega_1^3 - 432cs^2\omega_3v_1^2\omega_1\omega_2^3 + 333\omega_3v_1^4\omega_1\omega_2^2 + 6cs^4\omega_3\omega_1\omega_2^2 - 12\omega_3\omega_1^3\omega_2 - 12cs^4\omega_1^2\omega_2^2 - 24cs^2\omega_3\omega_2^3 + 8\omega_3\omega_1^2\omega_2^3 + 252cs^2\omega_3v_1^2\omega_1^2\omega_2^3 - 154\omega_3v_1^2\omega_1^3\omega_2^2 - 432cs^2\omega_3v_1^2\omega_1^3\omega_2 - 666\omega_3v_1^4\omega_1^2\omega_2^2 - 6cs^4\omega_3\omega_1^2\omega_2^2 + 28\omega_3v_1^2\omega_1^3\omega_2^3 - 153\omega_3v_1^2\omega_1^2\omega_2 + 171\omega_3v_1^4\omega_1^3 - 432cs^2\omega_3v_1^2\omega_1^2\omega_2^2 + 6cs^4\omega_1^3\omega_2 - 12\omega_3\omega_1^2\omega_2^2 - 33cs^4\omega_3\omega_1^3\omega_2 + 14cs^4\omega_3\omega_1^2\omega_2^3 - 423\omega_3v_1^4\omega_1^3\omega_2 + 6\omega_3\omega_1^3 + 207cs^2\omega_3v_1^2\omega_1^3 + 310\omega_3v_1^4\omega_1^2\omega_2^3 + 14cs^4\omega_3\omega_1^3\omega_2^2 + 18cs^4\omega_3\omega_2^3 + 12cs^2\omega_1^2\omega_2^2 + 18cs^2v_1^2\omega_1\omega_2^3 + 310\omega_3v_1^4\omega_1^3\omega_2^2 - 36cs^2\omega_3v_1^2\omega_1^3\omega_2^3 + 225cs^2\omega_3v_1^2\omega_1^2\omega_2 + 306\omega_3v_1^2\omega_1^2\omega_2^2 + 45cs^2\omega_3\omega_1\omega_2^3 + 6\omega_3\omega_1^2\omega_2 - 2\omega_3\omega_1^3\omega_2^3 + 333\omega_3v_1^4\omega_1^2\omega_2 - 99\omega_3v_1^2\omega_2^3 - 58\omega_3v_1^4\omega_1^3\omega_2^3 + 6cs^4\omega_3\omega_1^2\omega_2 - 6cs^2\omega_1^3\omega_2 - 2cs^4\omega_3\omega_1^3\omega_2^3 + 8\omega_3\omega_1^3\omega_2^2 - 12cs^2\omega_3\omega_1\omega_2^2 - 154\omega_3v_1^2\omega_1^2\omega_2^3 + 252cs^2\omega_3v_1^2\omega_1^3\omega_2^2 + 225\omega_3v_1^2\omega_1^3\omega_2)\frac{\rho}{24\omega_3\omega_1^3\omega_2^3}$

coefficient $C^{(1)}_{\mathrm{D}_x^3\mathrm{D}_y\rho}$ **at** $\frac{\partial^4\rho}{\partial x_1^3\partial x_2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = 0$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = (8v_1^4\omega_7^2\omega_5^2 - 51v_1^2cs^2\omega_7\omega_4^2\omega_5^3 - 84v_1^2cs^2\omega_7^2\omega_4\omega_5^2 - 20v_1^4\omega_7\omega_4^2\omega_5 + 16v_1^2\omega_7\omega_4\omega_5^2 + 8cs^4\omega_7\omega_4^2\omega_5^2 - 4v_1^4\omega_4\omega_5^3 + 120v_1^2cs^2\omega_7\omega_4^2\omega_5^2 + 20v_1^4\omega_7^2\omega_4\omega_5 + 12cs^2\omega_7^2\omega_4^2\omega_5 - 4cs^4\omega_4\omega_5^3 + 36v_1^2cs^2\omega_7^2\omega_5^2 - 4cs^4\omega_7\omega_4^2\omega_5^3 - 24v_1^2cs^2\omega_4\omega_5^3 + 4cs^4\omega_7^2\omega_5^2 - 8cs^4\omega_7^2\omega_4\omega_5^2 - 13v_1^2\omega_7^2\omega_4^2\omega_5^2 - 20v_1^2\omega_7\omega_4\omega_5^3 + 4cs^4\omega_7^2\omega_4\omega_5 - 8v_1^2\omega_7^2\omega_5^2 + 36v_1^2\omega_7^2\omega_4^2\omega_5 - 13v_1^4\omega_7\omega_4^2\omega_5^2 - 20v_1^4\omega_7^2\omega_4\omega_5^2 - 72v_1^2cs^2\omega_7\omega_4^2\omega_5 + 4v_1^2\omega_4\omega_5^3 - 4cs^2\omega_7^2\omega_4^2\omega_5^2 - 8cs^2\omega_7\omega_4\omega_5^3 + 4cs^2\omega_4\omega_5^3 - 4cs^4\omega_7\omega_4^2\omega_5 - 4cs^2\omega_7^2\omega_5^2 + 32v_1^4\omega_7\omega_4^2\omega_5^2 + 72v_1^2cs^2\omega_7^2\omega_4\omega_5 + 96v_1^2cs^2\omega_7^2\omega_4^2 + 20v_1^2\omega_7\omega_4^2\omega_5 + 8v_1^2\omega_7\omega_5^3 - 4cs^2\omega_4^2\omega_5^3 + 4v_1^2\omega_4^2\omega_5^2 - 8cs^2\omega_7\omega_4^2\omega_5^2 - 16v_1^4\omega_7\omega_4\omega_5^2 - 144v_1^2cs^2\omega_7^2\omega_4^2\omega_5 + 8cs^4\omega_7^2\omega_4^2 + 4cs^2\omega_4^2\omega_5^2 - 12cs^4\omega_7^2\omega_4^2\omega_5 - 20v_1^2\omega_7^2\omega_4\omega_5 + 24v_1^4\omega_7^2\omega_4^2 + 13v_1^4\omega_7^2\omega_4^2\omega_5^2 + 20v_1^4\omega_7\omega_4\omega_5^3 + 4cs^2\omega_7\omega_4^2\omega_5^3 + 4cs^2\omega_7^2\omega_5^3 + 8cs^2\omega_7^2\omega_4\omega_5^2 - 4v_1^2\omega_4^2\omega_5^3 - 48v_1^2cs^2\omega_7\omega_4\omega_5^2 - 36v_1^4\omega_7^2\omega_4^2\omega_5 - 8v_1^4\omega_7\omega_5^3 + 4cs^4\omega_4^2\omega_5^3 - 4cs^2\omega_7^2\omega_4\omega_5 + 4cs^4\omega_7^2\omega_4^2\omega_5^2 - 4v_1^4\omega_4^2\omega_5^2 + 8cs^4\omega_7\omega_4\omega_5^3 + 24v_1^2cs^2\omega_4^2\omega_5^3 + 13v_1^2\omega_7\omega_4^2\omega_5^3 - 8cs^2\omega_7^2\omega_4^2 + 20v_1^2\omega_7^2\omega_4\omega_5^2 - 36v_1^2cs^2\omega_7\omega_5^3 + 4cs^2\omega_7\omega_4^2\omega_5 - 4cs^4\omega_4^2\omega_5^2 - 24v_1^2\omega_7^2\omega_4^2 + 51v_1^2cs^2\omega_7^2\omega_4^2\omega_5^2 + 84v_1^2cs^2\omega_7\omega_4\omega_5^3 - 32v_1^2\omega_7\omega_4^2\omega_5^2 - 4cs^4\omega_7\omega_5^3 - 24v_1^2cs^2\omega_4^2\omega_5^2 + 4v_1^4\omega_4^2\omega_5^3)\frac{v_2}{4\omega_7^2\omega_4^2\omega_5^3}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = (8v_1^4\omega_7^2\omega_5^2 + 12\omega_7^2\omega_4^2cs^2\omega_5 - 84v_1^2\omega_7^2\omega_4cs^2\omega_5^2 - 8\omega_7\omega_4cs^2\omega_5^3 - 20v_1^4\omega_7\omega_4^2\omega_5 + 16v_1^2\omega_7\omega_4\omega_5^2 + 96v_1^2\omega_7^2\omega_4^2cs^2 - 8\omega_7^2\omega_4cs^4\omega_5^2 - 4v_1^4\omega_4\omega_5^3 - 4\omega_7cs^4\omega_5^3 + 20v_1^4\omega_7^2\omega_4\omega_5 + 4\omega_4cs^2\omega_5^3 - 72v_1^2\omega_7\omega_4^2cs^2\omega_5 - 13v_1^2\omega_7^2\omega_4^2\omega_5^2 + 36v_1^2\omega_7^2cs^2\omega_5^2 - 4\omega_7\omega_4^2cs^4\omega_5 - 20v_1^2\omega_7\omega_4\omega_5^3 - 8v_1^2\omega_7^2\omega_5^2 + 4\omega_4^2cs^4\omega_5^3 + 36v_1^2\omega_7^2\omega_4^2\omega_5 - 8\omega_7^2\omega_4^2cs^2 + 8\omega_7\omega_4^2cs^4\omega_5^2 - 13v_1^4\omega_7\omega_4^2\omega_5^2 - 20v_1^4\omega_7^2\omega_4\omega_5^2 + 4v_1^2\omega_4\omega_5^3 + 120v_1^2\omega_7\omega_4^2cs^2\omega_5^2 - 4\omega_7\omega_4^2cs^4\omega_5^3 - 4\omega_7^2cs^2\omega_5^2 + 4\omega_7^2\omega_4cs^4\omega_5 - 4\omega_4^2cs^4\omega_5^2 - 51v_1^2\omega_7\omega_4^2cs^2\omega_5^3 - 24v_1^2\omega_4cs^2\omega_5^3 - 4\omega_7^2\omega_4^2cs^2\omega_5^2 + 72v_1^2\omega_7^2\omega_4cs^2\omega_5 + 32v_1^4\omega_7\omega_4^2\omega_5^2 + 4\omega_7cs^2\omega_5^3 + 20v_1^2\omega_7\omega_4^2\omega_5 - 4\omega_4cs^4\omega_5^3 + 8v_1^2\omega_7\omega_5^3 - 48v_1^2\omega_7\omega_4cs^2\omega_5^2 - 24v_1^2\omega_4^2cs^2\omega_5^2 + 4v_1^2\omega_4^2\omega_5^2 - 16v_1^4\omega_7\omega_4\omega_5^2 + 8\omega_7^2\omega_4^2cs^4 + 4\omega_7\omega_4^2cs^2\omega_5 -$

$12\omega_7^2\omega_4^2cs^4\omega_5 - 20v_1^2\omega_7^2\omega_4\omega_5 + 24v_1^4\omega_7^2\omega_4^2 + 8\omega_7\omega_4cs^4\omega_5^3 + 13v_1^4\omega_7^2\omega_4^2\omega_5^2 + 20v_1^4\omega_7\omega_4\omega_5^3 - 144v_1^2\omega_7^2\omega_4^2cs^2\omega_5 + 8\omega_7^2\omega_4cs^2\omega_5^2 + 24v_1^2\omega_4^2cs^2\omega_5^3 + 84v_1^2\omega_7\omega_4cs^2\omega_5^3 - 4v_1^2\omega_4^2\omega_5^3 + 4\omega_7^2cs^4\omega_5^2 - 36v_1^4\omega_7^2\omega_4^2\omega_5 + 4\omega_7\omega_4^2cs^2\omega_5^3 + 51v_1^2\omega_7^2\omega_4^2cs^2\omega_5^2 - 8v_1^4\omega_7\omega_5^3 + 4\omega_4^2cs^2\omega_5^2 - 4\omega_7^2\omega_4cs^2\omega_5 - 4v_1^4\omega_4^2\omega_5^2 + 4\omega_7^2\omega_4^2cs^4\omega_5^2 + 13v_1^2\omega_7\omega_4^2\omega_5^3 - 36v_1^2\omega_7cs^2\omega_5^3 + 20v_1^2\omega_7^2\omega_4\omega_5^2 - 4\omega_4^2cs^2\omega_5^3 - 24v_1^2\omega_7^2\omega_4^2 - 8\omega_7\omega_4^2cs^2\omega_5^2 - 32v_1^2\omega_7\omega_4^2\omega_5^2 + 4v_1^4\omega_4^2\omega_5^3)\frac{v_2}{4\omega_7^2\omega_4^2\omega_5^3}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = 0$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = 0$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = 0$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = (9\omega_3^2v_1^2\omega_1^2v_2^2\omega_2 + 108\omega_3^2v_1^4\omega_1^2\omega_2^2 + 6cs^4\omega_3^2\omega_1^3\omega_2^2 - 6cs^2\omega_3\omega_1^3v_2^2\omega_2 + \omega_3^2\omega_1^2v_2^2\omega_2^3 - 72cs^2\omega_3^2v_1^2\omega_1^2\omega_2^3 - 24\omega_3^2v_1^2\omega_1^3\omega_2^2 - 486cs^2\omega_3^2v_1^2\omega_1^3\omega_2 - 3cs^2\omega_3^2\omega_1\omega_2^3 - 6\omega_3^2\omega_1^2\omega_2 - 54\omega_3^2v_1^4\omega_1^3\omega_2 - 6cs^2\omega_3^2\omega_1^2v_2^2\omega_2 - 18cs^4\omega_3^2\omega_2^3 - 54cs^4\omega_3^2\omega_1^2\omega_2 + 6cs^2\omega_3\omega_1v_2^2\omega_2^3 - 9\omega_3^2v_1^2\omega_2^3 + 18cs^2\omega_3^2\omega_1^3v_2^2 + 6cs^2\omega_3\omega_1^3\omega_2 + 12cs^2\omega_3^2\omega_1\omega_2^2 + 45\omega_3^2v_1^2\omega_1^2\omega_2 + 18cs^2\omega_3\omega_1^2\omega_2^3 + 540cs^2\omega_3^2v_1^2\omega_1^2\omega_2^2 + \omega_3^2\omega_1^3\omega_2^2 - \omega_3^2\omega_1^2\omega_2^3 - 18cs^2\omega_3\omega_1^3\omega_2^2 - 6\omega_3^2\omega_1^3\omega_2 - 243cs^2\omega_3^2v_1^2\omega_1^2\omega_2 + 12cs^2\omega_1^2v_2^2\omega_2^3 - 108\omega_3^2v_1^2\omega_1^2\omega_2^2 + 18cs^4\omega_3\omega_1\omega_2^3 - 18cs^2\omega_3^2v_2^2\omega_2^3 + 6\omega_3^2\omega_1^2v_2^2\omega_2 + 72cs^4\omega_3^2\omega_1^2\omega_2^2 - 24\omega_3^2v_1^2\omega_1^2v_2^2\omega_2^2 + 6\omega_3^2\omega_1^3 + 24\omega_3^2v_1^2\omega_1^2\omega_2^3 + 72cs^2\omega_3^2v_1^2\omega_1^3\omega_2^2 + 126\omega_3^2v_1^2\omega_1^3\omega_2 + 54\omega_3^2v_1^4\omega_1^3 + 405cs^2\omega_3^2v_1^2\omega_1^3 - 54\omega_3^2v_1^4\omega_1^2\omega_2 - 6cs^4\omega_3^2\omega_1^2\omega_2^3 - 2cs^2\omega_3^2\omega_1^2v_2^2\omega_2^3 + 18cs^2\omega_3\omega_1^3v_2^2\omega_2^2 - 99cs^4\omega_3^2\omega_1^3\omega_2 - 72cs^2\omega_3^2\omega_1^3 + 6\omega_3^2\omega_1\omega_2^2 - 18\omega_3^2v_1^2\omega_1\omega_2^3 - 5cs^2\omega_3^2\omega_1^3\omega_2^2 - 6\omega_3^2\omega_1^3v_2^2 + 54\omega_3^2v_1^4\omega_2^3 - 21cs^2\omega_3^2\omega_1^3v_2^2\omega_2 + 72\omega_3^2v_1^2\omega_1v_2^2\omega_2^3 - \omega_3^2\omega_1^3v_2^2\omega_2^2 + 135cs^2\omega_3^2v_1^2\omega_2^3 + 27cs^4\omega_3^2\omega_1\omega_2^3 + 6cs^2\omega_3^2\omega_1v_2^2\omega_2^2 + 12cs^2\omega_1^2\omega_2^2 + 45\omega_3^2v_1^2\omega_1^3v_2^2 + 63\omega_3^2v_1^2\omega_1\omega_2^2 + 36cs^4\omega_1^2\omega_2^3 + 6\omega_3^2\omega_1\omega_2^3 + 60cs^2\omega_3^2\omega_1^2\omega_2 + 21cs^2\omega_3^2\omega_1v_2^2\omega_2^3 - 18cs^4\omega_3^2\omega_1\omega_2^2 - 72\omega_3^2v_1^2\omega_1^3v_2^2\omega_2 - 18cs^4\omega_3\omega_1^3\omega_2 - 54cs^4\omega_3\omega_1^2\omega_2^3 - 6\omega_3^2\omega_2^3 - 9\omega_3^2v_1^2\omega_1v_2^2\omega_2^2 + 54cs^4\omega_3\omega_1^3\omega_2^2 - 6\omega_3^2\omega_1v_2^2\omega_2^3 + 24\omega_3^2v_1^2\omega_1^3v_2^2\omega_2^2 - 54\omega_3^2v_1^4\omega_1\omega_2^3 - 45\omega_3^2v_1^2v_2^2\omega_2^3 + 90cs^4\omega_3^2\omega_1^3 - 99\omega_3^2v_1^2\omega_1^3 - 12cs^2\omega_1^3v_1^2v_2^2\omega_2^2 - 297cs^2\omega_3^2v_1^2\omega_1\omega_2^2 - 36cs^4\omega_1^3\omega_2^2 - 6cs^2\omega_3\omega_1\omega_2^3 - 72cs^2\omega_3^2\omega_1^2\omega_2^2 - 18cs^2\omega_3\omega_1^2v_2^2\omega_2^3 + 6\omega_3^2\omega_1^3v_2^2\omega_2 + 2cs^2\omega_3^2\omega_1^3v_2^2\omega_2^2 - 12cs^2\omega_1^2\omega_2^3 + 6\omega_3^2v_2^2\omega_2^3 - 54\omega_3^2v_1^4\omega_1\omega_2^2 - 6\omega_3^2\omega_1v_2^2\omega_2^2 + 5cs^2\omega_3^2\omega_1^2\omega_2^3 + 75cs^2\omega_3^2\omega_1^3\omega_2 - 54cs^2\omega_3^2v_1^2\omega_1\omega_2^3)\frac{v_2}{24\omega_3^2\omega_1^3\omega_2^3}$

coefficient $C^{(1)}_{\mathrm{D}_x^3\mathrm{D}_y v_1}$ **at** $\frac{\partial^4 v_1}{\partial x_1^3\partial x_2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x^3\mathrm{D}_y v_1} = 0$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x^3\mathrm{D}_y v_1} = (48\omega_7^2\omega_4^2\omega_5 - 8\omega_4^2\omega_5^3 - 48v_1^2\omega_7\omega_4\omega_5^2 + 12\omega_7\omega_5^3 - 72cs^2\omega_7^2\omega_4^2\omega_5 + 43v_1^2\omega_7^2\omega_4^2\omega_5^2 + 68v_1^2\omega_7\omega_4\omega_5^3 + 8\omega_4^2\omega_5^2 - 32\omega_7^2\omega_4^2 + 28v_1^2\omega_7^2\omega_5^2 - 120v_1^2\omega_7^2\omega_4^2\omega_5 + 16\omega_7\omega_4\omega_5^2 - 16v_1^2\omega_4\omega_5^3 + 25cs^2\omega_7^2\omega_4^2\omega_5^2 + 44cs^2\omega_7\omega_4\omega_5^3 - 17\omega_7^2\omega_4^2\omega_5^2 - 28\omega_7\omega_4\omega_5^3 - 16cs^2\omega_4\omega_5^3 - 16cs^2\omega_7\omega_4\omega_5^2 + 20cs^2\omega_7^2\omega_5^2 + 17\omega_7\omega_4^2\omega_5^3 - 64v_1^2\omega_7\omega_4^2\omega_5 + 28\omega_7^2\omega_4\omega_5^2 - 28v_1^2\omega_7\omega_5^3 + 16cs^2\omega_4^2\omega_5^3 - 16v_1^2\omega_4^2\omega_5^2 + 56cs^2\omega_7\omega_4^2\omega_5^2 - 16cs^2\omega_4^2\omega_5^2 + 64v_1^2\omega_7^2\omega_4\omega_5 - 40\omega_7\omega_4^2\omega_5^2 - 25cs^2\omega_7\omega_4^2\omega_5^3 - 20cs^2\omega_7\omega_5^3 - 44cs^2\omega_7^2\omega_4\omega_5^2 + 16v_1^2\omega_4^2\omega_5^3 + 32cs^2\omega_7^2\omega_4\omega_5 - 43v_1^2\omega_7\omega_4^2\omega_5^3 + 48cs^2\omega_7^2\omega_4^2 + 24\omega_7\omega_4^2\omega_5 - 68v_1^2\omega_7^2\omega_4\omega_5^2 - 32cs^2\omega_7\omega_4^2\omega_5 + 80v_1^2\omega_7^2\omega_4^2 - 12\omega_7^2\omega_5^2 + 8\omega_4\omega_5^3 - 24\omega_7^2\omega_4\omega_5 + 104v_1^2\omega_7\omega_4^2\omega_5^2)\frac{v_1\rho v_2}{4\omega_7^2\omega_4^2\omega_5^3}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x^3\mathrm{D}_y v_1} = (-72\omega_7^2\omega_4^2cs^2\omega_5 + 44\omega_7\omega_4cs^2\omega_5^3 + 48\omega_7^2\omega_4^2\omega_5 - 8\omega_4^2\omega_5^3 - 48v_1^2\omega_7\omega_4\omega_5^2 - 16\omega_7\omega_4cs^2\omega_5^2 + 12\omega_7\omega_5^3 - 16\omega_4cs^2\omega_5^3 + 43v_1^2\omega_7^2\omega_4^2\omega_5^2 + 68v_1^2\omega_7\omega_4\omega_5^3 + 8\omega_4^2\omega_5^2 - 32\omega_7^2\omega_4^2 + 28v_1^2\omega_7^2\omega_5^2 - 120v_1^2\omega_7^2\omega_4^2\omega_5 + 16\omega_7\omega_4\omega_5^2 + 48\omega_7^2\omega_4^2cs^2 - 16v_1^2\omega_4\omega_5^3 - 17\omega_7^2\omega_4^2\omega_5^2 + 20\omega_7^2cs^2\omega_5^2 - 28\omega_7\omega_4\omega_5^3 + 25\omega_7^2\omega_4^2cs^2\omega_5^2 + 17\omega_7\omega_4^2\omega_5^3 - 20\omega_7cs^2\omega_5^3 - 64v_1^2\omega_7\omega_4^2\omega_5 + 28\omega_7^2\omega_4\omega_5^2 - 28v_1^2\omega_7\omega_5^3 - 16v_1^2\omega_4^2\omega_5^2 - 32\omega_7\omega_4^2cs^2\omega_5 + 64v_1^2\omega_7^2\omega_4\omega_5 - 40\omega_7\omega_4^2\omega_5^2 - 44\omega_7^2\omega_4cs^2\omega_5^2 + 16v_1^2\omega_4^2\omega_5^3 - 25\omega_7\omega_4^2cs^2\omega_5^3 - 16\omega_4^2cs^2\omega_5^2 + 32\omega_7^2\omega_4cs^2\omega_5 - 43v_1^2\omega_7\omega_4^2\omega_5^3 + 24\omega_7\omega_4^2\omega_5 - 68v_1^2\omega_7^2\omega_4\omega_5^2 + 16\omega_4^2cs^2\omega_5^3 + 80v_1^2\omega_7^2\omega_4^2 - 12\omega_7^2\omega_5^2 + 56\omega_7\omega_4^2cs^2\omega_5^2 + 8\omega_4\omega_5^3 - 24\omega_7^2\omega_4\omega_5 + 104v_1^2\omega_7\omega_4^2\omega_5^2)\frac{v_1\rho v_2}{4\omega_7^2\omega_4^2\omega_5^3}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x^3\mathrm{D}_y v_1} = 0$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x^3\mathrm{D}_y v_1} = 0$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x^3\mathrm{D}_y v_1} = 0$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x^3\mathrm{D}_y v_1} = (198\omega_3v_1^2\omega_1^3 + 54cs^2\omega_1\omega_2^3 + 10\omega_3\omega_1^3v_2^2\omega_2^2 + 324cs^2\omega_3\omega_1^2\omega_2^2 - 198\omega_3v_1^2\omega_1\omega_2^3 - 18\omega_1^3v_2^2\omega_2 - 36\omega_3v_2^2\omega_2^3 - 198\omega_3v_1^2\omega_1\omega_2^2 + 18\omega_1^3\omega_2 + 18\omega_1^2\omega_2^3 - 297cs^2\omega_3\omega_1^3\omega_2 + 18\omega_1v_2^2\omega_2^3 - 30cs^2\omega_3\omega_1^2\omega_2^3 - 18\omega_1^3\omega_2^2 + 36\omega_3\omega_1^3v_2^2 + 30cs^2\omega_3\omega_1^3\omega_2^2 + 90\omega_3\omega_1\omega_2^2 + 45\omega_3\omega_1v_2^2\omega_2^3 - 54\omega_3\omega_2^3 + 45\omega_3\omega_1\omega_2^3 - 162cs^2\omega_3\omega_1^2\omega_2 + 270cs^2\omega_3\omega_1^3 + 18\omega_1^3v_2^2\omega_2^2 - 45\omega_3\omega_1^3v_2^2\omega_2 + 135\omega_3\omega_1^3\omega_2 + 54cs^2\omega_3\omega_2^3 + 10\omega_3\omega_1^2\omega_2^3 - 10\omega_3\omega_1^2v_2^2\omega_2^3 + 54cs^2\omega_1^3\omega_2^2 - 198\omega_3v_1^2\omega_1^2\omega_2 - 180\omega_3\omega_1^2\omega_2^2 - 126\omega_3\omega_1^3 - 18\omega_1\omega_2^3 + 396\omega_3v_1^2\omega_1^2\omega_2^2 - 27cs^2\omega_3\omega_1\omega_2^3 + 90\omega_3\omega_1^2\omega_2 + 198\omega_3v_1^2\omega_2^3 - 54cs^2\omega_1^2\omega_2^3 - 54cs^2\omega_1^3\omega_2 - 10\omega_3\omega_1^3\omega_2^2 - 162cs^2\omega_3\omega_1\omega_2^2 - 18\omega_1^2v_2^2\omega_2^3 - 198\omega_3v_1^2\omega_1^3\omega_2)\frac{v_1\rho v_2}{24\omega_3\omega_1^3\omega_2^3}$

coefficient $C^{(1)}_{\mathrm{D}_x^3\mathrm{D}_y v_2}$ **at** $\frac{\partial^4 v_2}{\partial x_1^3\partial x_2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x^3\mathrm{D}_y v_2} = (12cs^2v_1^2\omega^3 - 4v_1^2\omega^3 + 36cs^2\omega - 42cs^2v_1^2\omega^2 + 36v_1^2 + 26v_1^2\omega^2 - 54v_1^2\omega + 36cs^4 + 54cs^2v_1^2\omega - 12cs^2\omega^2 - 36cs^2v_1^2 - 24cs^2 - 26v_1^4\omega^2 + 4v_1^4\omega^3 - 54cs^4\omega + 20cs^4\omega^2 - cs^4\omega^3 + 54v_1^4\omega - 36v_1^4)\frac{\rho}{12\omega^3}$

$$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (-cs^2\omega_7^2\omega_4^3\omega_5^2 - 48v_1^2cs^2\omega_7^2\omega_5^3 - 27v_1^4\omega_7\omega_4^3\omega_5^3 + 30v_1^2cs^2\omega_7\omega_4^2\omega_5^3 - 48v_1^2cs^2\omega_7^2\omega_4\omega_5^2 - 36v_1^2cs^2\omega_7\omega_4^3\omega_5 + 90v_1^2\omega_7^2\omega_4^3\omega_5 + 18v_1^2\omega_7^2\omega_4^2\omega_5^3 - 24cs^4\omega_7^2\omega_4\omega_5^3 + 12cs^4\omega_7\omega_4^2\omega_5^2 + 12cs^4\omega_7^2\omega_5^3 + 102v_1^2cs^2\omega_7^2\omega_4\omega_5^3 + 60v_1^4\omega_7\omega_4^3\omega_5^2 - 12v_1^2cs^2\omega_7\omega_4^2\omega_5^2 + 12cs^2\omega_7^2\omega_4^2\omega_5 - 18cs^4\omega_7\omega_4^2\omega_5^3 - 12v_1^2\omega_7^2\omega_4^2\omega_5^2 + 24v_1^2\omega_7\omega_4\omega_5^3 - 6cs^4\omega_7\omega_4^3\omega_5^2 - 4v_1^2\omega_7^2\omega_4^3\omega_5^3 - 21v_1^2cs^2\omega_7\omega_4^3\omega_5^3 + 48v_1^4\omega_7\omega_4^2\omega_5^3 - 36v_1^4\omega_7\omega_4^3\omega_5 - 6cs^2\omega_7^2\omega_4^2\omega_5^2 - 12cs^2\omega_7\omega_4\omega_5^3 - 19v_1^2\omega_7^2\omega_4^3\omega_5^2 + 6cs^4\omega_7\omega_4^3\omega_5^3 + 12cs^2\omega_7^2\omega_4^3\omega_5 - 5cs^2\omega_7^2\omega_4^2\omega_5^3 + 12v_1^4\omega_7^2\omega_4\omega_5^3 + 54v_1^2cs^2\omega_7\omega_4^2\omega_5^2 - 24v_1^4\omega_7\omega_4^2\omega_5^2 + 72v_1^4\omega_7^2\omega_4^3 + 27v_1^2\omega_7\omega_4^3\omega_5^3 + cs^4\omega_7^2\omega_4^3\omega_5^2 + 12v_1^2cs^2\omega_4^3\omega_5^3 - 12v_1^4\omega_4^3\omega_5^2 + 6cs^2\omega_7^2\omega_4\omega_5^3 - 12cs^2\omega_7\omega_4^2\omega_5^2 - 108v_1^2cs^2\omega_7^2\omega_4^2\omega_5 - 90v_1^4\omega_7^2\omega_4^3\omega_5 + 12v_1^2cs^2\omega_7^2\omega_4^3\omega_5^2 - 18v_1^4\omega_7^2\omega_4^2\omega_5^3 + 12v_1^4\omega_4^3\omega_5^3 - 12v_1^2cs^2\omega_4^3\omega_5^2 - 12cs^4\omega_7^2\omega_4^2\omega_5 - cs^4\omega_7^2\omega_4^3\omega_5^3 + 252v_1^2cs^2\omega_7^2\omega_4^3 - 60v_1^2\omega_7\omega_4^3\omega_5^2 + 60v_1^2cs^2\omega_7^2\omega_4^3\omega_5^2 + 12cs^4\omega_7^2\omega_4^3 + 12v_1^4\omega_7^2\omega_4^2\omega_5^2 - 24v_1^4\omega_7\omega_4\omega_5^3 + 18cs^2\omega_7\omega_4^2\omega_5^3 + 12v_1^2\omega_4^2\omega_5^3 - 306v_1^2cs^2\omega_7^2\omega_4^3\omega_5 + 4v_1^4\omega_7^2\omega_4^3\omega_5^2 - 72v_1^2\omega_7^2\omega_4^3 - 81v_1^2cs^2\omega_7^2\omega_4^2\omega_5^3 + 12v_1^2\omega_4^3\omega_5^2 + 6cs^2\omega_7\omega_4^3\omega_5^2 + 6cs^4\omega_7^2\omega_4^2\omega_5^2 + 12cs^4\omega_7\omega_4\omega_5^3 - 12v_1^2cs^2\omega_4^2\omega_5^3 - 48v_1^2\omega_7\omega_4^2\omega_5^3 + 36v_1^2\omega_7\omega_4^3\omega_5 - 6cs^2\omega_7\omega_4^3\omega_5^3 - 12v_1^2\omega_4^3\omega_5^3 + 19v_1^4\omega_7^2\omega_4^3\omega_5^2 + 162v_1^2cs^2\omega_7^2\omega_4^2\omega_5^2 - 12v_1^2cs^2\omega_7\omega_4\omega_5^3 - 12v_1^2\omega_7^2\omega_4\omega_5^3 - 12cs^2\omega_7^2\omega_4^3 + 24v_1^2\omega_7\omega_4^2\omega_5^2 - 12cs^4\omega_7^2\omega_4^3\omega_5 - 12v_1^4\omega_4^2\omega_5^3 + 13cs^4\omega_7^2\omega_4^2\omega_5^3)\frac{\rho}{12\omega_7^2\omega_4^3\omega_5^3}$$

$$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (-306v_1^2\omega_7^2\omega_4^3cs^2\omega_5 + 12\omega_7^2\omega_4^2cs^2\omega_5 - 27v_1^4\omega_7\omega_4^3\omega_5^3 - 48v_1^2\omega_7^2\omega_4cs^2\omega_5^2 + 12v_1^2\omega_4^3cs^2\omega_5^3 - 12\omega_7\omega_4cs^2\omega_5^3 + 90v_1^2\omega_7^2\omega_4^3\omega_5 - 12\omega_7^2\omega_4^3cs^4\omega_5 + 18v_1^2\omega_7^2\omega_4^2\omega_5^3 - 12\omega_7^2\omega_4^3cs^2 - 48v_1^2\omega_7^2cs^2\omega_5^3 + 102v_1^2\omega_7^2\omega_4cs^2\omega_5^3 + 60v_1^4\omega_7\omega_4^3\omega_5^2 - 12v_1^2\omega_4^3cs^2\omega_5^2 - 24\omega_7^2\omega_4cs^4\omega_5^3 - 12v_1^2\omega_7^2\omega_4^2\omega_5^2 + 24v_1^2\omega_7\omega_4\omega_5^3 - \omega_7^2\omega_4^3cs^4\omega_5^3 + 252v_1^2\omega_7^2\omega_4^3cs^2 + 12\omega_7\omega_4^2cs^4\omega_5^2 - 4v_1^2\omega_7^2\omega_4^3\omega_5^3 + 48v_1^4\omega_7\omega_4^2\omega_5^3 - 36v_1^4\omega_7\omega_4^3\omega_5 - 5\omega_7^2\omega_4^2cs^2\omega_5^3 + 6\omega_7\omega_4^3cs^2\omega_5^2 - 12v_1^2\omega_7\omega_4^2cs^2\omega_5^2 + 12v_1^2\omega_7^2\omega_4^3cs^2\omega_5^3 + \omega_7^2\omega_4^3cs^4\omega_5^2 - 19v_1^2\omega_7^2\omega_4^3\omega_5^2 - 18\omega_7\omega_4^2cs^4\omega_5^3 + 30v_1^2\omega_7\omega_4^2cs^2\omega_5^3 + 60v_1^2\omega_7^2\omega_4^3cs^2\omega_5^2 - 6\omega_7^2\omega_4^2cs^2\omega_5^2 - 6\omega_7\omega_4^3cs^2\omega_5^3 + 12v_1^4\omega_7^2\omega_4\omega_5^3 - 24v_1^4\omega_7\omega_4^2\omega_5^2 + 72v_1^4\omega_7^2\omega_4^3 + 27v_1^2\omega_7\omega_4^3\omega_5^3 - 12v_1^4\omega_4^3\omega_5^2 + 6\omega_7^2\omega_4cs^2\omega_5^3 - 36v_1^2\omega_7\omega_4^3cs^2\omega_5 - 90v_1^4\omega_7^2\omega_4^3\omega_5 - 18v_1^4\omega_7^2\omega_4^2\omega_5^3 + 12v_1^4\omega_4^3\omega_5^3 - 12\omega_7^2\omega_4^2cs^4\omega_5 - 60v_1^2\omega_7\omega_4^3\omega_5^2 + 12\omega_7\omega_4cs^4\omega_5^3 + 12\omega_7^2\omega_4^3cs^2\omega_5 + 12v_1^4\omega_7^2\omega_4^2\omega_5^2 - 24v_1^4\omega_7\omega_4\omega_5^3 - 108v_1^2\omega_7^2\omega_4^2cs^2\omega_5 - 12v_1^2\omega_4^2cs^2\omega_5^3 - 12v_1^2\omega_7\omega_4cs^2\omega_5^3 + 12v_1^2\omega_4^2\omega_5^3 + 18\omega_7^2\omega_4^2cs^2\omega_5^3 - \omega_7^2\omega_4^3cs^2\omega_5^2 + 12\omega_7^2\omega_4^3cs^4 + 4v_1^4\omega_7^2\omega_4^3\omega_5^3 - 72v_1^2\omega_7^2\omega_4^3 + 162v_1^2\omega_7^2\omega_4^2cs^2\omega_5^2 - 21v_1^2\omega_7\omega_4^3cs^2\omega_5^3 + 12v_1^2\omega_4^3\omega_5^2 + 6\omega_7\omega_4^3cs^4\omega_5^3 + 6\omega_7^2\omega_4^2cs^4\omega_5^2 - 48v_1^2\omega_7\omega_4^2\omega_5^3 + 36v_1^2\omega_7\omega_4^3\omega_5 - 12v_1^2\omega_4^3\omega_5^3 - 81v_1^2\omega_7^2\omega_4^2cs^2\omega_5^3 + 19v_1^4\omega_7^2\omega_4^3\omega_5^2 + 54v_1^2\omega_7\omega_4^3cs^2\omega_5^2 - 12\omega_7\omega_4^2cs^2\omega_5^2 + 12\omega_7^2cs^4\omega_5^3 - 12v_1^2\omega_7^2\omega_4\omega_5^3 + 24v_1^2\omega_7\omega_4^2\omega_5^2 - 6\omega_7\omega_4^3cs^4\omega_5^2 + 13\omega_7^2\omega_4^2cs^4\omega_5^3 - 12v_1^4\omega_4^2\omega_5^3)\frac{\rho}{12\omega_7^2\omega_4^3\omega_5^3}$$

$$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (-39v_1^4\omega_7\omega_4^3\omega_5^3 - cs^4\omega_7^2\omega_4^3\omega_5^3 - 12cs^4\omega_7^2\omega_4^2\omega_5 + 90v_1^2\omega_7^2\omega_4^3\omega_5 + 36cs^2v_1^2\omega_7\omega_4\omega_5^3 + 6v_1^2\omega_7^2\omega_4^2\omega_5^3 + 18cs^2v_1^2\omega_7^2\omega_4^2\omega_5^2 + 18cs^2\omega_7\omega_4^2\omega_5^3 - 12cs^2\omega_7^2\omega_4^3 + 72v_1^4\omega_7\omega_4^3\omega_5^2 + cs^4\omega_7^2\omega_4^3\omega_5^2 - 108cs^2v_1^2\omega_4^2\omega_5^3 - 12cs^2\omega_7\omega_4^2\omega_5^2 - 3cs^2v_1^2\omega_7^2\omega_4^2\omega_5^3 + 6cs^2\omega_7^2\omega_4\omega_5^3 - 306cs^2v_1^2\omega_7^2\omega_4^3\omega_5 - 6cs^2\omega_7\omega_4^3\omega_5^3 + 60cs^2v_1^2\omega_7^2\omega_4^3\omega_5^2 - 4v_1^2\omega_7^2\omega_4^3\omega_5^3 + 13cs^4\omega_7^2\omega_4^2\omega_5^3 + 252cs^2v_1^2\omega_7^2\omega_4^3 + 36v_1^4\omega_7\omega_4^2\omega_5^3 - 12cs^4\omega_7^2\omega_4^3\omega_5 - 36v_1^4\omega_7\omega_4^3\omega_5 - 108cs^2v_1^2\omega_4^3\omega_5^2 + 12cs^2v_1^2\omega_7^2\omega_4^3\omega_5^3 + 6cs^2\omega_7\omega_4^3\omega_5^2 - 19v_1^2\omega_7^2\omega_4^3\omega_5^2 - 36cs^2v_1^2\omega_7^2\omega_4^2\omega_5 + 12cs^4\omega_7^2\omega_4^3 + 108cs^2v_1^2\omega_4^3\omega_5^3 + 12cs^4\omega_7\omega_4\omega_5^3 + 6cs^4\omega_7^2\omega_4^2\omega_5^2 + 72v_1^4\omega_7^2\omega_4^3 + 198cs^2v_1^2\omega_7\omega_4^3\omega_5^2 + 39v_1^2\omega_7\omega_4^3\omega_5^3 + 12cs^2\omega_7^2\omega_4^2\omega_5 - 36v_1^4\omega_4^3\omega_5^2 - 90v_1^4\omega_7^2\omega_4^3\omega_5 - 18cs^4\omega_7\omega_4^2\omega_5^3 - 6v_1^4\omega_7^2\omega_4^2\omega_5^3 + 36v_1^4\omega_4^3\omega_5^3 - 99cs^2v_1^2\omega_7\omega_4^3\omega_5^3 - cs^2\omega_7^2\omega_4^3\omega_5^2 - 72v_1^2\omega_7\omega_4^3\omega_5^2 + 12cs^4\omega_7\omega_4^2\omega_5^2 - 24cs^4\omega_7^2\omega_4\omega_5^3 + 36v_1^2\omega_4^2\omega_5^3 + 4v_1^4\omega_7^2\omega_4^3\omega_5^3 - 72v_1^2\omega_7^2\omega_4^3 + 6cs^4\omega_7\omega_4^3\omega_5^3 + 36v_1^2\omega_4^3\omega_5^2 + 12cs^4\omega_7^2\omega_5^3 - 36v_1^2\omega_7\omega_4^2\omega_5^3 + 36cs^2v_1^2\omega_7\omega_4^2\omega_5^2 - 5cs^2\omega_7^2\omega_4^2\omega_5^3 - 18cs^2v_1^2\omega_7^2\omega_4\omega_5^3 + 36v_1^2\omega_7\omega_4^3\omega_5 + 12cs^2\omega_7^2\omega_4^3\omega_5 - 36v_1^2\omega_4^3\omega_5^3 + 19v_1^4\omega_7^2\omega_4^3\omega_5^2 - 6cs^4\omega_7\omega_4^3\omega_5^2 - 12cs^2\omega_7\omega_4\omega_5^3 - 108cs^2v_1^2\omega_7\omega_4^3\omega_5 - 6cs^2\omega_7^2\omega_4^2\omega_5^2 + 54cs^2v_1^2\omega_7\omega_4^2\omega_5^3 - 36v_1^4\omega_4^2\omega_5^3)\frac{\rho}{12\omega_7^2\omega_4^3\omega_5^3}$$

$$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (18cs^2\omega_7\omega_4^2\omega_5^3 - 39v_1^4\omega_7\omega_4^3\omega_5^3 + 60v_1^2cs^2\omega_7^2\omega_4^3\omega_5^2 + 90v_1^2\omega_7^2\omega_4^3\omega_5 + 6v_1^2\omega_7^2\omega_4^2\omega_5^3 - cs^4\omega_7^2\omega_4^3\omega_5^3 - 12cs^4\omega_7^2\omega_4^2\omega_5 + 12v_1^2cs^2\omega_7^2\omega_4^3\omega_5^3 + 72v_1^4\omega_7\omega_4^3\omega_5^2 - 36v_1^2cs^2\omega_7^2\omega_4^2\omega_5 - 12cs^2\omega_7\omega_4^2\omega_5^2 + 6cs^2\omega_7^2\omega_4\omega_5^3 + cs^4\omega_7^2\omega_4^3\omega_5^2 + 12cs^4\omega_7^2\omega_5^3 + 13cs^4\omega_7^2\omega_4^2\omega_5^3 - 12cs^4\omega_7^2\omega_4^3\omega_5 - 4v_1^2\omega_7^2\omega_4^3\omega_5^3 + 36v_1^2cs^2\omega_7\omega_4\omega_5^3 + 36v_1^4\omega_7\omega_4^2\omega_5^3 + 18v_1^2cs^2\omega_7^2\omega_4^2\omega_5^2 - 36v_1^4\omega_7\omega_4^3\omega_5 - 6cs^2\omega_7\omega_4^3\omega_5^3 - 19v_1^2\omega_7^2\omega_4^3\omega_5^2 + 12cs^4\omega_7\omega_4\omega_5^3 + 6cs^4\omega_7^2\omega_4^2\omega_5^2 + 6cs^2\omega_7\omega_4^3\omega_5^2 - 3v_1^2cs^2\omega_7^2\omega_4^2\omega_5^3 - 306v_1^2cs^2\omega_7^2\omega_4^3\omega_5 + 72v_1^4\omega_7^2\omega_4^3 + 39v_1^2\omega_7\omega_4^3\omega_5^3 - 108v_1^2cs^2\omega_4^2\omega_5^3 - 36v_1^4\omega_4^3\omega_5^2 - 18cs^4\omega_7\omega_4^2\omega_5^3 + 12cs^2\omega_7^2\omega_4^2\omega_5 + 36v_1^2cs^2\omega_7\omega_4^2\omega_5^2 - 90v_1^4\omega_7^2\omega_4^3\omega_5 - 18v_1^2cs^2\omega_7^2\omega_4\omega_5^3 - 6v_1^4\omega_7^2\omega_4^2\omega_5^3 + 36v_1^4\omega_4^3\omega_5^3 - 24cs^4\omega_7^2\omega_4\omega_5^3 - 12cs^2\omega_7^2\omega_4^3 - 72v_1^2\omega_7\omega_4^3\omega_5^2 - 108v_1^2cs^2\omega_7\omega_4^3\omega_5 + 54v_1^2cs^2\omega_7\omega_4^2\omega_5^3 + 36v_1^2\omega_4^2\omega_5^3 - cs^2\omega_7^2\omega_4^3\omega_5^2 + 198v_1^2cs^2\omega_7\omega_4^3\omega_5^2 + 4v_1^4\omega_7^2\omega_4^3\omega_5^3 - 72v_1^2\omega_7^2\omega_4^3 - 5cs^2\omega_7^2\omega_4^2\omega_5^3 + 36v_1^2\omega_4^3\omega_5^2 + 12cs^2\omega_7^2\omega_4^3\omega_5 + 108v_1^2cs^2\omega_4^3\omega_5^3 + 6cs^4\omega_7\omega_4^3\omega_5^3 - 36v_1^2\omega_7\omega_4^2\omega_5^3 + 36v_1^2\omega_7\omega_4^3\omega_5 - 12cs^2\omega_7\omega_4\omega_5^3 - 36v_1^2\omega_4^3\omega_5^3 - 6cs^2\omega_7^2\omega_4^2\omega_5^2 + 19v_1^4\omega_7^2\omega_4^3\omega_5^2 + 12cs^4\omega_7^2\omega_4^3 - 99v_1^2cs^2\omega_7\omega_4^3\omega_5^3 + 252v_1^2cs^2\omega_7^2\omega_4^3 - 6cs^4\omega_7\omega_4^3\omega_5^2 - 36v_1^4\omega_4^2\omega_5^3 - 108v_1^2cs^2\omega_4^3\omega_5^2)\frac{\rho}{12\omega_7^2\omega_4^3\omega_5^3}$$

$$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (-39\omega_3^3v_1^4\omega_4\omega_1^3 + \omega_3^3\omega_4^2\omega_1^2cs^4 - 36\omega_3^2v_1^2\omega_4^2\omega_1cs^2 + 6\omega_3^3\omega_4\omega_1^2cs^2 + 36\omega_3^3v_1^2\omega_4\omega_1 - 108\omega_3^3v_1^2\omega_4\omega_1cs^2 + 36\omega_3^2v_1^2\omega_4\omega_1^2cs^2 - 36\omega_3^2v_1^2\omega_4\omega_1^3 + 72\omega_3^3v_1^4\omega_4\omega_1^2 + 18\omega_3^2\omega_4\omega_1^3cs^2 + 12\omega_3^3\omega_4^2\omega_1cs^2 + 13\omega_3^2\omega_4^2\omega_1^3cs^4 + 60\omega_3^3v_1^2\omega_4^2\omega_1^2cs^2 - 12\omega_3^3\omega_4^2cs^2 - 6\omega_3^3\omega_4\omega_1^3cs^2 + 39\omega_3^3v_1^2\omega_4\omega_1^3 + 36\omega_3v_1^2\omega_4\omega_1^3cs^2 + 36\omega_3^3v_1^2\omega_1^2 - \omega_3^3\omega_4^2\omega_1^3cs^4 - 36\omega_3^3v_1^4\omega_4\omega_1 + 12\omega_3^2\omega_4^2\omega_1cs^2 + 12\omega_3\omega_4\omega_1^3cs^4 + 6\omega_3^3\omega_4^2\omega_1^2cs^4 - 72\omega_3^3v_1^2\omega_4\omega_1^2 - 36\omega_3^3v_1^4\omega_1^3 + 36\omega_3^2v_1^4\omega_4\omega_1^3 + 12\omega_3^3v_1^2\omega_4^2\omega_1^3cs^2 - 12\omega_3^2\omega_4\omega_1^2cs^2 - 72\omega_3^3v_1^2\omega_1^2 + 54\omega_3^3v_1^2\omega_4\omega_1^3cs^2 + 6\omega_3\omega_4^2\omega_1^3cs^2 - 36\omega_3^3v_1^2\omega_1^3 - 18\omega_3v_1^2\omega_4^2\omega_1^3cs^2 - 6\omega_3^3v_1^4\omega_4^2\omega_1^3 - 108\omega_3^3v_1^2\omega_1^2cs^2 - 12\omega_3^2\omega_4^2\omega_1cs^4 - 19\omega_3^3v_1^2\omega_4^2\omega_1^2 + 6\omega_3^3\omega_4\omega_1^3cs^4 - 4\omega_3^3v_1^2\omega_4^2\omega_1^3 - 99\omega_3^3v_1^2\omega_1\omega_4\omega_1^3cs^2 + 12\omega_3^2\omega_4\omega_1^2cs^4 - 24\omega_3\omega_4^2\omega_1^3cs^4 - 3\omega_3^2v_1^2\omega_4^2\omega_1^3cs^2 - 12\omega_3\omega_4\omega_1^3cs^2 - 6\omega_3^2\omega_4^2\omega_1^2cs^2 - 90\omega_3^3v_1^4\omega_4^2\omega_1 - 108\omega_3^3v_1^2\omega_1^3cs^2 + 252\omega_3^3v_1^2\omega_4^2cs^2 + 36\omega_3^3v_1^2\omega_1^3 + 12\omega_4^2\omega_1^3cs^4 - 6\omega_3^3\omega_4\omega_1^2cs^4 + 19\omega_3^3v_1^4\omega_4^2\omega_1^2 + 6\omega_3^3v_1^2\omega_4^2\omega_1^3 - 306\omega_3^3v_1^2\omega_4^2\omega_1cs^2 + 72\omega_3^3v_1^4\omega_4^2 - \omega_3^3\omega_4^2\omega_1^2cs^2 + 108\omega_3^3v_1^2\omega_1^3cs^2 + 36\omega_3^3v_1^4\omega_1^3 - 5\omega_3^2\omega_4^2\omega_1^3cs^2 - 12\omega_3^3\omega_4^2\omega_1cs^4 + 4\omega_3^3v_1^4\omega_4^2\omega_1^3 + 12\omega_3^3\omega_4^2cs^4 + 18\omega_3^2v_1^2\omega_4^2\omega_1^2cs^2 - 36\omega_3^3v_1^4\omega_1^2 + 198\omega_3^3v_1^2\omega_4\omega_1^2cs^2 + 90\omega_3^3v_1^2\omega_4^2\omega_1 - 18\omega_3^2\omega_4\omega_1^3cs^4)\frac{\rho}{12\omega_3^3\omega_4^2\omega_1^3}$$

$$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (27\omega_3^2v_1^2\omega_1^2v_2^2\omega_2 - 54\omega_3^2v_1^4\omega_1^2\omega_2^2 - cs^4\omega_3^2\omega_1^3\omega_2^2 + 18cs^2\omega_3\omega_1^3v_2^2\omega_2 + 3\omega_3^2\omega_1^2v_2^2\omega_2^3 - 24cs^2\omega_3\omega_1^2\omega_2^2 + 30cs^2\omega_3^2v_1^2\omega_1^2\omega_2^3 - 43\omega_3^2v_1^2\omega_1^3\omega_2^2 - 297cs^2\omega_3^2v_1^2\omega_1^3\omega_2 + 15cs^2\omega_3^2\omega_1\omega_2^3 - 6\omega_3^2\omega_1^2\omega_2 + 18\omega_3v_1^2\omega_1\omega_2^3 - 324cs^2v_1^2\omega_1^2\omega_2^3 - 2cs^4\omega_3^2\omega_1^3\omega_2^3 - 63\omega_3^2v_1^4\omega_1^3\omega_2 - 54cs^2\omega_3^2\omega_1^2v_2^2\omega_2 + 30cs^4\omega_3^2\omega_2^3 - 30cs^4\omega_3^2\omega_1^2\omega_2 + 7\omega_3^2v_1^4\omega_1^2\omega_2^3 - 54cs^2\omega_3\omega_1v_2^2\omega_2^3 + 9\omega_3^2v_1^2\omega_2^3 + 18cs^2\omega_3^2\omega_1^3v_2^2 - 6cs^2\omega_3\omega_1^3\omega_2 - 8\omega_3^2v_1^2\omega_1^3\omega_2^2 - 12cs^2\omega_3^2\omega_1\omega_2^2 - 45\omega_3^2v_1^2\omega_1^2\omega_2 + 30cs^2\omega_3\omega_1^2\omega_2^3 - 144cs^2\omega_3^2v_1^2\omega_1^2\omega_2^2 + \omega_3^2\omega_1^3\omega_2^2 + 24cs^2\omega_3^2v_1^2\omega_1^3\omega_2^3 - \omega_3^2\omega_1^2\omega_2^3 + 18cs^2\omega_3\omega_1^3\omega_2^2 - 6\omega_3^2\omega_1^3\omega_2 + 81cs^2\omega_3^2v_1^2\omega_1^2\omega_2 + 54\omega_3^2v_1^2\omega_1^2\omega_2^2 + 18cs^4\omega_3\omega_1\omega_2^3 + 19\omega_3^2v_1^4\omega_1^3\omega_2^2 + 18cs^2\omega_3^2\omega_1^2v_2^2\omega_2^2 + 18cs^2\omega_3^2v_2^2\omega_2^3 + 18\omega_3^2\omega_1^2v_2^2\omega_2 - 108cs^2v_1^2\omega_1^3\omega_2^2 + 12cs^4\omega_3^2\omega_1^2\omega_2^2 - 18\omega_3v_1^4\omega_1\omega_2^3 - 72\omega_3^2v_1^2\omega_1^2v_2^2\omega_2^2 + 6\omega_3^2\omega_1^3 + 17\omega_3^2v_1^2\omega_1^2\omega_2^3 + 84cs^2\omega_3^2v_1^2\omega_1^3\omega_2^2 - 12cs^2\omega_3\omega_1^3\omega_2^3 + 135\omega_3^2v_1^2\omega_1^3\omega_2 + 36\omega_3^2v_1^4\omega_1^3 + 54cs^2\omega_3v_1^2\omega_1\omega_2^3 + 189cs^2\omega_3^2v_1^2\omega_1^3 + 36\omega_3^2v_1^4\omega_1^2\omega_2 + 29cs^4\omega_3^2\omega_1^2\omega_2^3 + 216cs^2v_1^2\omega_1^3\omega_2^3 + 8\omega_3^2v_1^4\omega_1^3\omega_2^3 + 6cs^2\omega_3^2\omega_1^2v_2^2\omega_2^3 - 36cs^2\omega_3\omega_1^3v_2^2\omega_2^2 - 15cs^4\omega_3^2\omega_1^3\omega_2 - 24cs^2\omega_3^2\omega_1^3 + 6\omega_3^2\omega_1\omega_2^2 - 9\omega_3^2v_1^2\omega_1\omega_2^3 + 72v_1^4\omega_1^3\omega_2^3 - 18\omega_3^2\omega_1^3v_2^2 + 306cs^2\omega_3v_1^2\omega_1^2\omega_2^3 + 36\omega_3^2v_1^4\omega_2^3 - 72\omega_3v_1^2\omega_1^3\omega_2^2 - 54cs^2\omega_3v_1^2\omega_1^3\omega_2 - 36\omega_3v_1^4\omega_1^2\omega_2^2 - 9cs^2\omega_3^2\omega_1^3v_2^2\omega_2 + 216\omega_3^2v_1^2\omega_1v_2^2\omega_2^3 - 3\omega_3^2\omega_1^3v_2^2\omega_2^2 + 63cs^2\omega_3^2v_1^2\omega_1^3 + 108v_1^2\omega_1^2\omega_2^3 + 24cs^4\omega_3\omega_1^2\omega_2^2 - 57cs^4\omega_3^2\omega_1\omega_2^3 + 18cs^2\omega_3^2\omega_1v_2^2\omega_2^2 + 78\omega_3v_1^2\omega_1^3\omega_2^3 + 135\omega_3^2v_1^2\omega_1^3v_2^2 - 72cs^2\omega_3v_1^2\omega_1^2\omega_2^2 - 27\omega_3^2v_1^2\omega_1\omega_2^2 - 36v_1^4\omega_1^3\omega_2^2 + 6\omega_3^2\omega_1\omega_2^3 + 36cs^2\omega_3^2\omega_1^2\omega_2 - 9cs^2\omega_3^2\omega_1v_2^2\omega_2^3 + 6cs^4\omega_3^2\omega_1\omega_2^2 - 216\omega_3^2v_1^2\omega_1^3v_2^2\omega_2 + 6cs^4\omega_3\omega_1^3\omega_2 - 30cs^4\omega_3\omega_1^2\omega_2^3 - 18\omega_3v_1^4\omega_1^3\omega_2 - 6\omega_3^2\omega_2^3 - 27\omega_3^2v_1^2\omega_1v_2^2\omega_2^2 + 144\omega_3v_1^4\omega_1^2\omega_2^3 - 18cs^4\omega_3\omega_1^3\omega_2^2 - 18\omega_3^2\omega_1v_2^2\omega_2^3 + 72\omega_3^2v_1^2\omega_1^3v_2^2\omega_2^2 - 63\omega_3^2v_1^4\omega_1\omega_2^3 - 135\omega_3^2v_1^2v_2^2\omega_2^3 - 72v_1^2\omega_1^3\omega_2^3 + 18cs^4\omega_3^2\omega_1^3 - 81\omega_3^2v_1^2\omega_1^3 + 36cs^2\omega_3\omega_1^2v_2^2\omega_2^2 + 72\omega_3v_1^4\omega_1^3\omega_2^2 - 198cs^2\omega_3v_1^2\omega_1^3\omega_2^3 + 36\omega_3v_1^2\omega_1^2\omega_2^2 + 99cs^2\omega_3^2v_1^2\omega_1\omega_2^2 - 18cs^2\omega_3\omega_1\omega_2^3 -$$

$12cs^2\omega_3^2\omega_1^2\omega_2^2 - 108v_1^4\omega_1^2\omega_2^3 + 36cs^2\omega_3\omega_1^2v_2^2\omega_2^3 + 18\omega_3^2\omega_1^3v_2^2\omega_2 - 78\omega_3v_1^4\omega_1^3\omega_2^3 - 6cs^2\omega_3^2\omega_1^3v_2^2\omega_2^2 + 18\omega_3^2v_2^2\omega_2^3 + 36\omega_3^2v_1^4\omega_1\omega_2^2 - 18\omega_3^2\omega_1v_2^2\omega_2^2 + 12cs^4\omega_3\omega_1^3\omega_2^3 + 36v_1^2\omega_1^3\omega_2^2 - 12cs^2\omega_3^2\omega_1^2\omega_2^3 + 21cs^2\omega_3^2\omega_1^3\omega_2 - 171cs^2\omega_3^2v_1^2\omega_1\omega_2^3 - 144\omega_3v_1^2\omega_1^2\omega_2^3 + 198cs^2\omega_3v_1^2\omega_1^3\omega_2^2 + 18\omega_3v_1^2\omega_1^3\omega_2)\frac{\rho}{24\omega_3^2\omega_1^3\omega_2^3}$

coefficient $C^{(1)}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho}$ **at** $\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (24 - \omega^3 + v_1^2\omega^3 + 108cs^2\omega - 24v_1^2 + 14\omega^2 - 14v_1^2\omega^2 + 5cs^2\omega^3 + 36v_1^2\omega - 46cs^2\omega^2 - 72cs^2 - 36\omega)\frac{cs^2v_1}{12\omega^3}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (-36\omega_9cs^4\omega_7^2\omega_4^3\omega_8\omega_5 + 12v_1^2\omega_7^2\omega_4^2v_2^2\omega_5^3 - 24\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 + 6\omega_7^2\omega_4^3v_2^2\omega_5^3 + 12v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^3 + 24\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 +$
$12\omega_9v_1^2cs^2\omega_4^3\omega_8\omega_5^3 - 84\omega_9cs^4\omega_7^2\omega_4\omega_8\omega_5^2 - 12\omega_9v_1^2\omega_7^2\omega_4^2v_2^2\omega_5^2 + 12\omega_7\omega_4^3v_2^2\omega_8\omega_5^3 - 12\omega_9cs^2\omega_4^3\omega_8\omega_5^3 + 6v_1^2cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3 + 12\omega_9\omega_7^2\omega_4^2v_2^2\omega_5^2 +$
$36\omega_9cs^2\omega_4^3v_2^2\omega_8\omega_5^3 + 6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 + 12\omega_9cs^2\omega_7^2\omega_4^3\omega_8\omega_5 - 12\omega_9v_1^2cs^2\omega_7^2\omega_4\omega_8\omega_5^2 + 18\omega_9cs^4\omega_7^2\omega_4^3\omega_5^2 - 12\omega_9v_1^2cs^2\omega_7^2\omega_4^3\omega_8\omega_5 +$
$12\omega_9cs^2\omega_7^2\omega_4\omega_8\omega_5^2 + 12\omega_9cs^2\omega_4^3\omega_8\omega_5^2 + 12v_1^2cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 6v_1^2cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 180\omega_9cs^4\omega_7^2\omega_4\omega_8\omega_5^3 - 12\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^3 -$
$12\omega_9v_1^2cs^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 - 12\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 + 6cs^2\omega_7^2\omega_4^3\omega_5^3 + 12\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5^3 - 12\omega_9\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 + 36\omega_9cs^2\omega_7^2\omega_4^3v_2^2\omega_8 +$
$12\omega_9cs^4\omega_4^2\omega_8\omega_5^3 - 12\omega_9cs^2\omega_7^2\omega_4\omega_8\omega_5^3 - 6\omega_9\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 12v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^3 - 6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^3 + 12\omega_9v_1^2cs^2\omega_7^2\omega_4\omega_8\omega_5^3 + 6\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 -$
$36\omega_9cs^2\omega_4^3v_2^2\omega_8\omega_5^2 + \omega_9v_1^2cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3 + 18\omega_9\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 - 12cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 36\omega_9\omega_7\omega_4^2v_2^2\omega_8\omega_5^3 + 72\omega_9cs^2\omega_7^2\omega_4\omega_2^2\omega_8\omega_5^2 -$
$36\omega_9cs^4\omega_7^2\omega_4^2\omega_5^2 + 6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - \omega_9cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3 - 18\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 + 36\omega_9v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^3 + 36\omega_9cs^4\omega_7^2\omega_4^3\omega_8 -$
$18cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^3 - 24\omega_9v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 + 36cs^4\omega_7\omega_4^2\omega_8\omega_5^3 + 6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^3 + 24\omega_9\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 + 5\omega_9cs^4\omega_7^2\omega_4^3\omega_8\omega_5^3 -$
$72\omega_9cs^2\omega_7\omega_4v_2^2\omega_8\omega_5^3 - 12\omega_9v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 + 2\omega_9cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 12\omega_7\omega_4^2v_2^2\omega_8\omega_5^3 - 18\omega_9cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 12v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^3 +$
$12\omega_9\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 - 2\omega_9v_1^2cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3 + 18\omega_9v_1^2cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 18cs^2\omega_7^2\omega_4^3v_2^2\omega_5^3 - 42\omega_9cs^4\omega_7\omega_4^2\omega_8\omega_5^3 +$
$12\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5 - 6\omega_9cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2 - 6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 12cs^2\omega_7^2\omega_4^2\omega_5^3 + 18cs^4\omega_7^2\omega_4^3\omega_8\omega_5^3 - 12\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 + 18\omega_9cs^2\omega_7^2\omega_4^3v_2^2\omega_5^2 -$
$36\omega_9cs^2\omega_4^2v_2^2\omega_8\omega_5^3 - 12\omega_9cs^4\omega_4^3\omega_8\omega_5^3 - 12\omega_9v_1^2cs^2\omega_7\omega_4^3\omega_8\omega_5 + 72\omega_9cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 + 36cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^3 + 12\omega_9cs^2\omega_7\omega_4^3\omega_8\omega_5 -$
$6\omega_9cs^2\omega_7^2\omega_4^3\omega_5^2 + 6\omega_9v_1^2cs^2\omega_7^2\omega_4^3\omega_5^2 - 12v_1^2cs^2\omega_7\omega_4^3\omega_8\omega_5^3 + 12\omega_9cs^4\omega_7\omega_4^3\omega_8\omega_5 - 96\omega_9cs^4\omega_7^2\omega_8\omega_5^3 - 6v_1^2cs^2\omega_7^2\omega_4^3\omega_5^3 - 12\omega_9v_1^2cs^2\omega_7\omega_4\omega_8\omega_5^3 -$
$18cs^4\omega_7^2\omega_4^3\omega_5^3 - 36\omega_9cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^3 + 12\omega_9cs^2\omega_7\omega_4\omega_8\omega_5^3 + 36\omega_9cs^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 + 12\omega_9cs^4\omega_4^3\omega_8\omega_5^2 - 12\omega_7^2\omega_4^2v_2^2\omega_5^3 +$
$18\omega_9cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 48\omega_9cs^4\omega_7^2\omega_4^2\omega_8\omega_5 - 6v_1^2\omega_7^2\omega_4^3v_2^2\omega_5^3 - 12v_1^2cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 - 12\omega_9v_1^2\omega_4^2v_2^2\omega_8\omega_5^3 - 6\omega_9\omega_7^2\omega_4^3v_2^2\omega_5^2 + 12v_1^2cs^2\omega_7\omega_4^3\omega_8\omega_5^2 +$
$12\omega_9cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 - 36cs^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^3 + 12\omega_9\omega_4^2v_2^2\omega_8\omega_5^3 + 6\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_5^2 + 12\omega_9cs^4\omega_7\omega_4\omega_8\omega_5^3 - 12\omega_9v_1^2cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 + 12\omega_9v_1^2cs^2\omega_7^2\omega_4^3\omega_8 +$
$150\omega_9cs^4\omega_7^2\omega_4^2\omega_8\omega_5^2 - 54\omega_9cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 + 36cs^2\omega_7^2\omega_4^2v_2^2\omega_5^3 - 12\omega_9cs^2\omega_7^2\omega_4^3\omega_8 + 30\omega_9cs^4\omega_7\omega_4^3\omega_8\omega_5^3 - 24\omega_9\omega_7^2\omega_4\omega_2^2\omega_8\omega_5^2 + 12v_1^2cs^2\omega_7^2\omega_4^2\omega_5^3 +$
$108\omega_9cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^3 + 36cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 + 12\omega_9cs^2\omega_7^2\omega_4^2\omega_5^2 - 36\omega_9cs^2\omega_7^2\omega_4^2v_2^2\omega_5^2 - 12\omega_9v_1^2cs^2\omega_7^2\omega_4^2\omega_5^2 + 36cs^4\omega_7\omega_4^3\omega_8\omega_5^2 +$
$24\omega_9v_1^2\omega_4^2v_2^2\omega_8\omega_5^2 - 36cs^4\omega_7^2\omega_4^2\omega_8\omega_5^3 - 24\omega_9v_1^2\omega_7\omega_4v_2^2\omega_8\omega_5^3 - 12\omega_9\omega_4^3v_2^2\omega_8\omega_5^3 + 6\omega_9cs^2\omega_7\omega_4^3\omega_8\omega_5^3 - 18\omega_9cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9v_1^2\omega_4^3v_2^2\omega_8\omega_5^3 +$
$18cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^3 + 24\omega_9\omega_7\omega_4v_2^2\omega_8\omega_5^3 - 72\omega_9cs^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 - 6\omega_9v_1^2cs^2\omega_7\omega_4^3\omega_8\omega_5^3 + 12cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 + 18\omega_9v_1^2cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 -$
$12cs^2\omega_7\omega_4^3\omega_8\omega_5^2 - 36cs^4\omega_7\omega_4^3\omega_8\omega_5^3 - 36cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^3 - 88\omega_9cs^4\omega_7^2\omega_4^2\omega_8\omega_5^3 + 12\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_8 - 36\omega_9cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 -$
$42\omega_9cs^4\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_7^2\omega_4^3v_2^2\omega_8 - 36\omega_9cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 + 18\omega_9v_1^2cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 12cs^2\omega_7\omega_4^3\omega_8\omega_5^3 - 12\omega_9v_1^2cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 -$
$12\omega_9v_1^2\omega_4^3v_2^2\omega_8\omega_5^2 - 18cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 + 36cs^4\omega_7^2\omega_4^2\omega_5^3 + 12\omega_9\omega_4^3v_2^2\omega_8\omega_5^2 - 18\omega_9cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 12\omega_9cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3)\frac{v_1}{12\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^3}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (12v_1^2\omega_7^2\omega_4^2v_2^2\omega_5^3 - 24\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - 12\omega_9v_1^2\omega_7^2\omega_4\omega_8cs^2\omega_5^2 + 6\omega_7^2\omega_4^3v_2^2\omega_5^3 + 12v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^3 + 24\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 -$
$72\omega_9\omega_7^2\omega_4^2v_2^2\omega_8cs^2\omega_5^2 - 12\omega_9v_1^2\omega_7^2\omega_4^2v_2^2\omega_5^2 + 12\omega_7\omega_4^3v_2^2\omega_8\omega_5^3 + 36\omega_7\omega_4^2\omega_8cs^4\omega_5^3 + 36\omega_7\omega_4^2v_2^2\omega_8cs^2\omega_5^3 + 12\omega_9\omega_7^2\omega_4\omega_8cs^2\omega_5^2 + 12\omega_9\omega_7^2\omega_4^2v_2^2\omega_5^2 +$
$12\omega_9\omega_7\omega_4\omega_8cs^2\omega_5^3 + 6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 12\omega_9\omega_4^3\omega_8cs^2\omega_5^3 - 88\omega_9\omega_7^2\omega_4^2\omega_8cs^4\omega_5^3 - 12\omega_9v_1^2\omega_7\omega_4\omega_8cs^2\omega_5^3 + 12\omega_9\omega_7\omega_4^3\omega_8cs^4\omega_5 + 12\omega_9v_1^2\omega_4^3\omega_8cs^2\omega_5^3 +$
$36\omega_9\omega_7^2\omega_4^3v_2^2\omega_8cs^2 - 12\omega_9\omega_7^2\omega_4\omega_8cs^2\omega_5^3 - 12\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^3 + 12\omega_9v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 - 12\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - 42\omega_9\omega_7\omega_4^2\omega_8cs^4\omega_5^3 -$
$36\omega_9\omega_7^2\omega_4^3\omega_8cs^4\omega_5 + 12\omega_9v_1^2\omega_7^2\omega_4\omega_8cs^2\omega_5^3 + 12\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5^3 - 12\omega_9\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 - 12\omega_9v_1^2\omega_4^3\omega_8cs^2\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 -$
$12v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^3 + 12\omega_9\omega_4^3\omega_8cs^2\omega_5^2 + 150\omega_9\omega_7^2\omega_4^2\omega_8cs^4\omega_5^2 - 6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^3 + 72\omega_9\omega_7^2\omega_4v_2^2\omega_8cs^2\omega_5^2 + 6\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 36\omega_7^2\omega_4^2\omega_8cs^4\omega_5^3 +$
$18\omega_9\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 36\omega_9\omega_7\omega_4^2v_2^2\omega_8\omega_5^3 + 108\omega_9\omega_7\omega_4^2v_2^2\omega_8cs^2\omega_5^3 - 36\omega_9\omega_7^2\omega_4^2cs^4\omega_5^2 - 48\omega_9\omega_7^2\omega_4^2\omega_8cs^4\omega_5 + 30\omega_9\omega_7\omega_4^3\omega_8cs^4\omega_5^3 +$
$12v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - 18\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 + 36\omega_9v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^3 - 18\omega_7^2\omega_4^3\omega_8cs^4\omega_5^3 + 36\omega_7\omega_4^3\omega_8cs^4\omega_5^2 - 36\omega_9\omega_4^3v_2^2\omega_8cs^2\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3cs^2\omega_5^2 +$
$18\omega_7^2\omega_4^3\omega_8cs^4\omega_5^3 + 6\omega_9v_1^2\omega_7^2\omega_4^3cs^2\omega_5^2 + 12\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^3 - 24\omega_9v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3\omega_8cs^4\omega_5^2 + 6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^3 - 12\omega_7^2\omega_4^2cs^2\omega_5^3 +$
$36\omega_9\omega_7^2\omega_4^3\omega_8cs^4 + 24\omega_9\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 - 6v_1^2\omega_7^2\omega_4^3cs^2\omega_5^3 - 36\omega_7\omega_4^3\omega_8cs^4\omega_5^3 + 36\omega_9\omega_4^3v_2^2\omega_8cs^2\omega_5^3 - 12\omega_9v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 - 12\omega_7\omega_4^2v_2^2\omega_8\omega_5^3 -$
$36\omega_7^2\omega_4^2v_2^2\omega_8cs^2\omega_5^3 - 12v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^3 - 42\omega_9\omega_7\omega_4^3\omega_8cs^4\omega_5^2 + 12\omega_9\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 - 36\omega_9\omega_7\omega_4^2v_2^2\omega_8cs^2\omega_5^2 - 72\omega_9\omega_7\omega_4v_2^2\omega_8cs^2\omega_5^3 -$
$12\omega_9v_1^2\omega_4^3v_2^2\omega_8cs^2\omega_5^3 + 12\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - 6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 + 5\omega_9\omega_7^2\omega_4^3\omega_8cs^4\omega_5^3 + 12\omega_9\omega_4^3\omega_8cs^2\omega_5^3 + 36\omega_9\omega_7^2\omega_4^2v_2^2\omega_8cs^2\omega_5 -$
$12\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 - 18\omega_7^2\omega_4^3\omega_8cs^4\omega_5^2 + 18\omega_9v_1^2\omega_7\omega_4^2\omega_8cs^2\omega_5^3 + 180\omega_9\omega_7^2\omega_4\omega_8cs^4\omega_5^3 - 96\omega_9\omega_7^2\omega_8cs^4\omega_5^3 - 12\omega_9v_1^2\omega_7^2\omega_4^3\omega_8cs^2\omega_5 -$
$18\omega_9\omega_7\omega_4^2\omega_8cs^2\omega_5^3 + 12\omega_9\omega_7^2\omega_4^3\omega_8cs^2\omega_5 - 12\omega_9\omega_7^2\omega_4^3\omega_8cs^2 + 12\omega_9v_1^2\omega_7^2\omega_4^3\omega_8cs^2 + 12v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_5^2 + 6v_1^2\omega_7^2\omega_4^3\omega_8cs^2\omega_5^3 -$
$18\omega_9\omega_7^2\omega_4^2\omega_8cs^2\omega_5^2 + 12\omega_9\omega_4^3\omega_8cs^4\omega_5^2 - 36\omega_9\omega_7\omega_4^3v_2^2\omega_8cs^2\omega_5^3 + 12\omega_7^2\omega_4^2\omega_8cs^2\omega_5^3 - 18\omega_7^2\omega_4^3v_2^2\omega_8cs^2\omega_5^2 + 18\omega_9v_1^2\omega_7^2\omega_4^2\omega_8cs^2\omega_5^2 +$
$36\omega_7^2\omega_4^2v_2^2cs^2\omega_5^3 - 12v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_5^3 - 54\omega_9\omega_7^2\omega_4^3v_2^2\omega_8cs^2\omega_5 - 36\omega_9\omega_7^2\omega_4^2v_2^2cs^2\omega_5^2 - 84\omega_9\omega_7^2\omega_4\omega_8cs^4\omega_5^2 - 12\omega_7\omega_4^2\omega_8cs^2\omega_5^3 - 12\omega_7^2\omega_4^2v_2^2\omega_5^3 -$
$12\omega_9v_1^2\omega_7^2\omega_4^2\omega_8cs^2\omega_5^3 - 12\omega_9v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_5 + 12\omega_9\omega_7\omega_4\omega_8cs^4\omega_5^3 + 18\omega_7^2\omega_4^3v_2^2\omega_8cs^2\omega_5^3 + 72\omega_9\omega_7\omega_4^3v_2^2\omega_8cs^2\omega_5^2 - 6v_1^2\omega_7^2\omega_4^3v_2^2\omega_5^3 -$
$36\omega_9\omega_4^3v_2^2\omega_8cs^2\omega_5^3 - 12\omega_9v_1^2\omega_4^2v_2^2\omega_8\omega_5^3 - 6\omega_9\omega_7^2\omega_4^3v_2^2\omega_5^2 + 12\omega_9\omega_7^2\omega_4^2\omega_8cs^2\omega_5^3 - 12\omega_9\omega_4^3\omega_8cs^4\omega_5^3 + 12\omega_9\omega_7\omega_4^3\omega_8cs^2\omega_5 - 6v_1^2\omega_7^2\omega_4^3\omega_8cs^2\omega_5^2 +$
$12\omega_9\omega_4^2v_2^2\omega_8\omega_5^3 + 6\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_5^2 + 18\omega_9v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_5^2 + 12\omega_7\omega_4^3\omega_8cs^2\omega_5^3 + 18\omega_9\omega_7^2\omega_4^3v_2^2cs^2\omega_5^2 - 36\omega_9\omega_7\omega_4^3v_2^2\omega_8cs^2\omega_5 -$
$24\omega_9\omega_7^2\omega_4v_2^2\omega_8\omega_5^2 - 18\omega_9\omega_7\omega_4^3\omega_8cs^2\omega_5^2 + 12v_1^2\omega_7\omega_4^2\omega_8cs^2\omega_5^3 + 24\omega_9v_1^2\omega_7^2\omega_4v_2^2\omega_8\omega_5^2 - 18\omega_7^2\omega_4^3v_2^2cs^2\omega_5^3 - 24\omega_9v_1^2\omega_7\omega_4v_2^2\omega_8\omega_5^3 +$
$18\omega_9\omega_7^2\omega_4^3v_2^2\omega_8cs^2\omega_5^2 - 12\omega_9\omega_4^3v_2^2\omega_8\omega_5^3 + 12\omega_9v_1^2\omega_4^3v_2^2\omega_8\omega_5^3 - 36\omega_7\omega_4^3v_2^2\omega_8cs^2\omega_5^3 + 12\omega_9\omega_4^2\omega_8cs^4\omega_5^3 - \omega_9\omega_7^2\omega_4^3\omega_8cs^2\omega_5^3 + 24\omega_9\omega_7\omega_4v_2^2\omega_8\omega_5^3 +$
$6\omega_7^2\omega_4^3\omega_8cs^2\omega_5^2 + \omega_9v_1^2\omega_7^2\omega_4^3\omega_8cs^2\omega_5^3 - 12\omega_9v_1^2\omega_7^2\omega_4^2cs^2\omega_5^2 + 6\omega_9\omega_7\omega_4^3\omega_8cs^2\omega_5^3 + 12\omega_9\omega_7^2\omega_4^2cs^2\omega_5^2 + 12v_1^2\omega_7^2\omega_4^2cs^2\omega_5^3 + 12\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_8 -$
$12\omega_9\omega_7^2\omega_4^3v_2^2\omega_8 - 6\omega_9v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_5^3 + 6\omega_7^2\omega_4^3cs^2\omega_5^3 - 12\omega_7\omega_4^3\omega_8cs^2\omega_5^2 - 6\omega_7^2\omega_4^3\omega_8cs^2\omega_5^3 + 18\omega_9\omega_7^2\omega_4^3cs^4\omega_5^2 - 2\omega_9v_1^2\omega_7^2\omega_4^3\omega_8cs^2\omega_5^2 -$
$12\omega_9v_1^2\omega_4^3v_2^2\omega_8\omega_5^2 + 36\omega_7^2\omega_4^2cs^4\omega_5^3 + 2\omega_9\omega_7^2\omega_4^3\omega_8cs^2\omega_5^2 + 36\omega_7\omega_4^3v_2^2\omega_8cs^2\omega_5^2 - 12v_1^2\omega_7^2\omega_4^2\omega_8cs^2\omega_5^3 + 12\omega_9\omega_4^3v_2^2\omega_8\omega_5^2)\frac{v_1}{12\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^3}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2 + 54\omega_9cs^2\omega_7\omega_4^2\omega_8\omega_5^2 - 2\omega_9v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12\omega_9v_1^2\omega_4\omega_8\omega_5^3 - 6v_1^2\omega_7^2\omega_4^2\omega_5^3 + 12\omega_9\omega_4\omega_8\omega_5^3 + 36\omega_9cs^2\omega_4^2\omega_8\omega_5^3 -$
$36cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 12\omega_7\omega_4^2\omega_8\omega_5^2 + 6v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^3 + 36\omega_9cs^2\omega_7^2\omega_4^2\omega_8 - 6v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 36cs^2\omega_7\omega_4^2\omega_8\omega_5^2 + 12\omega_7\omega_4^2\omega_8\omega_5^3 + \omega_9v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^3 -$

$$36\omega_9 cs^2\omega_4^2\omega_8\omega_5^2 + 36cs^2\omega_7^2\omega_4\omega_5^3 - \omega_9\omega_7^2\omega_4^2\omega_8\omega_5^3 - 18\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5^3 + 54\omega_9 cs^2\omega_7^2\omega_4\omega_8\omega_5^2 + 12v_1^2\omega_7\omega_4\omega_8\omega_5^3 + 6\omega_7^2\omega_4^2\omega_5^3 - 12\omega_9 v_1^2\omega_7^2\omega_4^2\omega_5^2 - 36cs^2\omega_7^2\omega_4\omega_8\omega_5^3 + 12\omega_9\omega_7^2\omega_4\omega_5^2 + 12\omega_9\omega_7^2\omega_8\omega_5^2 - 12\omega_9 v_1^2\omega_7^2\omega_8\omega_5^2 - 36\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5 + 12\omega_7^2\omega_4\omega_8\omega_5^3 + 12\omega_9\omega_7^2\omega_4^2\omega_8\omega_5 + 18\omega_9 cs^2\omega_7^2\omega_4^2\omega_5^2 - 12\omega_9 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5 - 18\omega_9\omega_7\omega_4\omega_8\omega_5^3 - 40\omega_9 cs^2\omega_7^2\omega_4\omega_8\omega_5^3 + 18\omega_9 v_1^2\omega_7\omega_4\omega_8\omega_5^3 - 36\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 12\omega_9\omega_7^2\omega_8\omega_5^3 + 12\omega_9 v_1^2\omega_7^2\omega_8\omega_5^3 + 18cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 - 36\omega_9 cs^2\omega_7^2\omega_4\omega_5^2 + 6\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12v_1^2\omega_7\omega_4^2\omega_8\omega_5^3 - 18\omega_9\omega_7\omega_4^2\omega_8\omega_5^2 - 6\omega_9 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 18\omega_9 v_1^2\omega_7\omega_4^2\omega_8\omega_5^2 - 36\omega_9 cs^2\omega_7^2\omega_8\omega_5^2 - 6\omega_9 v_1^2\omega_7\omega_4^2\omega_8\omega_5^3 + 6\omega_9\omega_7\omega_4^2\omega_8\omega_5^3 + 5\omega_9 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 - 6\omega_9\omega_7^2\omega_4^2\omega_5^2 + 12v_1^2\omega_7\omega_4^2\omega_8\omega_5^2 - 12\omega_7^2\omega_4\omega_5^3 + 6\omega_9 v_1^2\omega_7^2\omega_4^2\omega_5^2 - 18cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 6\omega_7^2\omega_4^2\omega_8\omega_5^3 + 36\omega_9 cs^2\omega_7^2\omega_8\omega_5^3 + 12\omega_9\omega_7\omega_8\omega_5^3 - 12\omega_9 v_1^2\omega_7\omega_8\omega_5^3 - 12v_1^2\omega_7^2\omega_4\omega_8\omega_5^3 + 36cs^2\omega_7\omega_4\omega_8\omega_5^3 + 12\omega_9 v_1^2\omega_4^2\omega_8\omega_5^3 + 18\omega_9 v_1^2\omega_7^2\omega_4\omega_8\omega_5^2 - 12\omega_9\omega_4^2\omega_8\omega_5^3 - 36\omega_9 cs^2\omega_4\omega_8\omega_5^3 - 18cs^2\omega_7^2\omega_4^2\omega_5^3 - 18\omega_9\omega_7^2\omega_4\omega_8\omega_5^2 + 12\omega_9\omega_7^2\omega_4\omega_8\omega_5^3 + 12v_1^2\omega_7^2\omega_4\omega_5^3 + 54\omega_9 cs^2\omega_7\omega_4\omega_8\omega_5^3 - 12\omega_9 v_1^2\omega_7^2\omega_4\omega_8\omega_5^3 - 12\omega_9 v_1^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_4^2\omega_8\omega_5^2 - 36\omega_9 cs^2\omega_7^2\omega_4^2\omega_8\omega_5 + 12\omega_9\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_7\omega_4\omega_8\omega_5^3 - 12\omega_9\omega_7^2\omega_4^2\omega_8 - 12\omega_9 v_1^2\omega_7\omega_4^2\omega_8\omega_5 + 12\omega_9 v_1^2\omega_7^2\omega_4^2\omega_8)\frac{cs^2v_1}{12\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^3}$$

$$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (36\omega_9 cs^2\omega_4^2\omega_8\omega_5^3 + 2\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^2 + 36cs^2\omega_7\omega_4^2\omega_8\omega_5^2 - 2\omega_9 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12\omega_9 v_1^2\omega_4\omega_8\omega_5^3 - 6v_1^2\omega_7^2\omega_4^2\omega_5^3 + 12\omega_9\omega_4\omega_8\omega_5^3 - 18\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 12\omega_7\omega_4^2\omega_8\omega_5^2 + 6v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^3 + 36\omega_9 cs^2\omega_7^2\omega_4^2\omega_8 - 36\omega_9 cs^2\omega_4^2\omega_8\omega_5^2 + 36cs^2\omega_7^2\omega_4\omega_5^3 - 6v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 54\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5^2 + 12\omega_7\omega_4^2\omega_8\omega_5^3 + \omega_9 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^3 - \omega_9\omega_7^2\omega_4^2\omega_8\omega_5^3 - 36cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 36\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5 - 12v_1^2\omega_7\omega_4\omega_8\omega_5^3 + 6\omega_7^2\omega_4^2\omega_5^3 - 12\omega_9 v_1^2\omega_7^2\omega_4\omega_5^2 - 40\omega_9 cs^2\omega_7^2\omega_4\omega_8\omega_5^3 + 12\omega_9\omega_7^2\omega_4\omega_5^2 + 12\omega_9\omega_7^2\omega_8\omega_5^2 - 12\omega_9 v_1^2\omega_7^2\omega_8\omega_5^2 + 54\omega_9 cs^2\omega_7^2\omega_4\omega_8\omega_5^2 + 12\omega_7^2\omega_4\omega_8\omega_5^3 + 12\omega_9\omega_7^2\omega_4^2\omega_8\omega_5 - 36\omega_9 cs^2\omega_7\omega_8\omega_5^3 - 12\omega_9 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5 - 18\omega_9\omega_7\omega_4\omega_8\omega_5^3 - 36cs^2\omega_7^2\omega_4\omega_8\omega_5^3 + 18\omega_9 v_1^2\omega_7\omega_4\omega_8\omega_5^3 - 12\omega_9\omega_7^2\omega_8\omega_5^3 + 12\omega_9 v_1^2\omega_7^2\omega_8\omega_5^3 + 18\omega_9 cs^2\omega_7^2\omega_4^2\omega_5^2 + 5\omega_9 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 - 36\omega_9 cs^2\omega_7^2\omega_8\omega_5^2 + 6\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12v_1^2\omega_7\omega_4^2\omega_8\omega_5^3 - 18\omega_9\omega_7\omega_4^2\omega_8\omega_5^2 - 18cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 18\omega_9 v_1^2\omega_7\omega_4^2\omega_8\omega_5^2 - 36\omega_9 cs^2\omega_7^2\omega_4\omega_5^2 - 6\omega_9 v_1^2\omega_7\omega_4^2\omega_8\omega_5^3 + 6\omega_9\omega_7\omega_4^2\omega_8\omega_5^3 + 18cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 - 6\omega_9\omega_7^2\omega_4^2\omega_5^2 + 12v_1^2\omega_7\omega_4^2\omega_8\omega_5^2 - 12\omega_7^2\omega_4\omega_5^3 + 6\omega_9 v_1^2\omega_7^2\omega_4^2\omega_5^2 - 6\omega_9 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 6\omega_7^2\omega_4^2\omega_8\omega_5^3 + 36\omega_9 cs^2\omega_7^2\omega_8\omega_5^3 + 12\omega_9\omega_7\omega_8\omega_5^3 - 12\omega_9 v_1^2\omega_7\omega_8\omega_5^3 - 18cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 - 36\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5^2 + 54\omega_9 cs^2\omega_7\omega_4\omega_8\omega_5^3 + 12\omega_9 v_1^2\omega_4^2\omega_8\omega_5^3 + 18\omega_9 v_1^2\omega_7^2\omega_4\omega_8\omega_5^2 - 12\omega_9\omega_4^2\omega_8\omega_5^3 - 18\omega_9\omega_7^2\omega_4\omega_8\omega_5^2 - 36\omega_9 cs^2\omega_7^2\omega_4^2\omega_8\omega_5 + 12\omega_9\omega_7^2\omega_4\omega_8\omega_5^3 + 12v_1^2\omega_7^2\omega_4\omega_5^3 + 54\omega_9 cs^2\omega_7\omega_4\omega_8\omega_5^3 - 12\omega_9 v_1^2\omega_7^2\omega_4\omega_8\omega_5^3 - 12\omega_9 v_1^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_7\omega_4\omega_8\omega_5^3 - 12\omega_9\omega_7^2\omega_4^2\omega_8 - 12\omega_9 v_1^2\omega_7\omega_4^2\omega_8\omega_5 + 12\omega_9 v_1^2\omega_7^2\omega_4^2\omega_8)\frac{v_1cs^2}{12\omega_9\omega_7^2\omega_4^2\omega_8\omega_5^3}$$

$$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (6\omega_3^2\omega_4\omega_1^3 - 12\omega_3 v_1^2\omega_1^3 + 6\omega_3^2 v_1^2\omega_4\omega_1^2 - 6\omega_3\omega_4^2\omega_1^2 + 36\omega_4^2\omega_1^3 cs^2 - 12v_1^2\omega_4^2\omega_1^2 + 18\omega_3\omega_4^2\omega_1^2 cs^2 + 12\omega_3\omega_4^2\omega_1^3 - 6\omega_3^2 v_1^2\omega_4\omega_1^3 - 18\omega_3^2\omega_4\omega_1^3 cs^2 - 6\omega_3^2\omega_4\omega_1^2 + 12v_1^2\omega_4^2\omega_1^3 - 36\omega_4^2\omega_1^2 cs^2 - 12\omega_3^2\omega_4^2 - 12\omega_3 v_1^2\omega_4^2\omega_1^3 - 36\omega_3\omega_1^3 cs^2 - 12\omega_3^2\omega_1^3 - 54\omega_3^2\omega_4^2\omega_1 cs^2 + 12\omega_3^2\omega_1^2 + 18\omega_3^2\omega_4\omega_1^2 cs^2 + 6\omega_3 v_1^2\omega_4^2\omega_1^2 - 40\omega_3\omega_4^2\omega_1^3 cs^2 + 12\omega_4\omega_1^3 + 36\omega_3^2\omega_4^2 cs^2 + 36\omega_3^2\omega_1^3 cs^2 - 18\omega_3^2 v_1^2\omega_4^2\omega_1 - 12\omega_4^2\omega_1^3 + 12\omega_3 v_1^2\omega_4\omega_1^2 + 18\omega_3 v_1^2\omega_4\omega_1^3 + 12\omega_4^2\omega_1^2 + 54\omega_3\omega_4\omega_1^3 cs^2 + 12\omega_3^2\omega_4^2\omega_1^2 cs^2 + 18\omega_3^2\omega_4^2\omega_1 + 12\omega_3\omega_1^3 + 12\omega_3^2 v_1^2\omega_4^2 + 12\omega_3^2 v_1^2\omega_1^3 - 4\omega_3^2\omega_4^2\omega_1^2 - 36\omega_3^2\omega_1^2 cs^2 - 18\omega_3\omega_4\omega_1^3 + \omega_3^2 v_1^2\omega_4^2\omega_1^3 - 12v_1^2\omega_4\omega_1^3 - 36\omega_4\omega_1^3 cs^2 + 4\omega_3^2 v_1^2\omega_4^2\omega_1^2 + 5\omega_3^2\omega_4^2\omega_1^3 cs^2 - 12\omega_3\omega_4\omega_1^2 - \omega_3^2\omega_4^2\omega_1^3 - 12\omega_3^2 v_1^2\omega_1^2 + 36\omega_3\omega_4\omega_1^2 cs^2)\frac{v_1cs^2}{12\omega_3^2\omega_4^2\omega_1^3}$$

$$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (-45\omega_3^2 v_1^2\omega_1^2 v_2^2\omega_2 + 35cs^4\omega_3^2\omega_1^3\omega_2^2 + 27\omega_3^2\omega_1^2 v_2^2\omega_2^3 - 36cs^2\omega_3\omega_1^2\omega_2^2 - 24cs^2\omega_3^2 v_1^2\omega_1^2\omega_2^3 - 21cs^2\omega_3^2 v_1^2\omega_1^3\omega_2 - 39cs^2\omega_3^2\omega_1\omega_2^3 - 6\omega_3^2\omega_1^2\omega_2 - 36cs^2 v_1^2\omega_1^2\omega_2^3 - 90\omega_3^2\omega_1^2 v_2^2\omega_2^2 + 10cs^4\omega_3^2\omega_1^3\omega_2^3 - 297cs^2\omega_3^2\omega_1^2 v_2^2\omega_2 + 18cs^4\omega_3^2\omega_2^3 - 18cs^4\omega_3^2\omega_1^2\omega_2 - 6\omega_3^2 v_1^2\omega_2^3 + 405cs^2\omega_3^2\omega_1^3 v_2^2 + 27\omega_3^2\omega_1^3 v_2^4\omega_2^2 + 6cs^2\omega_3\omega_1^3\omega_2 + 48cs^2\omega_3^2\omega_1\omega_2^2 + 6\omega_3^2 v_1^2\omega_1^2\omega_2 - 48cs^2\omega_3\omega_1^2\omega_2^3 + 18cs^2\omega_3^2 v_1^2\omega_1^2\omega_2^2 - 54\omega_3^2\omega_1^3 v_2^4\omega_2 + 2cs^2\omega_3^2 v_1^2\omega_1^3\omega_2^2 - 54\omega_3^2 v_2^4\omega_2^3 - 6\omega_3^2\omega_1^3\omega_2 - 6cs^2\omega_3^2 v_1^2\omega_1^2\omega_2 + 54\omega_3^2\omega_1 v_2^4\omega_2^2 - 12\omega_3^2 v_1^2\omega_1^2\omega_2^2 - 90cs^4\omega_3\omega_1\omega_2^3 + 270cs^2\omega_3^2\omega_1^2 v_2^2\omega_2^2 - 135cs^2\omega_3^2 v_2^2\omega_2^3 + 99\omega_3^2\omega_1^2 v_2^2\omega_2 - 12cs^2 v_1^2\omega_1^3\omega_2^2 + 54cs^4\omega_3^2\omega_1^2\omega_2^2 + 54\omega_3^2\omega_1^3 v_2^4 + 6\omega_3^2\omega_1^3 + 54\omega_3^2\omega_1 v_2^4\omega_2^3 + 12\omega_3^2\omega_1^2\omega_2^2 + 8cs^2\omega_3^2 v_1^2\omega_1^3\omega_2^2 + 12cs^2\omega_3\omega_1^3\omega_2^3 + 6\omega_3^2 v_1^2\omega_1^3\omega_2 - 30cs^2\omega_3 v_1^2\omega_1\omega_2^3 + 18cs^2\omega_3^2 v_1^2\omega_1^3 + 90\omega_3^2 v_1^2\omega_1^2 v_2^2\omega_2^2 - 91cs^4\omega_3^2\omega_1^2\omega_2^3 + 24cs^2 v_1^2\omega_1^3\omega_2^3 - 138cs^2\omega_3^2\omega_1^2 v_2^2\omega_2^3 - 117cs^4\omega_3^2\omega_1^3\omega_2 - 72cs^2\omega_3^2\omega_1^3 - 6\omega_3^2\omega_1\omega_2^2 + 6\omega_3^2 v_1^2\omega_1\omega_2^3 - 25cs^2\omega_3^2\omega_1^3\omega_2^2 - 99\omega_3^2\omega_1^3 v_2^2 + 48cs^2\omega_3 v_1^2\omega_1^2\omega_2^3 - 6cs^2\omega_3 v_1^2\omega_1^3\omega_2 - 459cs^2\omega_3^2\omega_1^3 v_2^2\omega_2 - 45\omega_3^2 v_1^2\omega_1 v_2^2\omega_2^2 - 27\omega_3^2\omega_1^3 v_2^2\omega_2^2 + 18cs^2\omega_3^2 v_1^2\omega_2^3 + 108cs^4\omega_3\omega_1^2\omega_2^2 + 63cs^4\omega_3^2\omega_1\omega_2^3 + 27cs^2\omega_3^2\omega_1 v_2^2\omega_2^2 + 12cs^2\omega_1^3\omega_2^2 + 45\omega_3^2 v_1^2\omega_1^3 v_2^2 + 36cs^2\omega_3 v_1^2\omega_1^2\omega_2^2 + 6\omega_3^2 v_1^2\omega_1\omega_2^2 - 2cs^2\omega_3^2\omega_1^3\omega_2^3 - 108cs^4\omega_1^2\omega_2^3 - 27\omega_3^2\omega_1^2 v_2^4\omega_2^3 - 6\omega_3^2\omega_1\omega_2^3 + 24cs^2\omega_3^2\omega_1^2\omega_2 + 189cs^2\omega_3^2\omega_1 v_2^2\omega_2^3 - 90cs^4\omega_3^2\omega_1\omega_2^2 - 45\omega_3^2 v_1^2\omega_1^3 v_2^2\omega_2 - 18cs^4\omega_3\omega_1^3\omega_2 - 24cs^2\omega_1^3\omega_2^3 + 144cs^4\omega_3\omega_1^2\omega_2^3 + 6\omega_3^2\omega_2^3 - 45\omega_3^2 v_1^2\omega_1 v_2^2\omega_2^2 - 9\omega_3^2\omega_1 v_2^2\omega_2^3 + 45\omega_3^2 v_1^2 v_2^2\omega_2^3 + 90cs^4\omega_3^2\omega_1^3 - 6\omega_3^2 v_1^2\omega_1^3 - 12cs^2\omega_3 v_1^2\omega_1^3\omega_2^3 - 30cs^2\omega_3^2 v_1^2\omega_1\omega_2^2 - 36cs^4\omega_1^3\omega_2^2 + 30cs^2\omega_3\omega_1\omega_2^3 - 54cs^2\omega_3^2\omega_1^2\omega_2^2 + 99\omega_3^2\omega_1^3 v_2^2\omega_2 + 138cs^2\omega_3^2\omega_1^3 v_2^2\omega_2^2 + 36cs^2\omega_1^2\omega_2^3 + 9\omega_3^2 v_2^2\omega_2^3 - 9\omega_3^2\omega_1 v_2^2\omega_2^2 - 36cs^4\omega_3\omega_1^3\omega_2^3 + 41cs^2\omega_3^2\omega_1^2\omega_2^3 - 54\omega_3^2\omega_1^2 v_2^4\omega_2 + 93cs^2\omega_3^2\omega_1^3\omega_2 + 3cs^2\omega_3^2 v_1^2\omega_1\omega_2^3 + 72cs^4\omega_1^3\omega_2^3)\frac{v_1}{24\omega_3^2\omega_1^3\omega_2^3}$$

coefficient $C^{(1)}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_1}$ **at** $\frac{\partial^4 v_1}{\partial x_1^2\partial x_2^2}$**:**

$$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_1} = (-24 - 18cs^2\omega + 72v_1^2 - 12\omega^2 + 36v_1^2\omega^2 - cs^2\omega^3 - 108v_1^2\omega + 8cs^2\omega^2 + 12cs^2 + 36\omega)\frac{cs^2\rho}{12\omega^3}$$

$$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_1} = (6\omega_9 cs^4\omega_7^2\omega_4^3\omega_8\omega_5 + 36v_1^2\omega_7^2\omega_4^2 v_2^2\omega_5^3 - 24\omega_9\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 + 6\omega_7^2\omega_4^3 v_2^2\omega_5^3 + 36v_1^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^3 + 72\omega_9 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 - 24\omega_9 v_1^2 cs^2\omega_4^3\omega_8\omega_5^3 - 12\omega_9 cs^4\omega_7^2\omega_4\omega_8\omega_5^2 - 36\omega_9 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_5^3 + 12\omega_7\omega_4^3 v_2^2\omega_8\omega_5^3 + 18v_1^2 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3 + 12\omega_9\omega_7^2\omega_4^2 v_2^2\omega_5^3 + 12\omega_9 cs^2\omega_4^3 v_2^2\omega_8\omega_5^3 + 6\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 48\omega_9 v_1^2 cs^2\omega_7^2\omega_8\omega_5^3 - 6\omega_9 cs^2\omega_7^2\omega_4^3\omega_8\omega_5 - 84\omega_9 v_1^2 cs^2\omega_7^2\omega_4\omega_8\omega_5^2 + 6\omega_9 cs^4\omega_7^2\omega_4^3\omega_5^2 + 18\omega_9 v_1^2 cs^2\omega_7^2\omega_4^3\omega_8\omega_5 + 12\omega_9 cs^2\omega_7^2\omega_4\omega_8\omega_5^2 + 36v_1^2 cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 18v_1^2 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 18\omega_9 cs^4\omega_7^2\omega_4\omega_8\omega_5^3 - 36\omega_9 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^3 + 24\omega_9 v_1^2 cs^2\omega_4^3\omega_8\omega_5^2 + 36\omega_9 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5 - 12\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 + 6cs^2\omega_7^2\omega_4^3\omega_5^3 + 12\omega_9\omega_7\omega_4^3 v_2^2\omega_8\omega_5^3 - 12\omega_9\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5 + 12\omega_9 cs^2\omega_7^2\omega_4^3 v_2^2\omega_8 - 6\omega_9\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 36v_1^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^3 - 6\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^3 + 84\omega_9 v_1^2 cs^2\omega_7^2\omega_4\omega_8\omega_5^3 + 18\omega_9 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 12\omega_9 cs^2\omega_4^3 v_2^2\omega_8\omega_5^2 + 18\omega_9\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5 - 12cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 36\omega_9\omega_7\omega_4^2 v_2^2\omega_8\omega_5^3 + 24\omega_9 cs^2\omega_7^2\omega_4\omega_8\omega_5^2 + 60\omega_9 v_1^2 cs^2\omega_7\omega_4^2\omega_8\omega_5^2 - 12\omega_9 cs^4\omega_7^2\omega_4^2\omega_5^2 + 6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 36v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 - 54\omega_9 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5 + 108\omega_9 v_1^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^3 - 12\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5^2 - 6cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^3 - 72\omega_9 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^2 + 12cs^4\omega_7\omega_4^2\omega_8\omega_5^3 + 18v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^3 + 12\omega_9 cs^4\omega_7\omega_4^2\omega_8\omega_5^2 + 24\omega_9\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^2 - \omega_9 cs^4\omega_7^2\omega_4^3\omega_8\omega_5^3 - 24\omega_9 cs^2\omega_7\omega_4 v_2^2\omega_8\omega_5^3 - 36\omega_9 v_1^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 + 6\omega_9 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 12\omega_7\omega_4^2 v_2^2\omega_8\omega_5^3 + 24\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5^3 - 36v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^3 + 12\omega_9\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 - 18\omega_9 v_1^2 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^3 - 132\omega_9 v_1^2 cs^2\omega_7\omega_4^3\omega_8\omega_5^3 - 6cs^2\omega_7^2\omega_4^3 v_2^2\omega_5^3 - 24\omega_9 cs^4\omega_7\omega_4^2\omega_8\omega_5^3 + 12\omega_9\omega_7\omega_4^3 v_2^2\omega_8\omega_5 - 6\omega_9 cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2 - 18v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 12cs^2\omega_7^2\omega_4^2\omega_5^3 + 6cs^4\omega_7^2\omega_4^3\omega_8\omega_5^3 - 36\omega_9 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5 + 6\omega_9 cs^2\omega_7^2\omega_4^3 v_2^2\omega_5^2 - 12\omega_9 cs^2\omega_4^2 v_2^2\omega_8\omega_5^3 + 72\omega_9 v_1^2 cs^2\omega_7\omega_4^3\omega_8\omega_5 + 24\omega_9 cs^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 + 12cs^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^3 - 6\omega_9 cs^2\omega_7^2\omega_4^3\omega_5^2 + 18\omega_9 v_1^2 cs^2\omega_7^2\omega_4^3\omega_5^2 - 36v_1^2 cs^2\omega_7\omega_4^3\omega_8\omega_5^3 - 12\omega_9 cs^4\omega_7^2\omega_8\omega_5^3 - 18v_1^2 cs^2\omega_7^2\omega_4^3\omega_5^3 + 12\omega_9 cs^2\omega_7^2\omega_4^2\omega_8\omega_5 + 60\omega_9 v_1^2 cs^2\omega_7\omega_4\omega_8\omega_5^3 - 6cs^4\omega_7^2\omega_4^3\omega_5^3 -$$

$$108\omega_9 v_1^2 cs^2\omega_7^2\omega_4^2\omega_8\omega_5 - 12\omega_9 cs^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^3 - 12\omega_9 cs^2\omega_7\omega_4\omega_8\omega_5^3 + 12\omega_9 cs^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5 - 12\omega_7^2\omega_4^2 v_2^2\omega_5^3 + 6\omega_9 cs^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 12\omega_9 cs^4\omega_7^2\omega_4^2\omega_8\omega_5 - 18 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_5^3 - 36 v_1^2 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 - 36\omega_9 v_1^2\omega_4^2 v_2^2\omega_8\omega_5^3 - 6\omega_9\omega_7^2\omega_4^3 v_2^2\omega_5^3 + 36 v_1^2 cs^2\omega_7\omega_4^3\omega_8\omega_5^2 - 12 cs^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^3 + 12\omega_9\omega_4^2 v_2^2\omega_8\omega_5^3 + 18\omega_9 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_5^2 + 12\omega_9 cs^4\omega_7\omega_4\omega_8\omega_5^3 + 24\omega_9 v_1^2 cs^2\omega_4^2\omega_8\omega_5^3 + 24\omega_9 cs^4\omega_7^2\omega_4^2\omega_8\omega_5^2 - 18\omega_9 cs^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5 + 12 cs^2\omega_7^2\omega_4^2 v_2^2\omega_5^3 + 12\omega_9 cs^4\omega_7\omega_4^3\omega_8\omega_5^3 - 24\omega_9\omega_7^2\omega_4 v_2^2\omega_8\omega_5^2 + 36 v_1^2 cs^2\omega_7^2\omega_4^2\omega_5^3 + 36\omega_9 cs^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^3 + 12 cs^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 + 12\omega_9 cs^2\omega_7^2\omega_4^2\omega_5^2 - 12\omega_9 cs^2\omega_7^2\omega_4^2 v_2^2\omega_5^3 - 36\omega_9 v_1^2 cs^2\omega_7^2\omega_4^2\omega_5^2 + 12 cs^4\omega_7\omega_4^3\omega_8\omega_5^2 + 72\omega_9 v_1^2\omega_7^2\omega_4 v_2^2\omega_8\omega_5^2 - 12 cs^4\omega_7^2\omega_4^2\omega_8\omega_5^3 - 72\omega_9 v_1^2\omega_7\omega_4 v_2^2\omega_8\omega_5^3 - 12\omega_9\omega_4^3 v_2^2\omega_8\omega_5^3 - 12\omega_9 cs^2\omega_7\omega_4^3\omega_8\omega_5^3 - 24\omega_9 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 36\omega_9 v_1^2\omega_7^3 v_2^2\omega_8\omega_5^3 + 6 cs^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^3 + 24\omega_9\omega_7\omega_4 v_2^2\omega_8\omega_5^3 - 24\omega_9 cs^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^2 + 78\omega_9 v_1^2 cs^2\omega_7\omega_4^3\omega_8\omega_5^3 + 12 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 + 180\omega_9 v_1^2 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12 cs^2\omega_7\omega_4^3\omega_8\omega_5^3 - 12 cs^4\omega_7\omega_4^3\omega_8\omega_5^3 - 12 cs^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^3 - 4\omega_9 cs^4\omega_7^2\omega_4^2\omega_8\omega_5^3 + 36\omega_9 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8 - 12\omega_9 cs^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 - 12\omega_9 cs^4\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_7^2\omega_4^3 v_2^2\omega_8 - 12\omega_9 cs^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5 - 144\omega_9 v_1^2 cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 12 cs^2\omega_7\omega_4^3\omega_8\omega_5^3 - 42\omega_9 v_1^2 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^3 - 36\omega_9 v_1^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 6 cs^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 + 12 cs^4\omega_7^2\omega_4^2\omega_5^3 + 12\omega_9\omega_4^3 v_2^2\omega_8\omega_5^2 + 12\omega_9 cs^2\omega_7\omega_4^3\omega_8\omega_5^2)\frac{\rho}{12\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^3}$$

$$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_1} = (36 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_5^3 - 24\omega_9\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 - 84\omega_9 v_1^2\omega_7^2\omega_4\omega_8 cs^2\omega_5^2 + 6\omega_7^2\omega_4^3 v_2^2\omega_5^3 + 12\omega_9\omega_7\omega_4^2\omega_8 cs^4\omega_5^2 + 36 v_1^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^3 + 72\omega_9 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 - 24\omega_9\omega_7^2\omega_4^2 v_2^2\omega_8 cs^2\omega_5^2 - 36\omega_9 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_5^2 + 12\omega_7\omega_4^3 v_2^2\omega_8\omega_5^3 + 12\omega_7\omega_4^2\omega_8 cs^4\omega_5^3 + 12\omega_7\omega_4^2 v_2^2\omega_8 cs^2\omega_5^3 + 12\omega_9\omega_7^2\omega_4\omega_8 cs^2\omega_5^2 + 12\omega_9\omega_7^2\omega_4^2 v_2^2\omega_5^2 - 12\omega_9\omega_7\omega_4\omega_8 cs^2\omega_5^3 + 6\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 4\omega_9\omega_7^2\omega_4^2\omega_8 cs^4\omega_5^3 + 60\omega_9 v_1^2\omega_7\omega_4\omega_8 cs^2\omega_5^3 - 24\omega_9 v_1^2\omega_4^3\omega_8 cs^2\omega_5^3 + 12\omega_9\omega_7^2\omega_4^3 v_2^2\omega_8 cs^2 - 36\omega_9 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^3 + 36\omega_9 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5 - 12\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 - 48\omega_9 v_1^2\omega_7^2\omega_8 cs^2\omega_5^3 - 24\omega_9\omega_7\omega_4^2\omega_8 cs^4\omega_5^3 + 6\omega_9\omega_7^2\omega_4^3\omega_8 cs^4\omega_5 + 84\omega_9 v_1^2\omega_7^2\omega_4\omega_8 cs^2\omega_5^3 + 12\omega_9\omega_7\omega_4^3 v_2^2\omega_8\omega_5^3 - 12\omega_9\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5 + 24\omega_9 v_1^2\omega_4^3\omega_8 cs^2\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 36 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^3 + 24\omega_9\omega_7^2\omega_4^2\omega_8 cs^4\omega_5^2 - 6\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^3 + 24\omega_9\omega_7^2\omega_4 v_2^2\omega_8 cs^2\omega_5^2 + 18\omega_9 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 12\omega_7^2\omega_4^2\omega_8 cs^4\omega_5^3 + 18\omega_9\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5 - 36\omega_9\omega_7\omega_4^2 v_2^2\omega_8 cs^2\omega_5^3 - 12\omega_9\omega_7^2\omega_4^2 cs^4\omega_5^2 + 36\omega_9\omega_7\omega_4^3\omega_8 cs^4\omega_5^3 + 36 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 - 54\omega_9 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5 + 108\omega_9 v_1^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^3 - 6\omega_7^2\omega_4^3 cs^4\omega_5^3 + 12\omega_7\omega_4^3\omega_8 cs^4\omega_5^2 - 12\omega_9\omega_4^3 v_2^2\omega_8 cs^2\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3 cs^2\omega_5^2 + 6\omega_7^2\omega_4^3\omega_8 cs^4\omega_5^3 + 18\omega_9 v_1^2\omega_7^2\omega_4^3 cs^2\omega_5^2 + 12\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^3 - 72\omega_9 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3\omega_8 cs^4\omega_5^2 + 18 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^3 - 12\omega_7^2\omega_4^2 cs^2\omega_5^3 + 24\omega_9\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^2 - 18 v_1^2\omega_7^2\omega_4^3 cs^2\omega_5^3 - 12\omega_7\omega_4^3\omega_8 cs^4\omega_5^3 + 12\omega_9\omega_4^3 v_2^2\omega_8 cs^2\omega_5^3 - 36\omega_9 v_1^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 - 12\omega_7^2\omega_4^2 v_2^2\omega_8 cs^2\omega_5^3 - 36 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^3 - 12\omega_9\omega_7\omega_4^3\omega_8 cs^4\omega_5^2 + 12\omega_9\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 - 12\omega_9\omega_7^2\omega_4^2 v_2^2\omega_8 cs^2\omega_5^2 - 24\omega_9\omega_7^2\omega_4 v_2^2\omega_8 cs^2\omega_5^3 + 24\omega_9 v_1^2\omega_4^2\omega_8 cs^2\omega_5^3 + 12\omega_9\omega_7\omega_4^3 v_2^2\omega_8\omega_5 - 18 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - \omega_9\omega_7^2\omega_4^3\omega_8 cs^4\omega_5^3 + 12\omega_9\omega_7^2\omega_4^2 v_2^2\omega_8 cs^2\omega_5 - 36\omega_9 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5 - 6\omega_7^2\omega_4^3\omega_8 cs^4\omega_5^2 - 132\omega_9 v_1^2\omega_7\omega_4^2\omega_8 cs^2\omega_5^3 + 18\omega_9\omega_7^2\omega_4\omega_8 cs^4\omega_5^3 - 12\omega_9\omega_7^2\omega_8 cs^4\omega_5^3 + 18\omega_9 v_1^2\omega_7^2\omega_4^3\omega_8 cs^2\omega_5 + 24\omega_9\omega_7\omega_4^2\omega_8 cs^2\omega_5^3 - 6\omega_9\omega_7^2\omega_4^3\omega_8 cs^2\omega_5 + 36 v_1^2\omega_7\omega_4^3\omega_8 cs^2\omega_5^2 + 18 v_1^2\omega_7^2\omega_4^3\omega_8 cs^2\omega_5^3 - 24\omega_9\omega_7^2\omega_4^2\omega_8 cs^2\omega_5^2 - 12\omega_9\omega_7\omega_4^3 v_2^2\omega_8 cs^2\omega_5^3 + 12\omega_7^2\omega_4^2\omega_8 cs^2\omega_5^3 - 6\omega_7^2\omega_4^3 v_2^2\omega_8 cs^2\omega_5^2 + 180\omega_9 v_1^2\omega_7^2\omega_4^2\omega_8 cs^2\omega_5^2 + 12\omega_7^2\omega_4^2 v_2^2 cs^2\omega_5^3 - 36 v_1^2\omega_7\omega_4^3\omega_8 cs^2\omega_5^3 - 18\omega_9\omega_7^2\omega_4^3 v_2^2\omega_8 cs^2\omega_5 - 12\omega_9\omega_7\omega_4^2\omega_8 cs^2\omega_5^2 - 12\omega_9\omega_7^2\omega_4^2 v_2^2 cs^2\omega_5^2 - 12\omega_9\omega_7^2\omega_4\omega_8 cs^4\omega_5^2 + 60\omega_9 v_1^2\omega_7\omega_4^2\omega_8 cs^2\omega_5^2 - 12\omega_7\omega_4^2\omega_8 cs^2\omega_5^3 - 12\omega_7^2\omega_4^2 v_2^2\omega_5^3 - 42\omega_9 v_1^2\omega_7^2\omega_4^2\omega_8 cs^2\omega_5^3 + 72\omega_9 v_1^2\omega_7\omega_4^3\omega_8 cs^2\omega_5 + 12\omega_9\omega_7\omega_4\omega_8 cs^4\omega_5^3 + 6\omega_7^2\omega_4^3 v_2^2\omega_8 cs^2\omega_5^3 + 24\omega_9\omega_7\omega_4^3 v_2^2\omega_8 cs^2\omega_5^2 - 18 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_5^3 - 12\omega_9\omega_4^2 v_2^2\omega_8 cs^2\omega_5^3 - 36\omega_9 v_1^2\omega_4^2 v_2^2\omega_8\omega_5^3 - 6\omega_9\omega_7^2\omega_4^3 v_2^2\omega_5^2 - 18 v_1^2\omega_7^2\omega_4^3\omega_8 cs^2\omega_5^2 + 12\omega_9\omega_4^2 v_2^2\omega_8\omega_5^3 + 18\omega_9 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_5^3 - 144\omega_9 v_1^2\omega_7\omega_4^3\omega_8 cs^2\omega_5^2 + 12\omega_7\omega_4^3\omega_8 cs^2\omega_5^3 + 6\omega_9\omega_7^2\omega_4^3 v_2^2 cs^2\omega_5^2 - 12\omega_9\omega_7\omega_4^3 v_2^2\omega_8 cs^2\omega_5 - 24\omega_9\omega_7^2\omega_4 v_2^2\omega_8\omega_5^3 + 12\omega_9\omega_7^2\omega_4^3\omega_8 cs^2\omega_5^3 + 36\omega_9 v_1^2\omega_7^3 v_2^2\omega_8\omega_5^3 + 6\omega_7^2\omega_4^3 cs^2\omega_5^3 - 72\omega_9 v_1^2\omega_7\omega_4^2\omega_8\omega_5^3 - 12\omega_9\omega_7^2\omega_4^2 cs^2\omega_5^2 + 36 v_1^2\omega_7^2\omega_4^2 cs^2\omega_5^3 + 36\omega_9 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8 - 108\omega_9 v_1^2\omega_7^2\omega_4^2\omega_8 cs^2\omega_5 - 12\omega_9\omega_7^2\omega_4^3 v_2^2\omega_8 + 78\omega_9 v_1^2\omega_7\omega_4^3\omega_8 cs^2\omega_5^3 + 6\omega_7^2\omega_4^3 cs^2\omega_5^3 - 12\omega_7\omega_4^3\omega_8 cs^2\omega_5^2 - 6\omega_7^2\omega_4^3\omega_8 cs^2\omega_5^3 + 6\omega_9\omega_7^2\omega_4^3 cs^4\omega_5^2 - 18\omega_9 v_1^2\omega_7^2\omega_4^3\omega_8 cs^2\omega_5^2 - 36\omega_9 v_1^2\omega_4^3 v_2^2\omega_8\omega_5^2 + 12\omega_7^2\omega_4^2 cs^4\omega_5^3 + 6\omega_9\omega_7^2\omega_4^3\omega_8 cs^2\omega_5^2 + 12\omega_7\omega_4^3 v_2^2\omega_8 cs^2\omega_5^2 - 36 v_1^2\omega_7^2\omega_4^2\omega_8 cs^2\omega_5^3 + 12\omega_9\omega_4^3 v_2^2\omega_8\omega_5^2)\frac{\rho}{12\omega_9\omega_7^2\omega_4^3\omega_8\omega_5^3}$$

$$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_1} = (-4\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5^2 - 36\omega_9 v_1^2\omega_7\omega_4^2\omega_5 + 12\omega_9\omega_7\omega_4^2\omega_5 + 12\omega_7\omega_4^2\omega_8\omega_5^2 + 18 v_1^2\omega_7\omega_4^3\omega_8\omega_5^2 - 12 cs^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_7\omega_4^2\omega_8 - 36\omega_9 v_1^2\omega_4^3\omega_8\omega_5 - 36\omega_9 v_1^2\omega_7\omega_4^2\omega_8 + 12\omega_9\omega_4^3\omega_8\omega_5 - 36\omega_9 v_1^2\omega_7\omega_4\omega_8\omega_5 - 12 cs^2\omega_7\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_7\omega_4\omega_8\omega_5 + 36\omega_9 v_1^2\omega_4\omega_8\omega_5^2 - 24\omega_9 cs^2\omega_4^2\omega_8\omega_5^2 + 12 cs^2\omega_7\omega_4^2\omega_5^2 - 12\omega_9\omega_4\omega_8\omega_5^2 - 12\omega_4^2\omega_8\omega_5^2 - 12\omega_9\omega_4^3\omega_8\omega_5^2 + 36\omega_9 v_1^2\omega_4^3\omega_8\omega_5^2 - 18\omega_9 v_1^2\omega_7\omega_4^3\omega_8\omega_5 + 12\omega_9 cs^2\omega_4^2\omega_8\omega_5 - 6\omega_9\omega_7\omega_4^3\omega_5 + 6\omega_9\omega_7\omega_4^3\omega_8\omega_5 + 18\omega_9 v_1^2\omega_7\omega_4^3\omega_5 - 12\omega_9 cs^2\omega_7\omega_8\omega_5^2 + 24\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5 - 6 cs^2\omega_7\omega_4^3\omega_5^2 + 36 v_1^2\omega_4^2\omega_8\omega_5^2 + 18\omega_9 v_1^2\omega_7\omega_4^3\omega_8 - 6\omega_9\omega_7\omega_4^3\omega_8 + 12 cs^2\omega_4^3\omega_8\omega_5 - 18 v_1^2\omega_7\omega_4^3\omega_8\omega_5 + 6\omega_9 cs^2\omega_7\omega_4^3\omega_5 + 6 cs^2\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_4^2\omega_8\omega_5 + 36\omega_9 v_1^2\omega_4^2\omega_8\omega_5 + 12\omega_4^3\omega_8\omega_5^2 + 12\omega_9 cs^2\omega_4^3\omega_8\omega_5^2 + 36 v_1^2\omega_4^3\omega_8\omega_5 - \omega_9 cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 6\omega_9 cs^2\omega_7\omega_4^3\omega_8 + 12 cs^2\omega_4^2\omega_8\omega_5^2 - 36 v_1^2\omega_7\omega_4^2\omega_8\omega_5^2 - 6\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_7\omega_4^2\omega_5^2 - 12\omega_9 cs^2\omega_7\omega_4\omega_8\omega_5 - 18 v_1^2\omega_7\omega_4^3\omega_5^2 - 36 v_1^2\omega_4^3\omega_8\omega_5^2 - 6\omega_9 cs^2\omega_7\omega_4^3\omega_8\omega_5 - 12\omega_9 cs^2\omega_7\omega_4^2\omega_5 + 18\omega_9 cs^2\omega_7\omega_4\omega_8\omega_5^2 + 6\omega_7\omega_4^3\omega_8\omega_5 - 6 cs^2\omega_7\omega_4^3\omega_8\omega_5 - 72\omega_9 v_1^2\omega_4^2\omega_8\omega_5^2 + 36 v_1^2\omega_7\omega_4^2\omega_5^2 + 12\omega_9 cs^2\omega_4\omega_8\omega_5^2 + 6\omega_7\omega_4^3\omega_5^2 + 24\omega_9\omega_4^2\omega_8\omega_5^2 - 24\omega_9\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_4^3\omega_8\omega_5 - 12\omega_9 cs^2\omega_7\omega_4^2\omega_8 + 72\omega_9 v_1^2\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_9 cs^2\omega_4^3\omega_8\omega_5)\frac{cs^2\rho}{12\omega_9\omega_7\omega_4^3\omega_8\omega_5^2}$$

$$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_1} = (-12 cs^2\omega_4^3\omega_8\omega_5^2 - 12 cs^2\omega_7\omega_4^2\omega_8\omega_5^2 - 36\omega_9 v_1^2\omega_7\omega_4^2\omega_5 + 12\omega_9\omega_7\omega_4^2\omega_5 + 12\omega_7\omega_4^2\omega_8\omega_5^2 + 18 v_1^2\omega_7\omega_4^3\omega_8\omega_5^2 + 12 cs^2\omega_7\omega_4^2\omega_5^2 - 24\omega_9 cs^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_7\omega_4^2\omega_8 - 36\omega_9 v_1^2\omega_4^3\omega_8\omega_5 - 36\omega_9 v_1^2\omega_7\omega_4^2\omega_8 + 12\omega_9\omega_4^3\omega_8\omega_5 - 36\omega_9 v_1^2\omega_7\omega_4\omega_8\omega_5 - 4\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_7\omega_4\omega_8\omega_5 + 36\omega_9 v_1^2\omega_4\omega_8\omega_5^2 - 12\omega_9\omega_4\omega_8\omega_5^2 - 12\omega_4^2\omega_8\omega_5^2 - 12\omega_9\omega_4^3\omega_8\omega_5^2 + 36\omega_9 v_1^2\omega_4^3\omega_8\omega_5^2 + 24\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5 - 18\omega_9 v_1^2\omega_7\omega_4^3\omega_8\omega_5 - 6\omega_9\omega_7\omega_4^3\omega_5 + 6\omega_9\omega_7\omega_4^3\omega_8\omega_5 + 18\omega_9 v_1^2\omega_7\omega_4^3\omega_5 - 12\omega_9 cs^2\omega_7\omega_8\omega_5^2 + 24\omega_9 cs^2\omega_7\omega_4^2\omega_8\omega_5 - 6 cs^2\omega_7\omega_4^3\omega_5^2 + 36 v_1^2\omega_4^2\omega_8\omega_5^2 + 18\omega_9 v_1^2\omega_7\omega_4^3\omega_8 - 6\omega_9\omega_7\omega_4^3\omega_8 + 12 cs^2\omega_4^3\omega_8\omega_5 - 18 v_1^2\omega_7\omega_4^3\omega_8\omega_5 + 6\omega_9 cs^2\omega_7\omega_4^3\omega_5 + 6 cs^2\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_4^2\omega_8\omega_5 + 36\omega_9 v_1^2\omega_4^2\omega_8\omega_5 + 12\omega_4^3\omega_8\omega_5^2 + 12\omega_9 cs^2\omega_4^3\omega_8\omega_5^2 + 36 v_1^2\omega_4^3\omega_8\omega_5 - \omega_9 cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 6\omega_9 cs^2\omega_7\omega_4^3\omega_8 + 12 cs^2\omega_4^2\omega_8\omega_5^2 - 36 v_1^2\omega_7\omega_4^2\omega_8\omega_5^2 - 6\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_7\omega_4^2\omega_5^2 - 12\omega_9 cs^2\omega_7\omega_4\omega_8\omega_5 - 18 v_1^2\omega_7\omega_4^3\omega_5^2 - 36 v_1^2\omega_4^3\omega_8\omega_5^2 - 6\omega_9 cs^2\omega_7\omega_4^3\omega_5 - 12\omega_9 cs^2\omega_7\omega_4^2\omega_5 + 18\omega_9 cs^2\omega_7\omega_4\omega_8\omega_5^2 + 6\omega_7\omega_4^3\omega_8\omega_5 - 6 cs^2\omega_7\omega_4^3\omega_8\omega_5 - 72\omega_9 v_1^2\omega_4^2\omega_8\omega_5^2 + 36 v_1^2\omega_7\omega_4^2\omega_5^2 + 6\omega_7\omega_4^3\omega_5^2 + 24\omega_9\omega_4^2\omega_8\omega_5^2 + 18\omega_9 cs^2\omega_7\omega_4\omega_8\omega_5^2 - 24\omega_9\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_4^3\omega_8\omega_5 + 72\omega_9 v_1^2\omega_7\omega_4^2\omega_8\omega_5)\frac{\rho cs^2}{12\omega_9\omega_7\omega_4^3\omega_8\omega_5^2}$$

$$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_1} = (-24\omega_3^2\omega_1 + 12\omega_3\omega_1^2 cs^2 - 12\omega_3\omega_4\omega_1 cs^2 - \omega_3^2\omega_4\omega_1^2 cs^2 - 72\omega_3^2 v_1^2\omega_1 + 12\omega_3^2\omega_4 + 36\omega_3 v_1^2\omega_1^2 - 12\omega_3^2\omega_1^2 + 24\omega_3^2\omega_1 cs^2 + 36\omega_3^2 v_1^2\omega_1^2 + 24\omega_3^2\omega_1 - 12\omega_3^2\omega_4\omega_1 + 12\omega_3^2 cs^2 - 12\omega_3^2\omega_4 cs^2 + 24\omega_3^2\omega_1^2 - 4\omega_3^2\omega_4\omega_1^2 cs^2 + 36\omega_3^2 v_1^2\omega_4\omega_1 + 12\omega_3^2\omega_1^2 cs^2 - 12\omega_4\omega_1^2 cs^2 + 12\omega_3\omega_4\omega_1 + 12\omega_3^2\omega_4\omega_1 cs^2 - 12\omega_3\omega_1^2 + 72\omega_3^2 v_1^2\omega_1 + 36\omega_3^2 v_1^2 - 24\omega_3^2\omega_1 cs^2 - 36\omega_3^2 v_1^2\omega_4 - 24\omega_3^2\omega_1^2 cs^2 - 72\omega_3^2 v_1^2\omega_1^2 + 18\omega_3\omega_4\omega_1^2 cs^2 - 36\omega_3 v_1^2\omega_4\omega_1 - 12\omega_3^3)\frac{\rho cs^2}{12\omega_3^3\omega_4\omega_1^2}$$

$$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2 v_1} = (-135\omega_3^2 v_1^2\omega_1^2 v_2^2\omega_2 + 2 cs^4\omega_3^2\omega_1^3\omega_2^2 - 54 cs^2\omega_3\omega_1^3 v_2^2\omega_2 + 9\omega_3^2\omega_1^2 v_2^2\omega_2^3 - 54\omega_3\omega_1^3 v_2^2\omega_2^2 - 60 cs^2\omega_3\omega_1^2\omega_2^2 - 6 cs^2\omega_3^2 v_1^2\omega_1^2\omega_2^3 -$$

$\omega_3^2 v_1^2 \omega_1^3 \omega_2^2 - 9cs^2 \omega_3^2 v_1^2 \omega_1^3 \omega_2 - 3cs^2 \omega_3^2 \omega_1 \omega_2^3 - 6\omega_3^2 \omega_1^2 \omega_2 - 90\omega_3^2 \omega_1^2 v_2^2 \omega_2^2 - 2cs^4 \omega_3^2 \omega_1^3 \omega_2^3 - 81cs^2 \omega_3^2 \omega_1^2 v_2^2 \omega_2 - 30cs^4 \omega_3^2 \omega_2^3 - 30cs^4 \omega_3^2 \omega_1^2 \omega_2 - \omega_3^2 v_1^4 \omega_1^2 \omega_2^3 + 18cs^2 \omega_3 \omega_1 v_2^2 \omega_2^3 - 18\omega_3^2 v_1^2 \omega_2^3 + 189cs^2 \omega_3^2 \omega_1^3 v_2^2 + 9\omega_3^2 \omega_1^3 v_2^4 \omega_2^2 - 54\omega_3 \omega_1^2 v_2^4 \omega_2^3 - 6cs^2 \omega_3 \omega_1^3 \omega_2 + 36cs^2 \omega_3^2 \omega_1 \omega_2^2 + 18\omega_3^2 v_1^2 \omega_1^2 \omega_2 + 60cs^2 \omega_3 \omega_1^2 \omega_2^3 + 72cs^2 \omega_3^2 v_1^2 \omega_1^2 \omega_2^2 - 45\omega_3^2 \omega_1^3 v_2^4 \omega_2 + 36cs^2 \omega_3 \omega_1^3 \omega_2^2 - 36\omega_3^2 v_2^4 \omega_2^3 - 6\omega_3^2 \omega_1^3 \omega_2 - 54cs^2 \omega_3^2 v_1^2 \omega_1^2 \omega_2 + 108cs^2 \omega_1^2 v_2^2 \omega_2^3 - 36\omega_3^2 v_1^2 \omega_1^2 \omega_2^2 + 30cs^4 \omega_3 \omega_1 \omega_2^3 + \omega_3^2 v_1^4 \omega_1^3 \omega_2^2 + 108cs^2 \omega_3^2 \omega_1^2 v_2^2 \omega_2^2 - 63cs^2 \omega_3^2 v_2^2 \omega_2^3 + 45\omega_3^2 \omega_1^2 v_2^2 \omega_2 + 36\omega_1^2 v_2^4 \omega_2^3 + 30cs^4 \omega_3^2 \omega_1^2 \omega_2^2 - 18\omega_3 \omega_1 v_2^2 \omega_2^3 + 36\omega_3^2 \omega_1^3 v_2^2 + 6\omega_3^2 \omega_1^3 + \omega_3^2 v_1^2 \omega_1^2 \omega_2^3 + 45\omega_3^2 \omega_1 v_2^4 \omega_2^3 + 12\omega_3^2 \omega_1^2 \omega_2^2 + 6cs^2 \omega_3^2 v_1^2 \omega_1^3 \omega_2^2 - 24cs^2 \omega_3 \omega_1^3 \omega_2^3 + 18\omega_3^2 v_1^2 \omega_1^3 \omega_2 + 126cs^2 \omega_3 v_1^2 \omega_1 \omega_2^3 + 36\omega_1^3 v_2^2 \omega_2^2 + 18cs^2 \omega_3^2 v_1^2 \omega_1^3 + 270\omega_3^2 v_1^2 \omega_1^2 v_2^2 \omega_2^2 - 10cs^4 \omega_3^2 \omega_1^2 \omega_2^3 - 30cs^2 \omega_3^2 \omega_1^2 v_2^2 \omega_2^3 + 18\omega_3 \omega_1^3 v_2^2 \omega_2 + 144cs^2 \omega_3 \omega_1^3 v_2^2 \omega_2^2 - 15cs^4 \omega_3^2 \omega_1^3 \omega_2 - 24cs^2 \omega_3^2 \omega_1^3 - 6\omega_3^2 \omega_1 \omega_2^2 + 18\omega_3^2 v_1^2 \omega_1 \omega_2^3 - 2cs^2 \omega_3^2 \omega_1^3 \omega_2^2 - 81\omega_3^2 \omega_1^3 v_2^2 - 198cs^2 \omega_3 v_1^2 \omega_1^3 \omega_2^3 + 18cs^2 \omega_3 v_1^2 \omega_1^3 \omega_2 - 216cs^2 \omega_3^2 \omega_1^3 v_2^2 \omega_2 + 54\omega_3 \omega_1^2 v_2^2 \omega_2^3 - 135\omega_3^2 v_1^2 \omega_1 v_2^2 \omega_2^3 - 9\omega_3^2 \omega_1^3 v_2^2 \omega_2^2 - 18cs^2 \omega_3^2 v_1^2 \omega_2^3 + 60cs^4 \omega_3 \omega_1^2 \omega_2^2 + 45cs^4 \omega_3^2 \omega_1 \omega_2^3 - 45cs^2 \omega_3^2 \omega_1 v_2^2 \omega_2^2 + 135\omega_3^2 v_1^2 \omega_1^3 v_2^2 + 144cs^2 \omega_3 v_1^2 \omega_1^2 \omega_2^2 + 18\omega_3^2 v_1^2 \omega_1 \omega_2^2 + 54\omega_3 \omega_1^3 v_2^4 \omega_2^2 - 9\omega_3^2 \omega_1^2 v_2^4 \omega_2^3 - 6\omega_3^2 \omega_1 \omega_2^3 + 36cs^2 \omega_3^2 \omega_1^2 \omega_2 + 108cs^2 \omega_3^2 \omega_1^2 v_2^2 \omega_2^3 - 30cs^4 \omega_3^2 \omega_1 \omega_2^2 - 135\omega_3^2 v_1^2 \omega_1^3 v_2^2 \omega_2 + 6cs^4 \omega_3 \omega_1^3 \omega_2 - 60cs^4 \omega_3 \omega_1^2 \omega_2^3 + 6\omega_3^2 \omega_2^2 - 135\omega_3^2 v_1^2 \omega_1^2 v_2^2 \omega_2^2 - 36cs^4 \omega_3 \omega_1^3 \omega_2^2 + 135\omega_3^2 v_1^2 v_2^2 \omega_2^3 + 18cs^4 \omega_3^2 \omega_1^3 - 18\omega_3^2 v_1^2 \omega_1^3 + 36cs^2 \omega_3 \omega_1^2 v_2^2 \omega_2^2 - 36\omega_3^2 v_1^2 \omega_2^2 + 72cs^2 \omega_3 v_1^2 \omega_1^3 \omega_2^3 - 108cs^2 \omega_1^3 v_2^2 \omega_2^2 - 90cs^2 \omega_3^2 v_1^2 \omega_1 \omega_2^2 - 30cs^2 \omega_3 \omega_1 \omega_2^3 - 42cs^2 \omega_3^2 \omega_1^2 \omega_2^2 - 18\omega_3 \omega_1^3 v_2^4 \omega_2 - 144cs^2 \omega_3 \omega_1^2 v_2^2 \omega_2^3 + 90\omega_3^2 \omega_1^3 v_2^2 \omega_2 + 30cs^2 \omega_3^2 \omega_1^3 v_2^2 \omega_2^2 - 9\omega_3^2 v_2^2 \omega_2^3 + 45\omega_3^2 \omega_1 v_2^2 \omega_2^2 + 24cs^4 \omega_3 \omega_1^3 \omega_2^3 + 2cs^2 \omega_3^2 \omega_1^2 \omega_2^3 + 21cs^2 \omega_3^2 \omega_1^3 \omega_2 + 9cs^2 \omega_3^2 v_1^2 \omega_1 \omega_2^2 - 36\omega_1^2 v_2^2 \omega_2^3 + 18\omega_3 \omega_1 v_2^4 \omega_2^3 - 90cs^2 \omega_3 v_1^2 \omega_1^3 \omega_2^2) \frac{\rho}{24\omega_3^2 \omega_1^3 \omega_2^3}$

coefficient $C^{(1)}_{\mathrm{D}_x^2 \mathrm{D}_y^2 v_2}$ **at** $\frac{\partial^4 v_2}{\partial x_1^2 \partial x_2^2}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x^2 \mathrm{D}_y^2 v_2} = 0$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x^2 \mathrm{D}_y^2 v_2} = (12\omega_9\omega_6 cs^2 \omega_7^2 \omega_4 \omega_8 \omega_5^3 - 5\omega_9\omega_6 cs^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5^3 - 5\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5 - \omega_9\omega_6 cs^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^2 - 2\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8 \omega_5^3 + 2\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4 \omega_8^2 \omega_5^2 + 4\omega_9\omega_6 v_1^2 \omega_4^3 \omega_8^2 \omega_5^3 - \omega_9\omega_6 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 + 2\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^3 + 6\omega_9\omega_6\omega_7\omega_4 \omega_8^2 \omega_5^3 + 2\omega_9 cs^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 - 2\omega_9\omega_6 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5 + 2\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4 \omega_8^2 \omega_5^3 - 2\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_5^3 + 13\omega_9\omega_6 cs^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5^2 - 8\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 12\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_8^2 + 4\omega_9\omega_6\omega_7\omega_4^3 \omega_8^2 \omega_5 - 2\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 + 2\omega_6 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 - 2\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2 + 4\omega_6 v_1^2 \omega_7 \omega_4^2 \omega_8^2 \omega_5^3 - 4\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2 - 7\omega_9\omega_6\omega_7\omega_4^3 \omega_8^2 \omega_5^2 + \omega_9\omega_6 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 4\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8 \omega_5^3 - 2\omega_9 cs^2 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 + 4\omega_6\omega_7 \omega_4^3 \omega_8^2 \omega_5^3 - 4\omega_6 cs^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5^3 + 4\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8^2 - 4\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_8 \omega_5^2 - 2\omega_9\omega_6 v_1^2 \omega_7 \omega_4^2 \omega_8^2 \omega_5^2 - 8\omega_9\omega_6 cs^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5 - 8\omega_9\omega_6 cs^2 \omega_4^3 \omega_8^2 \omega_5^2 - 4\omega_6 cs^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 4\omega_6\omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 4\omega_6 cs^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5^2 - 4\omega_6\omega_7 \omega_4^3 \omega_8^2 \omega_5^2 + 3\omega_9\omega_6\omega_7\omega_4^3 \omega_8^2 \omega_5^3 + 3\omega_9\omega_6\omega_7^2 \omega_4^2 \omega_8^2 \omega_5^2 - 16\omega_9\omega_6 cs^2 \omega_7^2 \omega_8^2 \omega_5^3 + 4\omega_9\omega_6\omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 8\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^3 + 2\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2 + 9\omega_9\omega_6 v_1^2 \omega_7 \omega_4^2 \omega_8^2 \omega_5^3 + \omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^2 + 8\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 + 4\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 - 6\omega_9\omega_6 cs^2 \omega_7 \omega_4 \omega_8^2 \omega_5^3 + 4\omega_6 cs^2 \omega_7^2 \omega_4^2 \omega_8 \omega_5^3 - 4\omega_6\omega_7^2 \omega_4^2 \omega_8 \omega_5^3 - 4\omega_6 v_1^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5^3 - 2\omega_9\omega_6\omega_7^2 \omega_4 \omega_8^2 \omega_5^3 - 4\omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8^2 - 4\omega_9\omega_6 v_1^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5^2 + 2\omega_9\omega_6 cs^2 \omega_7 \omega_4^2 \omega_8^2 \omega_5^2 + 4\omega_6 v_1^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5^2 - 4\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 - 2\omega_9\omega_6\omega_7^2 \omega_4^2 \omega_8 \omega_5^3 - 2\omega_9\omega_6\omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 5\omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8^2 \omega_5 + 3\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2 + 2\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 11\omega_9\omega_6 cs^2 \omega_7\omega_4^2 \omega_8^2 \omega_5^3 - 6\omega_9\omega_6 v_1^2 \omega_7 \omega_4 \omega_8^2 \omega_5^3 + \omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 - 3\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^2 - 3\omega_9\omega_6 v_1^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5^3 - 15\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5 - 8\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 - 4\omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8^2 \omega_5^3 - 6\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^2 - 24\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^2 \omega_8 \omega_5^3 + 2\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^3 - 2\omega_6 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^3 - 4\omega_9 cs^2 \omega_7^2 \omega_4 \omega_8^2 \omega_5^3 - \omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2 - 9\omega_9\omega_6\omega_7\omega_4^2 \omega_8^2 \omega_5^3 + 8\omega_9\omega_6 cs^2 \omega_7^2 \omega_4^2 \omega_8 \omega_5^2 + 26\omega_9\omega_6 cs^2 \omega_7^2 \omega_4 \omega_8^2 \omega_5^3 + 4\omega_9\omega_6\omega_4^3 \omega_8^2 \omega_5^2 - \omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 7\omega_9\omega_6 v_1^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5^2 - 2\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 + 2\omega_9\omega_6\omega_7\omega_4^2 \omega_8^2 \omega_5^2 - 4\omega_6\omega_7\omega_4^2 \omega_8^2 \omega_5^3 + 4\omega_6 cs^2 \omega_7\omega_4^2 \omega_8^2 \omega_5^3 + 4\omega_9 cs^2 \omega_7^2 \omega_4^2 \omega_8 \omega_5^3 + 2\omega_6\omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2 - 2\omega_6 cs^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2) \frac{v_1 \rho v_2}{2\omega_9\omega_6 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^3}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x^2 \mathrm{D}_y^2 v_2} = (3\omega_9\omega_6 \omega_7^2 \omega_4^3 \omega_8^2 cs^2 \omega_5^2 - 5\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5 - 4\omega_6 \omega_7^2 \omega_4^2 \omega_8^2 cs^2 \omega_5^3 - 2\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8 \omega_5^3 + 2\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4 \omega_8^2 \omega_5^2 + 4\omega_9\omega_6 v_1^2 \omega_4^3 \omega_8^2 \omega_5^3 + 12\omega_9\omega_6 \omega_7^2 \omega_4 \omega_8 cs^2 \omega_5^3 - \omega_9\omega_6 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 + 2\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^3 + 6\omega_9\omega_6\omega_7\omega_4 \omega_8^2 \omega_5^3 + 2\omega_9\omega_6 \omega_7^2 \omega_4^2 \omega_8^2 cs^2 \omega_5 - 5\omega_9\omega_6\omega_7\omega_4^3 \omega_8^2 cs^2 \omega_5^3 - 2\omega_9\omega_6 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5 - 8\omega_9\omega_6 \omega_4^2 \omega_8^2 cs^2 \omega_5^3 + 2\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4 \omega_8^2 \omega_5^3 + 4\omega_9\omega_6\omega_7\omega_4^3 \omega_8^2 \omega_5 + 2\omega_6 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 + 13\omega_9\omega_6\omega_7\omega_4^3 \omega_8^2 cs^2 \omega_5^2 + 4\omega_6\omega_7\omega_4^2 \omega_8^2 cs^2 \omega_5^3 - 2\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2 + 4\omega_6 v_1^2 \omega_7\omega_4^2 \omega_8^2 \omega_5^3 - 4\omega_9\omega_6 v_1^2 \omega_4^3 \omega_8^2 \omega_5^3 - 7\omega_9\omega_6\omega_7\omega_4^3 \omega_8^2 \omega_5^2 + \omega_9\omega_6 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 - 8\omega_9\omega_6 \omega_7^2 \omega_4^2 \omega_8^2 cs^2 \omega_5^3 + 4\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8 \omega_5^3 - 8\omega_9\omega_6\omega_7\omega_4^3 \omega_8^2 cs^2 \omega_5 + 4\omega_6\omega_7\omega_4^3 \omega_8^2 \omega_5^3 - 2\omega_6 \omega_7^2 \omega_4^3 \omega_8^2 cs^2 \omega_5^2 + 8\omega_9\omega_6\omega_4^3 \omega_8^2 cs^2 \omega_5^3 + 4\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8^2 + 4\omega_9\omega_6 \omega_7^2 \omega_4^2 cs^2 \omega_5^3 - 4\omega_6\omega_7\omega_4^3 \omega_8^2 cs^2 \omega_5^3 - 2\omega_9\omega_6 v_1^2 \omega_7\omega_4^2 \omega_8^2 \omega_5^2 + 2\omega_9\omega_6\omega_7\omega_4^2 \omega_8^2 cs^2 \omega_5^2 - 8\omega_9\omega_6\omega_4^3 \omega_8^2 cs^2 \omega_5^2 + 4\omega_6\omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 2\omega_6\omega_7^2 \omega_4^3 \omega_8^2 cs^2 \omega_5^3 - 4\omega_6\omega_7\omega_4^3 \omega_8^2 \omega_5^2 - \omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8^2 cs^2 \omega_5^2 + 3\omega_9\omega_6\omega_7\omega_4^3 \omega_8^2 \omega_5^3 + 3\omega_9\omega_6\omega_7^2 \omega_4^2 \omega_8^2 \omega_5^2 + 4\omega_9\omega_6\omega_4^2 \omega_8^2 \omega_5^3 + 9\omega_9\omega_6 v_1^2 \omega_7\omega_4^2 \omega_8^2 \omega_5^3 + 2\omega_9\omega_6^2 \omega_4^2 \omega_8^2 cs^2 \omega_5^3 + \omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2 - 16\omega_9\omega_6\omega_7^2 \omega_8^2 cs^2 \omega_5^3 + 11\omega_9\omega_6\omega_7\omega_4^2 \omega_8^2 cs^2 \omega_5^3 - 15\omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8^2 cs^2 \omega_5 + 4\omega_6\omega_7\omega_4^3 \omega_8^2 cs^2 \omega_5^2 - 4\omega_6\omega_7^2 \omega_4^2 \omega_8\omega_5^3 - 24\omega_9\omega_6\omega_7^2 \omega_4^2 \omega_8 cs^2 \omega_5^3 - 4\omega_6 v_1^2 \omega_7\omega_4^3 \omega_8^2 \omega_5^3 - 2\omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2 - 4\omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8^2 - 4\omega_9\omega_6 v_1^2 \omega_7 \omega_4^3 \omega_8^2 \omega_5^2 + 4\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 2\omega_9\omega_6\omega_7^2 \omega_4^2 \omega_8 \omega_5^3 + 8\omega_9\omega_6\omega_7^2 \omega_4^2 \omega_8 cs^2 \omega_5^2 - 4\omega_9\omega_6 v_1^2 \omega_4^2 \omega_8^2 \omega_5^3 + 5\omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8^2 \omega_5 - 2\omega_6\omega_7^2 \omega_4^3 \omega_8 cs^2 \omega_5^3 + 2\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5 - 6\omega_9\omega_6 v_1^2 \omega_7\omega_4 \omega_8^2 \omega_5^3 + 4\omega_9\omega_7^2 \omega_4^2 \omega_8 cs^2 \omega_5^3 + \omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 - 3\omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^2 - 3\omega_9\omega_6 v_1^2 \omega_7\omega_4^3 \omega_8^2 \omega_5^3 - 4\omega_9\omega_6\omega_4^3 \omega_8^2 \omega_5^3 + 4\omega_6\omega_7^2 \omega_4^2 \omega_8 cs^2 \omega_5^3 - 4\omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8 cs^2 \omega_5^3 - 2\omega_6\omega_7^2 \omega_4^3 \omega_8^2 \omega_5^3 - \omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2 - 9\omega_9\omega_6\omega_7\omega_4^2 \omega_8^2 \omega_5^3 + 26\omega_9\omega_6\omega_7^2 \omega_4\omega_8^2 cs^2 \omega_5^3 - 2\omega_9\omega_6\omega_7^2 \omega_4^3 cs^2 \omega_5^3 + 8\omega_9\omega_6\omega_7^2 \omega_4^3 \omega_8 cs^2 \omega_5^2 + 4\omega_9\omega_6\omega_4^3 \omega_8^2 \omega_5^2 - \omega_9\omega_6 v_1^2 \omega_7^2 \omega_4^2 \omega_8^2 \omega_5^3 + 7\omega_9\omega_6 v_1^2 \omega_7\omega_4^3 \omega_8^2 \omega_5^2 - 2\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8\omega_5^3 + 6\omega_9\omega_6\omega_7^2 \omega_4\omega_8^2 cs^2 \omega_5^2 - 2\omega_6 v_1^2 \omega_7^2 \omega_4^3 \omega_8 \omega_5^3 + 2\omega_9\omega_6 \omega_7^2 \omega_4^2 \omega_8^2 cs^2 - 4\omega_6\omega_7\omega_4^2 \omega_8^2 \omega_5^3 + 2\omega_6\omega_7^2 \omega_4^3 \omega_8^2 \omega_5^2) \frac{v_1 \rho v_2}{2\omega_9\omega_6 \omega_7^2 \omega_4^3 \omega_8^2 \omega_5^3}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x^2 \mathrm{D}_y^2 v_2} = 0$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x^2 \mathrm{D}_y^2 v_2} = 0$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x^2 \mathrm{D}_y^2 v_2} = 0$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x^2 \mathrm{D}_y^2 v_2} = (36\omega_3 v_1^2 \omega_1^3 - 54cs^2 \omega_1 \omega_2^3 + 100\omega_3 \omega_1^3 v_2^2 \omega_2^2 + 162cs^2 \omega_3 \omega_1^2 \omega_2^2 - 36\omega_1^2 \omega_2^2 - 27\omega_3 v_1^2 \omega_1 \omega_2^3 - 198\omega_3 v_2^2 \omega_2^3 - 36\omega_3 v_1^2 \omega_1 \omega_2^2 + 18\omega_1^3 \omega_2 - 297cs^2 \omega_3 \omega_1^3 \omega_2 - 84cs^2 \omega_3 \omega_1^2 \omega_2^3 + 198\omega_3 \omega_1^3 v_2^2 + 84cs^2 \omega_3 \omega_1^3 \omega_2^2 - 18\omega_3 \omega_1 \omega_2^2 + 216\omega_3 \omega_1 v_2^2 \omega_2^3 + 54\omega_3 \omega_2^3 - 81\omega_3 \omega_1 \omega_2^3 - 162cs^2 \omega_3 \omega_1^2 \omega_2 + 270cs^2 \omega_3 \omega_1^3 + 162\omega_3 \omega_1 v_2^2 \omega_2^2 - 216\omega_3 \omega_1^3 v_2^2 \omega_2 - 18v_1^2 \omega_1 \omega_2^3 + 135\omega_3 \omega_1^3 \omega_2 - 54cs^2 \omega_3 \omega_2^3 + 46\omega_3 \omega_1^2 \omega_2^3 - 100\omega_3 \omega_1^2 v_2^2 \omega_2^3 - 18v_1^2 \omega_1^3 \omega_2 - 36\omega_3 v_1^2 \omega_1^2 \omega_2 - 54\omega_3 \omega_1^2 \omega_2^2 + 36v_1^2 \omega_1^2 \omega_2^2 - 126\omega_3 \omega_1^3 + 108cs^2 \omega_1^2 \omega_2^2 - 162\omega_3 \omega_1^2 v_2^2 \omega_2 + 18\omega_1 \omega_2^2 + 54\omega_3 v_1^2 \omega_1^2 \omega_2^2 + 135cs^2 \omega_3 \omega_1 \omega_2^2 + 90\omega_3 \omega_1^2 \omega_2 + 36\omega_3 v_1^2 \omega_2^2 - 54cs^2 \omega_1^3 \omega_2 - 46\omega_3 \omega_1^3 \omega_2^2 - 54cs^2 \omega_3 \omega_1 \omega_2^2 - 27\omega_3 v_1^2 \omega_1^3 \omega_2) \frac{v_1 \rho v_2}{24\omega_3 \omega_1^3 \omega_2^3}$

coefficient $C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^3\rho}$ **at** $\frac{\partial^4\rho}{\partial x_1\partial x_2^3}$**:**

$$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = (24-\omega^3+108cs^2\omega+14\omega^2+3cs^2\omega^3-42cs^2\omega^2-72cs^2+36v_2^2\omega-24v_2^2-36\omega+v_2^2\omega^3-14v_2^2\omega^2)\tfrac{cs^2v_2}{12\omega^3}$$

$$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = (6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_5+12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5-72\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^2\omega_8+36\omega_6^2v_1^2cs^2\omega_7\omega_4^2\omega_8\omega_5+36\omega_6^2cs^4\omega_4^2\omega_8^2\omega_5+$$
$$27\omega_9\omega_6v_1^2cs^2\omega_7\omega_4^3\omega_8^2\omega_5+24\omega_9\omega_6v_1^2\omega_7\omega_4v_2^2\omega_8^2\omega_5-6\omega_9\omega_6^2cs^4\omega_7\omega_4^3\omega_5-36\omega_9\omega_6cs^4\omega_4^2\omega_8^2\omega_5+36\omega_6^2cs^4\omega_4^3\omega_8^2+72\omega_9\omega_6v_1^2cs^2\omega_7\omega_4^2\omega_8^2-$$
$$12\omega_9v_1^2\omega_7\omega_4^2\omega_8^2\omega_5+12\omega_6^2v_1^2\omega_4^2v_2^2\omega_8^2\omega_5-6\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2+18\omega_9\omega_6cs^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5+36\omega_6^2v_1^2cs^2\omega_4^2\omega_8^2\omega_5+6\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5-$$
$$36\omega_9\omega_6cs^4\omega_4^3\omega_8^2+15\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5+6\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5-12\omega_6^2cs^2\omega_7\omega_4^2\omega_8\omega_5-24\omega_9\omega_6^2v_1^2\omega_7\omega_4v_2^2\omega_8\omega_5+12\omega_9\omega_6cs^2\omega_7\omega_4\omega_8^2\omega_5+$$
$$12\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5-36\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^2\omega_5+12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8+3\omega_9\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2\omega_5-45\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_8\omega_5+36\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5-$$
$$12\omega_9\omega_6cs^2\omega_4^3\omega_8^2\omega_5-6\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2-12\omega_9\omega_6v_1^2\omega_4^2v_2^2\omega_8^2\omega_5-36\omega_9\omega_6v_1^2cs^2\omega_4^2\omega_8^2\omega_5+36\omega_6^2cs^4\omega_7\omega_4^2\omega_8\omega_5+18\omega_9\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5+$$
$$36\omega_9\omega_6cs^4\omega_7\omega_4\omega_8^2\omega_5+12\omega_6^2cs^2\omega_4^3\omega_8^2\omega_5-\omega_9\omega_6^2cs^2\omega_7\omega_4^3\omega_8^2\omega_5-12\omega_9\omega_6^2cs^2\omega_7\omega_4\omega_8^2\omega_5-96\omega_9\omega_6^2cs^4\omega_7\omega_8^2\omega_5-6\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5+$$
$$12\omega_9\omega_6^2cs^2\omega_7\omega_4v_2^2\omega_8^2\omega_5-15\omega_9\omega_6cs^4\omega_7\omega_4^3\omega_8^2\omega_5-12\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5-12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2\omega_5-18\omega_9\omega_6v_1^2cs^2\omega_7\omega_4^3\omega_8^2-12\omega_6^2cs^2\omega_4^3\omega_8^2+$$
$$6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5+156\omega_9\omega_6^2cs^4\omega_7\omega_4\omega_8^2\omega_5-72\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4\omega_8\omega_5+18\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_8^2\omega_5-36\omega_9\omega_6v_1^2cs^2\omega_7\omega_4^2\omega_8\omega_5+12\omega_9\omega_6^2cs^4\omega_7\omega_4^2\omega_5+$$
$$36\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_8+12\omega_6^2v_1^2\omega_4^3\omega_8^2\omega_5+12\omega_9\omega_6cs^2\omega_4^3\omega_8^2+5\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_8^2\omega_5-3\omega_9\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5+12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2+18\omega_9\omega_6cs^4\omega_7\omega_4^3\omega_8^2-$$
$$12\omega_6^2v_1^2\omega_4^3\omega_8^2-18\omega_9v_1^2cs^2\omega_7\omega_4^3\omega_8^2\omega_5-18\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_8^2+24\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_8\omega_5+18\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2\omega_5+12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2+18\omega_9\omega_6cs^4\omega_7\omega_4^3\omega_8^2-$$
$$18\omega_9\omega_6^2cs^2\omega_7\omega_4^2\omega_8\omega_5-6\omega_6^2cs^2\omega_7\omega_4^3\omega_8^2\omega_5-12\omega_9\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_5-12\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5-12\omega_6^2v_1^2\omega_4^3v_2^2\omega_8^2\omega_5-5\omega_9\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5-$$
$$42\omega_9\omega_6^2cs^4\omega_7\omega_4^2\omega_8\omega_5-6\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_5+18\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_5-18\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2+72\omega_9\omega_6v_1^2cs^2\omega_7\omega_4\omega_8^2\omega_5-18\omega_6^2cs^4\omega_7\omega_4^3\omega_8\omega_5-$$
$$12\omega_9\omega_6cs^2\omega_4^3v_2^2\omega_8^2-12\omega_9\omega_6cs^2\omega_7\omega_4v_2^2\omega_8^2\omega_5+6\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2+36\omega_9\omega_6v_1^2cs^2\omega_4^3\omega_8^2\omega_5-6\omega_9\omega_6^2cs^2\omega_7\omega_4^3\omega_5+24\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2+$$
$$12\omega_9\omega_6^2cs^2\omega_7\omega_4^2\omega_8^2\omega_5-36\omega_9\omega_6v_1^2cs^2\omega_4^3\omega_8^2-12\omega_6^2cs^2\omega_4^2\omega_8^2\omega_5-24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8+12\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2-36\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5+$$
$$6\omega_6^2cs^2\omega_7\omega_4^3\omega_8^2+6\omega_9\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8^2+12\omega_6^2v_1^2\omega_4^3v_2^2\omega_8^2+9\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5+12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2\omega_5+54\omega_9\omega_6cs^4\omega_7\omega_4^2\omega_8^2\omega_5)\tfrac{v_2}{12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5}$$

$$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} =$$
$$(-18\omega_6^2\omega_7\omega_4^3\omega_8cs^4\omega_5+6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_5+12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5+12\omega_6^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5+12\omega_9\omega_6^2\omega_7\omega_4^2cs^4\omega_5+36\omega_6^2v_1^2\omega_4^3\omega_8^2cs^2+12\omega_6^2\omega_4^3\omega_8^2cs^2\omega_5+$$
$$24\omega_9\omega_6v_1^2\omega_7\omega_4v_2^2\omega_8^2\omega_5-6\omega_9\omega_6^2\omega_7\omega_4^3cs^2\omega_5+36\omega_9v_1^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5-12\omega_9\omega_6\omega_4^3\omega_8^2cs^2\omega_5-36\omega_9\omega_6v_1^2\omega_4^3\omega_8^2cs^2-36\omega_9\omega_6\omega_7\omega_4\omega_8^2cs^4\omega_5-$$
$$36\omega_9\omega_6\omega_4^3\omega_8^2cs^4-12\omega_9\omega_6\omega_4^2v_2^2\omega_8^2cs^2\omega_5+12\omega_9\omega_6^2\omega_7\omega_4\omega_8cs^2\omega_5-12\omega_9v_1^2\omega_7\omega_4^2\omega_8^2\omega_5+12\omega_6^2v_1^2\omega_4^2v_2^2\omega_8^2\omega_5-6\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2+$$
$$27\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5-45\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_5+6\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5+36\omega_6^2\omega_4^3\omega_8^2cs^4+15\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5-\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5-$$
$$36\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5-96\omega_9\omega_6^2\omega_7\omega_8^2cs^4\omega_5-24\omega_9\omega_6^2v_1^2\omega_7\omega_4v_2^2\omega_8\omega_5-42\omega_9\omega_6^2\omega_7\omega_4^2\omega_8cs^4\omega_5+12\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5+12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8-$$
$$18\omega_9\omega_6\omega_7\omega_4^2\omega_8^2cs^2\omega_5+36\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5+12\omega_6^2\omega_7\omega_4^2v_2^2\omega_8cs^2\omega_5-6\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2-12\omega_9\omega_6v_1^2\omega_4^2v_2^2\omega_8^2\omega_5+12\omega_6^2\omega_4^2v_2^2\omega_8^2cs^2\omega_5+$$
$$6\omega_6^2\omega_7\omega_4^3v_2^2\omega_8^2cs^2\omega_5+36\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2cs^2+5\omega_9\omega_6\omega_7\omega_4^3\omega_8^2cs^2\omega_5-6\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5+12\omega_9\omega_6^2\omega_7\omega_4v_2^2\omega_8^2cs^2\omega_5+18\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5+$$
$$12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5+15\omega_9\omega_6^2\omega_7\omega_4^3\omega_8cs^4\omega_5-12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2\omega_5+6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5+12\omega_6^2v_1^2\omega_4^3\omega_8^2\omega_5-36\omega_9\omega_6^2v_1^2\omega_7\omega_4^2cs^2\omega_5+$$
$$12\omega_9\omega_6v_1^2\omega_4^3v_2^2\omega_8^2\omega_5-12\omega_6^2v_1^2\omega_4^3\omega_8^2+24\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_8\omega_5-3\omega_9\omega_6^2\omega_7\omega_4^3v_2^2\omega_8cs^2\omega_5+12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2-12\omega_6^2\omega_4^2\omega_8^2cs^2\omega_5+36\omega_6^2\omega_7\omega_4^2\omega_8cs^4\omega_5-$$
$$5\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8^2cs^2\omega_5-6\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5-6\omega_9\omega_6\omega_7\omega_4^3\omega_8^2cs^2+144\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8cs^2\omega_5-12\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5-12\omega_6^2v_1^2\omega_4^2v_2^2\omega_8^2\omega_5-$$
$$108\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5+72\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2cs^2+156\omega_9\omega_6^2\omega_7\omega_4\omega_8^2cs^4\omega_5+6\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2-6\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_5-12\omega_9\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2cs^2\omega_5+$$
$$12\omega_9\omega_6\omega_4^2\omega_8^2cs^2\omega_5-18\omega_9v_1^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5-12\omega_9\omega_6^2\omega_7\omega_4v_2^2\omega_8cs^2\omega_5-18\omega_9\omega_6^2\omega_7\omega_4^2\omega_8cs^2\omega_5-18\omega_6^2v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_5+3\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2cs^4\omega_5+$$
$$6\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2-12\omega_9\omega_6\omega_7\omega_4v_2^2\omega_8^2cs^2\omega_5+24\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2+54\omega_9\omega_6\omega_7\omega_4^2\omega_8^2cs^4\omega_5-24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8-36\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5+$$
$$6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2-36\omega_6^2v_1^2\omega_4^3\omega_8^2cs^2\omega_5+24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8-6\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5-9\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5-36\omega_6^2\omega_7\omega_4^2\omega_8^2cs^4\omega_5+$$
$$6\omega_6^2\omega_7\omega_4^3\omega_8cs^2\omega_5-36\omega_6^2\omega_4^3\omega_8^2cs^4\omega_5+\omega_9\omega_6^2\omega_7\omega_4^3v_2^2\omega_8^2cs^2\omega_5+12\omega_9\omega_6^2\omega_7\omega_4^2cs^2\omega_5-48\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5-18\omega_6^2\omega_7\omega_4^3\omega_8^2cs^4-$$
$$12\omega_9\omega_6\omega_4^3v_2^2\omega_8^2cs^2+6\omega_9v_1^2\omega_7\omega_4^3\omega_8^2\omega_5+6\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5+12\omega_9\omega_6\omega_7\omega_4\omega_8^2cs^2\omega_5+36\omega_9\omega_6\omega_4^3\omega_8^2cs^4\omega_5+18\omega_9\omega_6^2\omega_7\omega_4^2v_2^2\omega_8cs^2\omega_5+$$
$$6\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2cs^4\omega_5+18\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8^2cs^2\omega_5-12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_5-6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5+48\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5+12\omega_6^2\omega_4^3v_2^2\omega_8^2cs^2+$$
$$36\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8cs^2\omega_5+12\omega_9\omega_6^2\omega_7\omega_4\omega_8cs^4\omega_5+36\omega_9\omega_6v_1^2\omega_4^3\omega_8^2cs^2\omega_5+18\omega_9\omega_6\omega_7\omega_4^3\omega_8^2cs^4+12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_5-12\omega_9\omega_6^2\omega_7\omega_4^2v_2^2cs^2\omega_5-$$
$$18\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2cs^2-12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8-12\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5+12\omega_9\omega_6\omega_4^3v_2^2\omega_8^2cs^2\omega_5+12\omega_9\omega_6\omega_4^3\omega_8^2cs^2+36\omega_6^2\omega_4^2\omega_8^2cs^4\omega_5+$$
$$18\omega_6^2\omega_7\omega_4^3\omega_8^2cs^4\omega_5+12\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5-12\omega_6^2\omega_4^3\omega_8^2cs^2-12\omega_6^2\omega_7\omega_4^2\omega_8cs^2\omega_5-6\omega_6^2\omega_7\omega_4^3v_2^2\omega_8^2cs^2-36\omega_9\omega_6v_1^2\omega_4^2\omega_8^2cs^2\omega_5+$$
$$6\omega_9\omega_6^2\omega_7\omega_4^3v_2^2cs^2\omega_5-12\omega_9\omega_6^2\omega_7\omega_4\omega_8^2cs^2\omega_5-15\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5+18\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_5-24\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2-36\omega_9\omega_6\omega_4^2\omega_8^2cs^4\omega_5-$$
$$12\omega_9\omega_6v_1^2\omega_4^3v_2^2\omega_8^2-12\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2cs^2\omega_5-6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_5-24\omega_9\omega_6v_1^2\omega_7\omega_4\omega_8^2\omega_5-12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5-15\omega_9\omega_6\omega_7\omega_4^3\omega_8^2cs^4\omega_5-$$
$$72\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_8cs^2\omega_5-12\omega_6^2\omega_4^3v_2^2\omega_8^2cs^2\omega_5+18\omega_9\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_5-18\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2cs^2+36\omega_6^2v_1^2\omega_7\omega_4^2\omega_8cs^2\omega_5-12\omega_6^2v_1^2\omega_4^2\omega_8^2\omega_5+$$
$$3\omega_9\omega_6^2\omega_7\omega_4^3\omega_8cs^2\omega_5-60\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2cs^4\omega_5+72\omega_9\omega_6v_1^2\omega_7\omega_4\omega_8^2cs^2\omega_5+12\omega_9v_1^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5-6\omega_6^2\omega_7\omega_4^3v_2^2\omega_8cs^2\omega_5-72\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8cs^2+$$
$$12\omega_6^2v_1^2\omega_4^3v_2^2\omega_8^2+9\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5+12\omega_9\omega_6v_1^2\omega_4^2\omega_8^2\omega_5+6\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8^2cs^2+36\omega_6^2v_1^2\omega_4^2\omega_8^2cs^2\omega_5)\tfrac{v_2}{12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5}$$

$$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = (12\omega_9\omega_4^2v_2^2\omega_8^2\omega_5+12\omega_9\omega_7\omega_8^2\omega_5-6\omega_6\omega_7\omega_4^2v_2^2\omega_8^2+12\omega_6\omega_4^2v_2^2\omega_8^2-12\omega_6\omega_4^2\omega_8^2-18cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5-12\omega_6\omega_7\omega_4v_2^2\omega_8^2\omega_5+$$
$$5\omega_9\omega_7\omega_4^2\omega_8^2\omega_5+12\omega_6\omega_4v_2^2\omega_8^2\omega_5-36\omega_9cs^2\omega_6\omega_7\omega_4\omega_5-3\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5-36cs^2\omega_6\omega_7\omega_4\omega_8^2\omega_5-36\omega_9cs^2\omega_6\omega_7\omega_8\omega_5-6\omega_9\omega_7\omega_4^2\omega_8^2+$$
$$6\omega_6\omega_7\omega_4^2\omega_8\omega_5+12\omega_9\omega_6\omega_7\omega_4\omega_8^2\omega_5-12\omega_9\omega_6\omega_7\omega_8^2\omega_5+54\omega_9cs^2\omega_7\omega_4\omega_8^2\omega_5+12\omega_9\omega_6\omega_7v_2^2\omega_8^2\omega_5-12\omega_9\omega_6\omega_7\omega_4v_2^2\omega_8^2\omega_5-$$

$9\omega_9 cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5 - 6\omega_9\omega_6\omega_7\omega_4^2\omega_5 + 36cs^2\omega_6\omega_4\omega_8^2\omega_5 + 18\omega_9\omega_7\omega_4 v_2^2\omega_8^2\omega_5 - 12\omega_9\omega_4^2\omega_8^2\omega_5 - 6\omega_6\omega_7\omega_4^2 v_2^2\omega_8\omega_5 + 3\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5 - 36\omega_9 cs^2\omega_4\omega_8^2\omega_5 + 12\omega_6\omega_7\omega_4\omega_8^2\omega_5 - 12\omega_6\omega_4\omega_8^2\omega_5 + 6\omega_9\omega_6\omega_7\omega_4^2 v_2^2\omega_8^2 - 36cs^2\omega_6\omega_4\omega_8^2\omega_5 - 36\omega_9 cs^2\omega_6\omega_7\omega_4\omega_8^2\omega_5 + 36cs^2\omega_6\omega_4^2\omega_8^2 - \omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5 + 6\omega_6\omega_7\omega_4^2 v_2^2\omega_8^2\omega_5 - 15\omega_9 cs^2\omega_7\omega_4^2\omega_8^2\omega_5 - 12\omega_6\omega_7\omega_4\omega_8\omega_5 + 18\omega_9 cs^2\omega_7\omega_4^2\omega_8^2 - 36cs^2\omega_6\omega_4^2\omega_8^2\omega_5 + 54\omega_9 cs^2\omega_6\omega_7\omega_4\omega_8\omega_5 - 36\omega_9 cs^2\omega_4^2\omega_8^2 + 6\omega_6\omega_7\omega_4^2\omega_8^2 - 12\omega_9\omega_4 v_2^2\omega_8^2\omega_5 - 6\omega_6\omega_7\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_4\omega_8^2\omega_5 + 36\omega_9 cs^2\omega_4^2\omega_8^2\omega_5 - 18\omega_9\omega_6\omega_7\omega_4\omega_8\omega_5 + 12\omega_9\omega_6\omega_7\omega_8\omega_5 - 12\omega_9\omega_6\omega_7\omega_4 v_2^2\omega_5 + 6\omega_9\omega_7\omega_4^2 v_2^2\omega_8^2 - 18cs^2\omega_6\omega_7\omega_4^2\omega_8^2 + 3\omega_9 cs^2\omega_6\omega_7\omega_4^2\omega_8^2\omega_5 + 18\omega_9\omega_6\omega_7\omega_4 v_2^2\omega_8\omega_5 - 12\omega_9\omega_6\omega_7 v_2^2\omega_8\omega_5 - 12\omega_6\omega_4^2 v_2^2\omega_8^2\omega_5 + 12\omega_9\omega_6\omega_7\omega_4\omega_5 + 12\omega_6\omega_4^2\omega_8^2\omega_5 + 18\omega_9 cs^2\omega_6\omega_7\omega_4^2\omega_5 - 36\omega_9 cs^2\omega_7\omega_8^2\omega_5 - 12\omega_9\omega_7 v_2^2\omega_8^2\omega_5 + \omega_9\omega_6\omega_7\omega_4^2 v_2^2\omega_8^2\omega_5 - 12\omega_9\omega_4^2 v_2^2\omega_8^2 - 18\omega_9\omega_7\omega_4\omega_8^2\omega_5 + 36\omega_9 cs^2\omega_6\omega_7\omega_8^2\omega_5 + 36cs^2\omega_6\omega_7\omega_4\omega_8\omega_5 - 5\omega_9\omega_7\omega_4^2 v_2^2\omega_8^2\omega_5 + 12\omega_6\omega_7\omega_4 v_2^2\omega_8\omega_5 + 12\omega_9\omega_4^2\omega_8^2 + 18cs^2\omega_6\omega_7\omega_4^2\omega_8^2\omega_5)\frac{cs^2 v_2}{12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = (-36\omega_6 cs^2\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_4^2 v_2^2\omega_8^2\omega_5 + 12\omega_9\omega_7\omega_8^2\omega_5 - 6\omega_6\omega_7\omega_4^2 v_2^2\omega_8^2 + 12\omega_6\omega_4^2 v_2^2\omega_8^2 - 36\omega_6 cs^2\omega_7\omega_4\omega_8^2\omega_5 - 36\omega_9 cs^2\omega_4^2\omega_8^2 - 12\omega_6\omega_4^2\omega_8^2 - 12\omega_6\omega_7\omega_4 v_2^2\omega_8^2\omega_5 + 5\omega_9\omega_7\omega_4^2\omega_8^2\omega_5 + 12\omega_6\omega_4 v_2^2\omega_8^2\omega_5 - 18\omega_6 cs^2\omega_7\omega_4^2\omega_8^2 - 3\omega_9\omega_6\omega_7\omega_4^2 v_2^2\omega_8\omega_5 - 18\omega_6 cs^2\omega_7\omega_4^2\omega_8\omega_5 + 36\omega_9\omega_6 cs^2\omega_7\omega_8^2\omega_5 - 6\omega_9\omega_7\omega_4^2\omega_8^2 + 6\omega_6\omega_7\omega_4^2\omega_8\omega_5 + 12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5 - 12\omega_9\omega_6\omega_7\omega_8^2\omega_5 + 18\omega_9\omega_6 cs^2\omega_7\omega_4^2\omega_5 + 12\omega_9\omega_6\omega_7 v_2^2\omega_8^2\omega_5 - 12\omega_9\omega_6\omega_7\omega_4 v_2^2\omega_8^2\omega_5 - 6\omega_9\omega_6\omega_7\omega_4^2\omega_5 - 36\omega_9\omega_6 cs^2\omega_7\omega_4\omega_8^2\omega_5 + 18\omega_9\omega_7\omega_4 v_2^2\omega_8^2\omega_5 - 12\omega_9\omega_4^2\omega_8^2\omega_5 - 6\omega_6\omega_7\omega_4^2 v_2^2\omega_8\omega_5 + 3\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5 + 54\omega_9 cs^2\omega_7\omega_4\omega_8^2\omega_5 + 12\omega_6\omega_7\omega_4\omega_8^2\omega_5 - 36\omega_9 cs^2\omega_4\omega_8^2\omega_5 - 12\omega_6\omega_4\omega_8^2\omega_5 - 9\omega_9\omega_6 cs^2\omega_7\omega_4^2\omega_8\omega_5 + 6\omega_9\omega_6\omega_7\omega_4^2 v_2^2\omega_5 - \omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5 + 6\omega_6\omega_7\omega_4^2 v_2^2\omega_8^2\omega_5 - 12\omega_6\omega_7\omega_4\omega_8\omega_5 + 3\omega_9\omega_6 cs^2\omega_7\omega_4^2\omega_8^2\omega_5 + 6\omega_6\omega_7\omega_4^2\omega_8^2 + 18\omega_9 cs^2\omega_7\omega_4^2\omega_8^2 - 12\omega_9\omega_4 v_2^2\omega_8^2\omega_5 - 15\omega_9 cs^2\omega_7\omega_4^2\omega_8^2\omega_5 - 6\omega_6\omega_7\omega_4^2\omega_8^2\omega_5 - 36\omega_9\omega_6 cs^2\omega_7\omega_8\omega_5 + 12\omega_9\omega_4\omega_8^2\omega_5 - 18\omega_9\omega_6\omega_7\omega_4\omega_8\omega_5 + 12\omega_9\omega_6\omega_7\omega_8\omega_5 - 12\omega_9\omega_6\omega_7\omega_4 v_2^2\omega_5 + 6\omega_9\omega_7\omega_4^2 v_2^2\omega_8^2 + 18\omega_9\omega_6\omega_7\omega_4\omega_8\omega_5 - 12\omega_9\omega_6\omega_7 v_2^2\omega_8\omega_5 - 36\omega_9\omega_6 cs^2\omega_7\omega_4\omega_5 + 54\omega_9\omega_6 cs^2\omega_7\omega_4\omega_8\omega_5 - 12\omega_6\omega_4^2 v_2^2\omega_8^2\omega_5 + 36\omega_9 cs^2\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_6\omega_7\omega_4\omega_5 + 12\omega_6\omega_4^2\omega_8^2\omega_5 - 12\omega_9\omega_7 v_2^2\omega_8^2\omega_5 + \omega_9\omega_6\omega_7\omega_4^2 v_2^2\omega_8^2\omega_5 + 36\omega_6 cs^2\omega_4^2\omega_8^2 + 36\omega_6 cs^2\omega_4\omega_8^2\omega_5 - 12\omega_9\omega_4^2 v_2^2\omega_8^2 - 18\omega_9\omega_7\omega_4\omega_8^2\omega_5 - 36\omega_9 cs^2\omega_7\omega_8^2\omega_5 + 18\omega_6 cs^2\omega_7\omega_4^2\omega_8^2\omega_5 + 36\omega_6 cs^2\omega_7\omega_4\omega_8\omega_5 - 5\omega_9\omega_7\omega_4^2 v_2^2\omega_8^2\omega_5 + 12\omega_6\omega_7\omega_4 v_2^2\omega_8\omega_5 + 12\omega_9\omega_4^2\omega_8^2)\frac{cs^2 v_2}{12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = (6\omega_6^2\omega_3 v_2^2 + 12\omega_3\omega_2 - 18\omega_6\omega_3\omega_2 + 3\omega_6^2\omega_3^2 cs^2\omega_2 + 12\omega_6^2 v_2^2\omega_2 + 18\omega_6^2\omega_3 cs^2 - 6\omega_6^2\omega_3 - \omega_6^2\omega_3^2\omega_2 - 6\omega_6\omega_3^2 v_2^2 - 18\omega_6\omega_3^2 cs^2 + \omega_6^2\omega_3^2 v_2^2\omega_2 + 36\omega_6^2 cs^2\omega_2 - 36\omega_3 cs^2\omega_2 + 12\omega_6\omega_2 + 54\omega_6\omega_3 cs^2\omega_2 - 36\omega_6^2 cs^2 - \omega_6^2\omega_3^2 + 18\omega_6\omega_3 v_2^2\omega_2 - 12\omega_3 v_2^2\omega_2 - 12\omega_6^2 v_2^2 + 18\omega_3^2 cs^2\omega_2 + 6\omega_6\omega_3^2 - 9\omega_6\omega_3^2 cs^2\omega_2 - 3\omega_6\omega_3^2 v_2^2\omega_2 + 6\omega_3^2 v_2^2\omega_2 - 12\omega_6^2\omega_2 - 12\omega_6 v_2^2\omega_2 + 12\omega_6^2\omega_3\omega_2 - 36\omega_6^2\omega_3 cs^2\omega_2 + 12\omega_6\omega_3 v_2^2 + 36\omega_6\omega_3 cs^2 - 6\omega_3^2\omega_2 + \omega_6^2\omega_3^2 v_2^2 + 3\omega_6\omega_3^2\omega_2 + 12\omega_6^2 - 36\omega_6 cs^2\omega_2 - 12\omega_6^2\omega_3 v_2^2\omega_2 + 3\omega_6^2\omega_3^2 cs^2 - 12\omega_6\omega_3)\frac{v_2 cs^2}{12\omega_6^2\omega_3^2\omega_2}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3\rho} = (72cs^4\omega_3^2\omega_1^3\omega_2^2 + 6cs^2\omega_3\omega_1^3 v_2^2\omega_2 + 46\omega_3^2\omega_1^2 v_2^2\omega_2^3 - 24cs^2\omega_3\omega_1^2\omega_2^2 - 9cs^2\omega_3^2 v_1^2\omega_1^2\omega_2^3 - 3\omega_3^2 v_1^2\omega_1^3\omega_2^2 - 147cs^2\omega_3^2\omega_1\omega_2^3 + 6\omega_3^2\omega_1^2\omega_2 + 6cs^4\omega_3^2\omega_1^3\omega_2^3 + 141cs^2\omega_3^2\omega_1^2 v_2^2\omega_2 - 90cs^4\omega_3^2\omega_2^3 + 18cs^4\omega_3^2\omega_1^2\omega_2 - 3\omega_3^2 v_1^4\omega_1^2\omega_2^3 - 30cs^2\omega_3\omega_1 v_2^2\omega_2^3 + 261cs^2\omega_3^2\omega_1^3 v_2^2 + 39\omega_3^2\omega_1^3 v_2^4\omega_2^2 - 6cs^2\omega_3\omega_1^3\omega_2 + 48cs^2\omega_3^2\omega_1\omega_2^2 - 42cs^2\omega_3\omega_1^2\omega_2^3 + 7\omega_3^2\omega_1^3\omega_2^2 - 90\omega_3^2\omega_1^3 v_2^4\omega_2 - 7\omega_3^2\omega_1^2\omega_2^3 + 18cs^2\omega_3\omega_1^3\omega_2^2 - 45\omega_3^2 v_2^4\omega_2^3 - 12\omega_3^2\omega_1^3\omega_2 - 45\omega_3^2\omega_1 v_2^4\omega_2^2 - 24cs^2\omega_1^2 v_2^2\omega_2^3 - 90cs^4\omega_3\omega_1\omega_2^3 + 3\omega_3^2 v_1^4\omega_1^3\omega_2^2 + 12cs^2\omega_3^2\omega_1^2 v_2^2\omega_2^2 - 261cs^2\omega_3^2 v_2^2\omega_2^3 - 6cs^2\omega_3\omega_1^3 v_2^2\omega_2^3 - 51\omega_3^2\omega_1^2 v_2^2\omega_2 + 36cs^4\omega_3^2\omega_1^2\omega_2^2 + 45\omega_3^2\omega_1^3 v_2^4 + 6\omega_3^2\omega_1^3 + 3\omega_3^2 v_1^2\omega_1^2\omega_2^3 + 90\omega_3^2\omega_1 v_2^4\omega_2^3 + 9cs^2\omega_3^2 v_1^2\omega_1^3\omega_2^2 + 6cs^2\omega_3\omega_1^3\omega_2^3 + 72cs^2\omega_3^2\omega_2^3 - 138cs^4\omega_3^2\omega_1^2\omega_2^3 - 219cs^2\omega_3^2\omega_1^2 v_2^2\omega_2^3 - 18cs^2\omega_3\omega_1^3 v_2^2\omega_2^2 - 153cs^4\omega_3^2\omega_1^3\omega_2 - 72cs^2\omega_3^2\omega_1^3 - 6\omega_3^2\omega_1\omega_2^2 - 59cs^2\omega_3^2\omega_1^3\omega_2^2 - 51\omega_3^2\omega_1^3 v_2^2 - 465cs^2\omega_3^2\omega_1^3 v_2^2\omega_2 - 46\omega_3^2\omega_1^3 v_2^2\omega_2^2 + 72cs^4\omega_3\omega_1^2\omega_2^2 + 225cs^4\omega_3^2\omega_1\omega_2^3 - 165cs^2\omega_3^2\omega_1 v_2^2\omega_2^2 - 2cs^2\omega_3^2\omega_1^3\omega_2^3 - 72cs^4\omega_1^2\omega_2^3 - 39\omega_3^2\omega_1^2 v_2^4\omega_2^3 + 12\omega_3^2\omega_1\omega_2^3 - 24cs^2\omega_3^2\omega_1^2\omega_2 + 489cs^2\omega_3^2\omega_1 v_2^2\omega_2^3 - 90cs^4\omega_3^2\omega_1\omega_2^2 + 18cs^4\omega_3\omega_1^3\omega_2 - 12cs^2\omega_3^2\omega_2^3 + 126cs^4\omega_3\omega_1^2\omega_2^3 - 6\omega_3^2\omega_2^3 - 54cs^4\omega_3\omega_1^3\omega_2^2 - 102\omega_3^2\omega_1 v_2^2\omega_2^3 + 90cs^4\omega_3^2\omega_1^3 + 24cs^2\omega_3\omega_1^2 v_2^2\omega_2^2 + 2cs^2\omega_3^2\omega_1^3 v_2^2\omega_2^2 + 30cs^2\omega_3\omega_1\omega_2^3 - 12cs^2\omega_3^2\omega_1^2\omega_2^2 + 42cs^2\omega_3\omega_1^2 v_2^2\omega_2^3 + 102\omega_3^2\omega_1^3 v_2^2\omega_2 + 197cs^2\omega_3^2\omega_1^3 v_2^2\omega_2^2 + 24cs^2\omega_1^2\omega_2^3 + 51\omega_3^2 v_2^2\omega_2^3 + 51\omega_3^2\omega_1 v_2^2\omega_2^2 - 18cs^4\omega_3\omega_1^3\omega_2^3 + 81cs^2\omega_3^2\omega_1^2\omega_2^3 + 45\omega_3^2\omega_1^2 v_2^4\omega_2 + 123cs^2\omega_3^2\omega_1^3\omega_2 + 36cs^4\omega_1^3\omega_2^3 + 12cs^2\omega_1^3 v_2^2\omega_2^3)\frac{v_2}{24\omega_3^2\omega_1^3\omega_2^3}$

coefficient $C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^3 v_1}$ **at** $\frac{\partial^4 v_1}{\partial x_1\partial x_2^3}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^3 v_1} = (2 + 3cs^2\omega - 6cs^2 + v_2^2\omega - 2v_2^2 - \omega)\frac{v_1\rho v_2}{12\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^3 v_1} = (12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5 + 6\omega_9\omega_6\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 24\omega_6^2 cs^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 42\omega_9\omega_6 cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 66\omega_9\omega_6^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^2 + 18\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 84\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_6^2\omega_7^2\omega_4^3 v_2^2\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4 v_2^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5 + 24\omega_9\omega_6^2 cs^2\omega_4^3\omega_8^2\omega_5 - 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_5^2 - 24\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5 + 12\omega_6^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 24\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5 - 24\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 36\omega_9 cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 72\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_5^2 + 24\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_5^2 - 84\omega_9\omega_6^2 cs^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 6\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 6\omega_9\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8\omega_5 - 24\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2 + 24\omega_6^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^2 - 36\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 60\omega_9\omega_6^2 cs^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 6\omega_9\omega_6 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 48\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_5^2 - 66\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 18\omega_9\omega_6^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 24\omega_9\omega_6^2 cs^2\omega_4^3\omega_8^2\omega_5^2 + 18\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 96\omega_9\omega_6^2 cs^2\omega_7^2\omega_8^2\omega_5^2 + 24\omega_6^2 cs^2\omega_7\omega_4^3\omega_8^2\omega_5 - 12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4 v_2^2\omega_8^2\omega_5^2 + 36\omega_9\omega_6^2\omega_7^2\omega_4\omega_8\omega_5^2 - 24\omega_9\omega_6^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5 + \omega_9\omega_6^2\omega_7^2\omega_4^3 v_2^2\omega_8^2\omega_5^2 - 18\omega_9 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 90\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 48\omega_9\omega_6^2 cs^2\omega_7\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 12\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_6^2\omega_7^2\omega_4^2 v_2^2\omega_8^2\omega_5 - 24\omega_6^2\omega_7^2\omega_4^2 v_2^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^2 - 24\omega_9\omega_6^2\omega_7^2\omega_4^2 v_2^2\omega_5^2 + 156\omega_9\omega_6^2 cs^2\omega_7^2\omega_4\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7\omega_4^3 v_2^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_6^2 cs^2\omega_7\omega_4^2\omega_8^2\omega_5^2 + 12\omega_9\omega_7^2\omega_4^2 v_2^2\omega_8^2\omega_5^2 - 66\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3 v_2^2\omega_8^2\omega_5 - 12\omega_9\omega_6^2\omega_7\omega_4^3 v_2^2\omega_8^2\omega_5 + 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_6^2 cs^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8\omega_5 + 12\omega_9\omega_6 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 12\omega_6^2\omega_7^2\omega_4^3 v_2^2\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2 cs^2\omega_7\omega_4^3\omega_8^2 + 3\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3 v_2^2\omega_8^2\omega_5^2 - 4\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7\omega_4^2 v_2^2\omega_8^2\omega_5^2 - 72\omega_9\omega_6^2 cs^2\omega_7^2\omega_4\omega_8^2\omega_5 - 12\omega_9\omega_6 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 24\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2 + 4\omega_9\omega_6\omega_7^2\omega_4^3 v_2^2\omega_8^2\omega_5^2 - 12\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - \omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^2 v_2^2\omega_8^2\omega_5^2 - 12\omega_9\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 24\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8\omega_5 - 132\omega_9\omega_6^2 cs^2\omega_7\omega_4^2\omega_8^2\omega_5^2 - 24\omega_6^2\omega_7\omega_4^3 v_2^2\omega_8^2\omega_5^2)\frac{v_1\rho v_2}{12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^3 v_1} = (12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5 + 6\omega_9\omega_6\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2 cs^2\omega_5^2 + 66\omega_9\omega_6^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^2 - 66\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2 cs^2\omega_5^2 +$

$18\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4v_2^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 24\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5^2 - 84\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5 + 24\omega_9\omega_6^2\omega_7^3\omega_4^3\omega_8^2cs^2\omega_5 - 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5 + 12\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5 + 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2cs^2\omega_5^2 - 18\omega_9\omega_7^2\omega_4^3\omega_8^2cs^2\omega_5^2 - 132\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5^2 + 24\omega_9\omega_6^2\omega_4^2\omega_8^2cs^2\omega_5^2 - 6\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2 + 6\omega_9\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2cs^2\omega_5^2 + 24\omega_6^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 - 48\omega_9\omega_6^2\omega_7^2\omega_4^2cs^2\omega_5^2 + 48\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5 - 24\omega_9\omega_6^2\omega_4^3\omega_8^2cs^2\omega_5^2 + 60\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5^2 + 24\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 36\omega_9\omega_6^2\omega_7^2\omega_4\omega_8cs^2\omega_5^2 + 36\omega_9\omega_7^2\omega_4^2\omega_8^2cs^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2cs^2\omega_5 + 24\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 3\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2cs^2\omega_5^2 - 18\omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 42\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2cs^2\omega_5^2 - 96\omega_9\omega_6^2\omega_7^2\omega_8^2cs^2\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 + 24\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5 + 18\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2cs^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4v_2^2\omega_8^2\omega_5^2 + 36\omega_9\omega_6^2\omega_7^2\omega_4\omega_8\omega_5^2 - 24\omega_9\omega_6^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5 + 84\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2cs^2\omega_5 + \omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8\omega_5^2 - 18\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8cs^2\omega_5^2 - 36\omega_9\omega_6^2\omega_7^2\omega_4v_2^2\omega_8\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5^2 + 156\omega_9\omega_6^2\omega_4\omega_8^2cs^2\omega_5^2 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5 - 24\omega_6^2\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4\omega_8^2\omega_5^2 - 24\omega_9\omega_6^2\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8cs^2\omega_5^2 + 72\omega_9\omega_6^2\omega_7\omega_4\omega_8^2cs^2\omega_5^2 - 24\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8cs^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5^2 - 24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8cs^2\omega_5 + 12\omega_9\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5^2 - 66\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 12\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5 + 90\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8cs^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5 + 12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5 + 6\omega_9\omega_6\omega_7^2\omega_4^3\omega_8cs^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 12\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5^2 - 6\omega_9\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5^2 - 4\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_6^2\omega_4^3\omega_8cs^2\omega_5 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8cs^2\omega_5^2 - 24\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2 - 72\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2cs^2\omega_5 + 4\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5^2 - \omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4\omega_8^2cs^2\omega_5^2 - 12\omega_9\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2\omega_7^2\omega_4^3cs^2\omega_5^2 - 24\omega_6^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5^2)\frac{v_1\rho v_2}{12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3v_1} = (-\omega_6\omega_8 + 3\omega_6 + 3cs^2\omega_8 + 3cs^2\omega_6\omega_8 + v_2^2\omega_8 + \omega_6v_2^2\omega_8 - 3\omega_6v_2^2 - \omega_8 - 9cs^2\omega_6)\frac{v_1\rho v_2}{12\omega_6\omega_8}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3v_1} = (-\omega_6\omega_8 - 9\omega_6cs^2 + 3\omega_6 + v_2^2\omega_8 + \omega_6v_2^2\omega_8 - 3\omega_6v_2^2 - \omega_8 + 3cs^2\omega_8 + 3\omega_6cs^2\omega_8)\frac{v_1\rho v_2}{12\omega_6\omega_8}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3v_1} = (-\omega_6 - \omega_6\omega_2 + 3\omega_6cs^2 + \omega_6v_2^2 + \omega_6v_2^2\omega_2 - 3v_2^2\omega_2 + 3\omega_2 + 3\omega_6cs^2\omega_2 - 9cs^2\omega_2)\frac{v_1\rho v_2}{12\omega_6\omega_2}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3v_1} = (2\omega_3\omega_2 + 2\omega_3\omega_1v_2^2\omega_2 + 6cs^2\omega_3\omega_1 - 2\omega_3\omega_1\omega_2 - 18cs^2\omega_1\omega_2 + 9\omega_3v_1^2\omega_1 - 6\omega_1v_2^2\omega_2 + \omega_3v_2^2\omega_2 + 6cs^2\omega_3\omega_1\omega_2 + 6\omega_1\omega_2 - 9\omega_3v_1^2\omega_2 - 4\omega_3\omega_1 + \omega_3\omega_1v_2^2)\frac{v_1\rho v_2}{24\omega_3\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}_x\mathrm{D}_y^3v_2}$ **at** $\frac{\partial^4 v_2}{\partial x_1\partial x_2^3}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^3v_2} = (-12 - 6\omega^2 - cs^2\omega^3 + 2cs^2\omega^2 - 54v_2^2\omega + 36v_2^2 + 18\omega + 18v_2^2\omega^2)\frac{cs^2\rho}{12\omega^3}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^3v_2} =$
$(18\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_5 + 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 - 24\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^2\omega_8 + 12\omega_6^2v_1^2cs^2\omega_7\omega_4^2\omega_8\omega_5 + 12\omega_6^2cs^4\omega_4^2\omega_8^2\omega_5 + 9\omega_9\omega_6v_1^2cs^2\omega_7\omega_4^3\omega_8^2\omega_5 + 72\omega_9\omega_6v_1^2\omega_7\omega_4v_2^2\omega_8^2\omega_5 - 12\omega_9\omega_6cs^4\omega_4^2\omega_8^2\omega_5 + 12\omega_6^2cs^4\omega_4^3\omega_8^2 + 24\omega_9\omega_6v_1^2cs^2\omega_7\omega_4^2\omega_8^2 - 12\omega_9v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 + 36\omega_6^2v_1^2\omega_4^2v_2^2\omega_8^2\omega_5 - 18\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 + 54\omega_9\omega_6cs^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5 + 12\omega_6^2v_1^2cs^2\omega_4^2\omega_8^2\omega_5 + 18\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 - 12\omega_9\omega_6cs^4\omega_4^3\omega_8^2 + 15\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5 + 18\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5 - 12\omega_6^2cs^2\omega_7\omega_4^2\omega_8\omega_5 - 72\omega_9\omega_6^2v_1^2\omega_7\omega_4v_2^2\omega_8\omega_5 + 12\omega_9\omega_6cs^2\omega_7\omega_4\omega_8^2\omega_5 + 36\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5 - 12\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^2\omega_5 + 36\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8 - \omega_9\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2\omega_5 - 15\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_8\omega_5 + 36\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 - 12\omega_9\omega_6cs^2\omega_4^3\omega_8^2\omega_5 - 18\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 36\omega_9\omega_6v_1^2\omega_4^2v_2^2\omega_8^2\omega_5 - 12\omega_9\omega_6v_1^2cs^2\omega_4^2\omega_8^2\omega_5 + 12\omega_6^2cs^4\omega_7\omega_4^2\omega_8^2\omega_5 - 102\omega_9\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5 - 12\omega_9\omega_6cs^4\omega_7\omega_4\omega_8^2\omega_5 + 12\omega_6^2cs^2\omega_4^3\omega_8^2\omega_5 - 12\omega_9\omega_6^2cs^4\omega_7\omega_8^2\omega_5 - 18\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 + 60\omega_9\omega_6^2cs^2\omega_7\omega_4v_2^2\omega_8^2\omega_5 - 5\omega_9\omega_6cs^4\omega_7\omega_4^3\omega_8^2\omega_5 - 36\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5 - 12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2\omega_5 - 6\omega_9\omega_6v_1^2cs^2\omega_7\omega_4^3\omega_8^2 - 12\omega_6^2cs^2\omega_4^3\omega_8^2 + 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5 + 18\omega_9\omega_6^2cs^4\omega_7\omega_4\omega_8^2\omega_5 - 24\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4\omega_8\omega_5 + 6\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_8^2\omega_5 - 12\omega_9\omega_6v_1^2cs^2\omega_7\omega_4^2\omega_8\omega_5 + 12\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_8 + 12\omega_6^2v_1^2\omega_4^3\omega_8^2\omega_5 + 12\omega_9\omega_6cs^2\omega_4^3\omega_8^2 + 5\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_8^2\omega_5 + 30\omega_9\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 - 48\omega_9\omega_6^2cs^2\omega_7v_2^2\omega_8^2\omega_5 + 36\omega_9\omega_6v_1^2\omega_4^3v_2^2\omega_8^2\omega_5 - 12\omega_6^2v_1^2\omega_4^3\omega_8^2 - 6\omega_9v_1^2cs^2\omega_7\omega_4^3\omega_8^2\omega_5 - 6\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_8^2 + 24\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_8\omega_5 + 6\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2\omega_5 + 12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2 + 6\omega_9\omega_6cs^4\omega_7\omega_4^3\omega_8^2 + 18\omega_9\omega_6^2cs^2\omega_7\omega_4^2\omega_8\omega_5 - 6\omega_6^2cs^2\omega_7\omega_4^3\omega_8^2\omega_5 + 24\omega_9\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_5 - 36\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5 - 36\omega_6^2v_1^2\omega_4^3v_2^2\omega_8^2\omega_5 - 15\omega_9\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5 - 18\omega_9\omega_6^2cs^4\omega_7\omega_4^2\omega_8\omega_5 - 6\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_5 + 6\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_5 - 6\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2 + 24\omega_9\omega_6v_1^2cs^2\omega_7\omega_4\omega_8^2\omega_5 - 6\omega_6^2cs^4\omega_7\omega_4^3\omega_8\omega_5 - 36\omega_9\omega_6cs^2\omega_4^3v_2^2\omega_8^2\omega_5 - 36\omega_9\omega_6cs^2\omega_7\omega_4v_2^2\omega_8^2\omega_5 + 6\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2 + 12\omega_9\omega_6v_1^2cs^2\omega_4^3\omega_8^2\omega_5 + 72\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2 + \omega_9\omega_6^2cs^2\omega_7\omega_4^2\omega_8^2\omega_5 - 12\omega_9\omega_6v_1^2cs^2\omega_4^3\omega_8^2 - 12\omega_6^2cs^2\omega_4^2\omega_8^2\omega_5 - 72\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8 + 36\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2 - 108\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5 + 6\omega_6^2cs^2\omega_7\omega_4^3\omega_8\omega_5 + 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2 + 36\omega_9\omega_6cs^2\omega_4^3v_2^2\omega_8^2\omega_5 + 12\omega_6^2v_1^2cs^2\omega_4^3\omega_8^2 + 24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8 + 12\omega_9\omega_6cs^2\omega_4^2\omega_8^2\omega_5 - 18\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5 - 9\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 + 48\omega_9\omega_6^2v_1^2cs^2\omega_7\omega_4^2\omega_8\omega_5 - 5\omega_9\omega_6^2cs^4\omega_7\omega_4^2\omega_8^2\omega_5 - 12\omega_9\omega_6^2cs^2\omega_7\omega_4\omega_8\omega_5 + 12\omega_9\omega_6cs^4\omega_4^3\omega_8^2\omega_5 - 12\omega_6^2v_1^2cs^2\omega_4^3\omega_8^2\omega_5 - 48\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5 + 36\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5 + 6\omega_9v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 + 18\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5 + 60\omega_9\omega_6^2cs^2\omega_7\omega_4v_2^2\omega_8\omega_5 - 12\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2\omega_5 - 36\omega_9\omega_6v_1^2cs^2\omega_7\omega_4^2\omega_8^2\omega_5 - 36\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2\omega_5 + 12\omega_9\omega_6^2cs^4\omega_7\omega_4\omega_8\omega_5 - 6\omega_6^2v_1^2cs^2\omega_7\omega_4^3\omega_8\omega_5 - 36\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_5 - 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 + 144\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5 + 12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_5 - 12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8 - 36\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5 + 12\omega_6^2cs^2\omega_7\omega_4^2\omega_8^2\omega_5 - 18\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 - 12\omega_9\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_5 + 12\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5 + 6\omega_9\omega_6^2cs^4\omega_7\omega_4^3\omega_8\omega_5 - 15\omega_9\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5 - 12\omega_6^2cs^4\omega_7\omega_4^2\omega_8^2\omega_5 - 45\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 + 12\omega_9v_1^2cs^2\omega_7\omega_4^2\omega_8^2\omega_5 - 24\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2 - 6\omega_9\omega_6^2cs^2\omega_7\omega_4^3\omega_8\omega_5 - 18\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8^2 + 36\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2\omega_5 - 6\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_8^2 - 36\omega_9\omega_6v_1^2\omega_4^3v_2^2\omega_8^2 + 6\omega_9\omega_6v_1^2cs^2\omega_7\omega_4^3\omega_8\omega_5 - 6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_5 - 12\omega_6^2v_1^2cs^2\omega_7\omega_4^2\omega_8^2\omega_5 - 24\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2 - 12\omega_6^2v_1^2\omega_4^2\omega_8^2\omega_5 - 18\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_8^2\omega_5 + 36\omega_9v_1^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5 - 36\omega_9\omega_6cs^2\omega_4^2v_2^2\omega_8^2\omega_5 + 6\omega_6^2cs^2\omega_7\omega_4^3\omega_8^2 + 18\omega_9\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8^2 + 36\omega_6^2v_1^2\omega_4^3v_2^2\omega_8^2 + 27\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5 + 12\omega_9\omega_6v_1^2\omega_4^2\omega_8^2\omega_5 + 18\omega_9\omega_6cs^4\omega_7\omega_4^2\omega_8^2\omega_5)\frac{\rho}{12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^3v_2} = (-6\omega_6^2\omega_7\omega_4^3\omega_8cs^4\omega_5 + 18\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_5 + 12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 + 12\omega_6^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5 + 12\omega_6^2v_1^2\omega_4^3\omega_8^2cs^2 + 12\omega_6^2\omega_4^3\omega_8^2cs^2\omega_5 + 72\omega_9\omega_6v_1^2\omega_7\omega_4v_2^2\omega_8^2\omega_5 + 12\omega_9v_1^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5 - 12\omega_9\omega_6\omega_4^3\omega_8^2cs^2\omega_5 - 12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2cs^2 - 12\omega_9\omega_6\omega_7\omega_4\omega_8^2cs^4\omega_5 - 12\omega_9\omega_6\omega_4^3\omega_8^2cs^4 - 36\omega_9\omega_6\omega_4^2v_2^2\omega_8^2cs^2\omega_5 - 12\omega_9\omega_6^2\omega_7\omega_4\omega_8^2cs^2\omega_5 - 12\omega_9v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 + 36\omega_6^2v_1^2\omega_4^2v_2^2\omega_8^2\omega_5 - 18\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 + 9\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5 -$

$$15\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_5+18\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5+12\omega_6^2\omega_4^3\omega_8^2cs^4+15\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5-12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5-12\omega_9\omega_6^2\omega_7\omega_8^2cs^4\omega_5-72\omega_9\omega_6^2v_1^2\omega_7\omega_4v_2^2\omega_8\omega_5-18\omega_9\omega_6^2\omega_7\omega_4^2\omega_8cs^4\omega_5+36\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5+36\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8-18\omega_9\omega_6\omega_7\omega_4^2\omega_8^2cs^2\omega_5+36\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2\omega_5+36\omega_6^2\omega_7\omega_4^2v_2^2\omega_8cs^2\omega_5-18\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2-36\omega_9\omega_6v_1^2\omega_4^2v_2^2\omega_8^2\omega_5+36\omega_6^2\omega_4^2v_2^2\omega_8^2cs^2\omega_5+18\omega_6^2\omega_7\omega_4^3v_2^2\omega_8^2cs^2\omega_5+12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8cs^2+5\omega_9\omega_6\omega_7\omega_4^3\omega_8^2cs^2\omega_5-18\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5+60\omega_9\omega_6^2\omega_7\omega_4v_2^2\omega_8^2cs^2\omega_5+6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5+\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5+6\omega_9\omega_6^2\omega_7\omega_4^3\omega_8cs^4\omega_5-12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2\omega_5+6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8\omega_5+12\omega_6^2v_1^2\omega_4^3\omega_8^2\omega_5-12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2cs^2\omega_5+36\omega_9\omega_6v_1^2\omega_4^3v_2^2\omega_8^2\omega_5-12\omega_6^2v_1^2\omega_4^3\omega_8^2+24\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_8\omega_5+30\omega_9\omega_6^2\omega_7\omega_4^3v_2^2\omega_8cs^2\omega_5+12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2-12\omega_6^2\omega_4^2\omega_8^2cs^2\omega_5+12\omega_6^2\omega_7\omega_4^2\omega_8cs^4\omega_5-15\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8^2cs^2\omega_5-6\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5-6\omega_9\omega_6\omega_7\omega_4^3\omega_8^2cs^2+48\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8cs^2\omega_5-36\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5-36\omega_6^2v_1^2\omega_4^3v_2^2\omega_8^2\omega_5-36\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2cs^2\omega_5+24\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2cs^2+18\omega_9\omega_6^2\omega_7\omega_4\omega_8^2cs^4\omega_5+6\omega_6^2\omega_7\omega_4^3\omega_8^2cs^2-6\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_5-15\omega_9\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2cs^2\omega_5+12\omega_9\omega_6\omega_4^2\omega_8^2cs^2\omega_5-6\omega_9v_1^2\omega_7\omega_4^3\omega_8^2cs^2\omega_5+60\omega_9\omega_6^2\omega_7\omega_4v_2^2\omega_8^2cs^2\omega_5+18\omega_9\omega_6^2\omega_7\omega_4^2\omega_8cs^2\omega_5-6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2cs^4\omega_5+6\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2-36\omega_9\omega_6\omega_7\omega_4v_2^2\omega_8^2cs^2\omega_5+72\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2+18\omega_9\omega_6\omega_7\omega_4^2\omega_8^2cs^4\omega_5-72\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8-108\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5+6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2-12\omega_6^2v_1^2\omega_4^3\omega_8^2cs^2\omega_5+24\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8-18\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5-9\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2\omega_5-12\omega_6^2\omega_7\omega_4^2\omega_8^2cs^4\omega_5+6\omega_6^2\omega_7\omega_4^3\omega_8cs^2\omega_5-12\omega_6^2\omega_4^3\omega_8^2cs^4\omega_5-48\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5-6\omega_6^2\omega_7\omega_4^3\omega_8^2cs^4-36\omega_9\omega_6\omega_4^3v_2^2\omega_8^2cs^2+6\omega_9v_1^2\omega_7\omega_4^3\omega_8^2\omega_5+18\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5+12\omega_9\omega_6\omega_7\omega_4\omega_8^2cs^2\omega_5+12\omega_9\omega_6\omega_4^3\omega_8^2cs^4\omega_5-102\omega_9\omega_6^2\omega_7\omega_4^2v_2^2\omega_8cs^2\omega_5+54\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8^2cs^2\omega_5-36\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_5-6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2\omega_5+144\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5+36\omega_6^2\omega_4^3v_2^2\omega_8^2cs^2-12\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8cs^2\omega_5+12\omega_9\omega_6^2\omega_7\omega_4\omega_8cs^4\omega_5+12\omega_9\omega_6v_1^2\omega_4^3\omega_8^2cs^2\omega_5+6\omega_9\omega_6\omega_7\omega_4^3\omega_8^2cs^4+12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_5+24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8cs^2-12\omega_6^2\omega_4^2\omega_8^2cs^4\omega_5+6\omega_6^2\omega_7\omega_4^3\omega_8^2cs^4\omega_5+12\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5-12\omega_6^2\omega_4^3\omega_8^2cs^2-12\omega_6^2\omega_7\omega_4^2\omega_8cs^2\omega_5-18\omega_6^2\omega_7\omega_4^3v_2^2\omega_8^2cs^2-12\omega_9\omega_6v_1^2\omega_4^2\omega_8^2cs^2\omega_5-12\omega_9\omega_6^2\omega_7\omega_4^3v_2^2cs^2\omega_5-45\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5+6\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8cs^2\omega_5-24\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2-12\omega_9\omega_6\omega_4^2\omega_8^2cs^4\omega_5-36\omega_9\omega_6v_1^2\omega_4^3v_2^2\omega_8^2-48\omega_9\omega_6^2\omega_7v_2^2\omega_8^2cs^2\omega_5-36\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2cs^2\omega_5-6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_5-24\omega_9\omega_6v_1^2\omega_7\omega_4\omega_8^2\omega_5-12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8\omega_5-5\omega_9\omega_6\omega_7\omega_4^3\omega_8^2cs^4\omega_5-24\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_8cs^2\omega_5-36\omega_6^2\omega_7\omega_4^3v_2^2\omega_8^2cs^2\omega_5+6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3cs^2\omega_5-6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2cs^2+12\omega_6^2v_1^2\omega_7\omega_4^2\omega_8cs^2\omega_5-12\omega_6^2v_1^2\omega_4^2\omega_8^2\omega_5-6\omega_9\omega_6^2\omega_7\omega_4^3\omega_8cs^2\omega_5-5\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2cs^4\omega_5+24\omega_9\omega_6v_1^2\omega_7\omega_4\omega_8^2cs^2\omega_5+36\omega_9v_1^2\omega_7\omega_4^2v_2^2\omega_8^2\omega_5-18\omega_6^2\omega_7\omega_4^3v_2^2\omega_8cs^2\omega_5-24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8cs^2+36\omega_6^2v_1^2\omega_4^3v_2^2\omega_8^2+27\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2\omega_5+12\omega_9\omega_6v_1^2\omega_4^2\omega_8^2\omega_5+18\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8^2cs^2+12\omega_6^2v_1^2\omega_4^2\omega_8^2cs^2\omega_5)\frac{\rho}{12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5}$$

$$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3v_2}=$$
$$(-6\omega_9\omega_6\omega_7\omega_4^3\omega_5-36\omega_9\omega_4^3v_2^2\omega_8+18\omega_6\omega_7\omega_4^3v_2^2\omega_8\omega_5-12cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5+54\omega_9\omega_7\omega_4^2v_2^2\omega_8\omega_5+12\omega_9cs^2\omega_6\omega_7\omega_4\omega_5-3\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5-36\omega_6\omega_4^3v_2^2\omega_8\omega_5-12\omega_9\omega_4^3\omega_8\omega_5-12\omega_9cs^2\omega_6\omega_7\omega_8\omega_5+12\omega_9\omega_7\omega_4\omega_8\omega_5-12\omega_6\omega_4^3\omega_8+12\omega_6\omega_7\omega_4^2\omega_8\omega_5-12\omega_9cs^2\omega_4^2\omega_8\omega_5+5\omega_9\omega_7\omega_4^3\omega_8\omega_5-5\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5-12\omega_6\omega_4^2\omega_8\omega_5+36\omega_6\omega_7\omega_4^2v_2^2\omega_5+18\omega_9\omega_6\omega_7\omega_4^2\omega_5+36\omega_6\omega_4^2v_2^2\omega_8\omega_5+18\omega_9cs^2\omega_7\omega_4^2\omega_8\omega_5-36\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5+\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5-6\omega_9\omega_7\omega_4^3\omega_8-15\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5+12cs^2\omega_6\omega_4^2\omega_8\omega_5+18\omega_9\omega_7\omega_4^3v_2^2\omega_8-54\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_5+12\omega_9\omega_4^2\omega_8\omega_5-36\omega_9\omega_7\omega_4v_2^2\omega_8\omega_5+36\omega_9\omega_4^3v_2^2\omega_8\omega_5+6\omega_6\omega_7\omega_4^3\omega_5+18\omega_9cs^2\omega_6\omega_7\omega_4\omega_8\omega_5+6\omega_9cs^2\omega_6\omega_7\omega_4^3\omega_5-6cs^2\omega_6\omega_7\omega_4^3\omega_8+6\omega_9cs^2\omega_7\omega_4^3\omega_8+12cs^2\omega_6\omega_4^3\omega_8+6cs^2\omega_6\omega_7\omega_4^3\omega_8\omega_5-12\omega_9cs^2\omega_7\omega_4\omega_8\omega_5+36\omega_9\omega_6\omega_7\omega_4v_2^2\omega_5-12\omega_9cs^2\omega_4^3\omega_8+6\omega_6\omega_7\omega_4^3\omega_8-6cs^2\omega_6\omega_7\omega_4^3\omega_5-12\omega_9\omega_6\omega_7\omega_4\omega_5-18\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_5-12cs^2\omega_6\omega_4^3\omega_8\omega_5-12\omega_6\omega_7\omega_4^2\omega_5+18\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_5-18\omega_6\omega_7\omega_4^3v_2^2\omega_8+12\omega_9\omega_4^3\omega_8+36\omega_6\omega_4^3v_2^2\omega_8-5\omega_9cs^2\omega_7\omega_4^3\omega_8\omega_5-36\omega_9\omega_4^2v_2^2\omega_8\omega_5-\omega_9cs^2\omega_6\omega_7\omega_4^3\omega_8\omega_5+12cs^2\omega_6\omega_7\omega_4^2\omega_5-18\omega_6\omega_7\omega_4^3v_2^2\omega_5+12\omega_6\omega_4^3\omega_8\omega_5-6\omega_6\omega_7\omega_4^3\omega_8\omega_5-18\omega_9\omega_7\omega_4^2\omega_8\omega_5+12\omega_9cs^2\omega_4^3\omega_8\omega_5)\frac{cs^2\rho}{12\omega_9\omega_6\omega_7\omega_4^3\omega_8\omega_5}$$

$$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3v_2}=(-6\omega_9\omega_6\omega_7\omega_4^3\omega_5-36\omega_9\omega_4^3v_2^2\omega_8-6\omega_6cs^2\omega_7\omega_4^3\omega_8+6\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_5+18\omega_6\omega_7\omega_4^3v_2^2\omega_8\omega_5+54\omega_9\omega_7\omega_4^2v_2^2\omega_8\omega_5-6\omega_6cs^2\omega_7\omega_4^3\omega_5-3\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5-36\omega_6\omega_4^3v_2^2\omega_8\omega_5-12\omega_9\omega_4^3\omega_8\omega_5+12\omega_9\omega_7\omega_4\omega_8\omega_5-12\omega_6cs^2\omega_7\omega_4^2\omega_8\omega_5-12\omega_9cs^2\omega_4^3\omega_8-12\omega_6\omega_4^3\omega_8+12\omega_6\omega_7\omega_4^2\omega_8\omega_5+18\omega_9cs^2\omega_7\omega_4^2\omega_8\omega_5+5\omega_9\omega_7\omega_4^3\omega_8\omega_5-18\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_5-12\omega_6cs^2\omega_4^3\omega_8\omega_5-12\omega_9cs^2\omega_4^2\omega_8\omega_5-12\omega_6\omega_4^2\omega_8\omega_5+36\omega_6\omega_7\omega_4^2v_2^2\omega_5+18\omega_9\omega_6\omega_7\omega_4^2\omega_5+36\omega_6\omega_4^2v_2^2\omega_8\omega_5-36\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5+\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5-6\omega_9\omega_7\omega_4^3\omega_8-15\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5+18\omega_9\omega_7\omega_4^3v_2^2\omega_8-5\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_8\omega_5+12\omega_6cs^2\omega_7\omega_4^2\omega_5-54\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_5+12\omega_9\omega_4^2\omega_8\omega_5-36\omega_9\omega_7\omega_4v_2^2\omega_8\omega_5-12\omega_9cs^2\omega_7\omega_4\omega_8\omega_5+6\omega_6cs^2\omega_7\omega_4^3\omega_8\omega_5+36\omega_9\omega_4^3v_2^2\omega_8\omega_5+6\omega_6\omega_7\omega_4^3\omega_5-12\omega_9\omega_6cs^2\omega_7\omega_8\omega_5+36\omega_9\omega_6\omega_7\omega_4v_2^2\omega_5+6\omega_6\omega_7\omega_4^3\omega_8+6\omega_9cs^2\omega_7\omega_4^3\omega_8+12\omega_9\omega_6cs^2\omega_7\omega_4\omega_5+18\omega_9\omega_6cs^2\omega_7\omega_4\omega_8\omega_5-12\omega_9\omega_6\omega_7\omega_4\omega_5-\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_8\omega_5-12\omega_6\omega_7\omega_4^2\omega_5+18\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_5-18\omega_6\omega_7\omega_4^3v_2^2\omega_8+12\omega_9\omega_4^3\omega_8+36\omega_6\omega_4^3v_2^2\omega_8-36\omega_9\omega_4^2v_2^2\omega_8\omega_5+12\omega_6cs^2\omega_4^3\omega_8+12\omega_6cs^2\omega_4^2\omega_8\omega_5+12\omega_9cs^2\omega_4^3\omega_8\omega_5-18\omega_6\omega_7\omega_4^3v_2^2\omega_5+12\omega_6\omega_4^3\omega_8\omega_5-5\omega_9cs^2\omega_7\omega_4^3\omega_8\omega_5-6\omega_6\omega_7\omega_4^3\omega_8\omega_5-18\omega_9\omega_7\omega_4^2\omega_8\omega_5)\frac{\rho cs^2}{12\omega_9\omega_6\omega_7\omega_4^3\omega_8\omega_5}$$

$$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3v_2}=(18\omega_3^3v_2^2\omega_2-12\omega_3\omega_2+36\omega_3^2v_2^2-\omega_6\omega_3^3cs^2\omega_2+18\omega_6\omega_3^2v_2^2+6\omega_3^3cs^2\omega_2+6\omega_6\omega_3^2cs^2+12\omega_3^2cs^2+12\omega_3cs^2\omega_2+18\omega_6\omega_3cs^2\omega_2-6\omega_3^3cs^2+\omega_6\omega_3^3cs^2+3\omega_6\omega_3^3v_2^2+36\omega_3v_2^2\omega_2-18\omega_3^3v_2^2-18\omega_3^2cs^2\omega_2-6\omega_6\omega_3^2-5\omega_6\omega_3^2cs^2\omega_2-3\omega_6\omega_3^2v_2^2\omega_2-\omega_6\omega_3^3-54\omega_3^2v_2^2\omega_2-6\omega_3^3\omega_2-36\omega_6\omega_3v_2^2-12\omega_6\omega_3cs^2-12\omega_3^2+18\omega_3^2\omega_2+\omega_6\omega_3^2\omega_2+6\omega_3^3-12\omega_6cs^2\omega_2+12\omega_6\omega_3)\frac{\rho cs^2}{12\omega_6\omega_3^3\omega_2}$$

$$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3v_2}=(-135cs^2\omega_3\omega_1v_2^2\omega_2^2-351cs^2\omega_3\omega_1^3v_2^2\omega_2-18cs^2\omega_1\omega_2^3-81\omega_3\omega_1^3v_2^2\omega_2^2-12cs^2\omega_3\omega_1^2\omega_2^2+18cs^4\omega_3\omega_1^3+99\omega_3v_2^2\omega_2^3+351cs^2\omega_3\omega_1v_2^2\omega_2^3-138\omega_3\omega_1^2v_2^4\omega_2^3+45cs^2\omega_3\omega_1^3\omega_2+24cs^2\omega_3\omega_1^2\omega_2^3-99\omega_3\omega_1^3v_2^2-24cs^2\omega_3\omega_1^3\omega_2^2+18cs^4\omega_1\omega_2^3-6\omega_3\omega_1\omega_2^2-90cs^2\omega_1^2v_2^2\omega_2^3+69cs^4\omega_3\omega_1\omega_2^3-180\omega_3\omega_1v_2^2\omega_2^3-6\omega_3\omega_2^3+72cs^2\omega_1^2v_2^2\omega_2^2+12\omega_3\omega_1\omega_2^3-12cs^2\omega_3\omega_1^2\omega_2-24cs^2\omega_3\omega_1^3+135\omega_3\omega_1^2v_2^4\omega_2+63\omega_3\omega_1v_2^2\omega_2^2+180\omega_3\omega_1^3v_2^2\omega_2-30cs^4\omega_3\omega_1\omega_2^2+153cs^2\omega_3\omega_1^3v_2^2\omega_2^2-12\omega_3\omega_1^3\omega_2+24cs^4\omega_1^2\omega_2^2+24cs^2\omega_3\omega_2^3+54cs^2\omega_1v_2^2\omega_2^3-7\omega_3\omega_1^2\omega_2^3-171\omega_3v_2^4\omega_2^3-3cs^2\omega_3v_2^2\omega_1^2\omega_2^3-\omega_3v_2^2\omega_1^3\omega_2^2+81\omega_3\omega_1^2v_2^2\omega_2^3+171\omega_3\omega_1^3v_2^4+12cs^4\omega_3\omega_1^2\omega_2^2-207cs^2\omega_3v_2^2\omega_2^3+18cs^2\omega_1^3\omega_2^2+18cs^2\omega_1^3v_2^2\omega_2+6cs^4\omega_1^3\omega_2+138\omega_3\omega_1^3v_2^4\omega_2^2-30cs^4\omega_1^2\omega_2^3-33cs^4\omega_3\omega_1^3\omega_2-12cs^2\omega_1^3\omega_2^3-25cs^4\omega_3\omega_1^2\omega_2^3+63cs^2\omega_3\omega_1^2v_2^2\omega_2+6\omega_3\omega_1^3-\omega_3v_1^4\omega_1^2\omega_2^3+17cs^4\omega_3\omega_1^3\omega_2^2-42cs^4\omega_3\omega_2^3-24cs^2\omega_1^2\omega_2^2+36cs^2\omega_3\omega_1^2v_2^2\omega_2^2+\omega_3v_1^4\omega_1^3\omega_2^2-63\omega_3\omega_1^2v_2^2\omega_2-54cs^2\omega_1^3v_2^2\omega_2^2-135\omega_3\omega_1v_2^4\omega_2^2-18cs^4\omega_1^3\omega_2^2-45cs^2\omega_3\omega_1\omega_2^3+6\omega_3\omega_1^2\omega_2-324\omega_3\omega_1^3v_2^4\omega_2-153cs^2\omega_3\omega_1^2v_2^2\omega_2^3+6cs^4\omega_3\omega_1^2\omega_2+30cs^2\omega_1^2\omega_2^3-6cs^2\omega_1^3\omega_2-2cs^4\omega_3\omega_1^3\omega_2^3+7\omega_3\omega_1^3\omega_2^2+36cs^2\omega_3\omega_1\omega_2^2+12cs^4\omega_1^3\omega_2^3+36cs^2\omega_1^3v_2^2\omega_2^3+324\omega_3\omega_1v_2^4\omega_2^3+\omega_3v_1^2\omega_1^2\omega_2^3+3cs^2\omega_3v_1^2\omega_1^3\omega_2^2+207cs^2\omega_3\omega_1^3v_2^2)\frac{\rho}{24\omega_3\omega_1^3\omega_2^2}$$

coefficient $C^{(1)}_{\mathrm{D}_y^4\rho}$ **at** $\frac{\partial^4\rho}{\partial x_2^4}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}^4_y\rho} = (cs^2\omega + 6v_2^4 - 3v_2^4\omega + 2cs^4 - 2cs^2 + 3v_2^2\omega - 12cs^2v_2^2\omega + 24cs^2v_2^2 - cs^4\omega - 6v_2^2)\frac{v_1}{24\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^4_y\rho} = (24\omega_6cs^4\omega_8^2 + 36\omega_4^2v_2^2\omega_8^2 + \omega_6^2cs^2\omega_4^2\omega_8^2 - 48\omega_6\omega_4v_2^4\omega_8 - 36\omega_6\omega_4^2v_2^2\omega_8^2 - 144\omega_6^2cs^2\omega_4v_2^2 + 150\omega_6cs^2\omega_4^2v_2^2\omega_8^2 - 24\omega_6^2\omega_4v_2^2 + 24\omega_6^2cs^2\omega_8 - 12\omega_6^2cs^2\omega_4^2v_2^2\omega_8^2 - 12\omega_6^2\omega_4^2v_2^2 + 24cs^4\omega_4\omega_8^2 - 3\omega_6^2\omega_4^2v_2^4\omega_8^2 - 48\omega_6cs^4\omega_4\omega_8^2 - 24\omega_6^2cs^4\omega_4 - 96\omega_6^2\omega_4v_2^2\omega_8 - 12\omega_6^2cs^4\omega_4^2\omega_8 - 144cs^2\omega_4^2v_2^2\omega_8^2 + 12\omega_6^2cs^4\omega_4^2 + 48\omega_6^2v_2^2\omega_8 - \omega_6^2cs^4\omega_4^2\omega_8^2 - 126\omega_6^2cs^2\omega_4^2v_2^2\omega_8 - 30\omega_6^2\omega_4^2v_2^4\omega_8 + 48\omega_6v_2^4\omega_8^2 - 24cs^2\omega_4\omega_8^2 - 24\omega_6\omega_4^2v_2^2\omega_8 + 72\omega_6cs^2\omega_4^2v_2^2\omega_8 + 72\omega_4v_2^4\omega_8^2 + 48\omega_6cs^2\omega_4\omega_8^2 + 216\omega_6cs^2v_2^2\omega_8^2 + 12\omega_6^2cs^2\omega_4^2\omega_8 - 96\omega_6\omega_4v_2^4\omega_8^2 + 12cs^2\omega_4^2\omega_8^2 + 3\omega_6^2\omega_4^2v_2^2\omega_8^2 + 24\omega_6^2cs^2\omega_4 - 216\omega_6^2cs^2v_2^2\omega_8 - 14\omega_6cs^2\omega_4^2\omega_8^2 + 96\omega_6^2\omega_4v_2^4\omega_8 + 432\omega_6^2cs^2\omega_4v_2^2\omega_8 - 48\omega_6^2cs^2\omega_4\omega_8 - 36\omega_4^2v_2^4\omega_8^2 - 24\omega_6cs^2\omega_8^2 - 144\omega_6cs^2\omega_4v_2^2\omega_8 + 48\omega_6\omega_4v_2^2\omega_8 + 36\omega_6\omega_4^2v_2^4\omega_8^2 - 24\omega_6^2cs^4\omega_8 - 12cs^4\omega_4^2\omega_8^2 + 24\omega_6\omega_4^2v_2^4\omega_8 + 24\omega_6^2\omega_4v_2^2 - 72\omega_4v_2^2\omega_8^2 + 14\omega_6cs^4\omega_4^2\omega_8^2 + 48\omega_6^2cs^4\omega_4\omega_8 - 432\omega_6cs^2\omega_4v_2^2\omega_8^2 + 96\omega_6\omega_4v_2^2\omega_8^2 - 12\omega_6^2cs^2\omega_4^2 - 48\omega_6^2v_2^4\omega_8 + 288cs^2\omega_4v_2^2\omega_8^2 + 12\omega_6^2\omega_4^2v_2^4 + 72\omega_6^2cs^2\omega_4^2v_2^2 - 48\omega_6v_2^2\omega_8^2 + 30\omega_6^2\omega_4^2v_2^2\omega_8)\frac{v_1}{24\omega_6^2\omega_4^2\omega_8^2}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^4_y\rho} = (72\omega_6\omega_4^2v_2^2\omega_8cs^2 + 12\omega_6^2\omega_4^2cs^4 + 36\omega_4^2v_2^2\omega_8^2 - 24\omega_6\omega_8^2cs^2 - 48\omega_6\omega_4v_2^4\omega_8 - 36\omega_6\omega_4^2v_2^2\omega_8^2 - 24\omega_6^2\omega_4v_2^4 + 24\omega_6^2\omega_8cs^2 - 12\omega_6^2\omega_4^2v_2^2 - 12\omega_4^2\omega_8^2cs^4 - 3\omega_6^2\omega_4^2v_2^4\omega_8^2 + 48\omega_6\omega_4\omega_8^2cs^2 + 14\omega_6\omega_4^2\omega_8^2cs^4 + 24\omega_6^2\omega_4cs^2 - 126\omega_6^2\omega_4^2v_2^2\omega_8cs^2 + 216\omega_6v_2^2\omega_8^2cs^2 - 96\omega_6^2\omega_4v_2^2\omega_8 - 24\omega_4\omega_8^2cs^2 + 48\omega_6^2v_2^2\omega_8 - 216\omega_6^2v_2^2\omega_8cs^2 - 144\omega_6^2\omega_4v_2^2cs^2 - 12\omega_6^2\omega_4^2\omega_8cs^4 - 48\omega_6^2\omega_4\omega_8cs^2 + 288\omega_4v_2^2\omega_8^2cs^2 - 30\omega_6^2\omega_4^2v_2^4\omega_8 + 48\omega_6v_2^4\omega_8^2 - 24\omega_6\omega_4^2v_2^2\omega_8 + 72\omega_4v_2^4\omega_8^2 + \omega_6^2\omega_4^2\omega_8^2cs^2 - 96\omega_6\omega_4v_2^4\omega_8^2 - 432\omega_6\omega_4v_2^2\omega_8^2cs^2 + 72\omega_6^2\omega_4^2v_2^2cs^2 + 48\omega_6^2\omega_4\omega_8cs^4 + 3\omega_6^2\omega_4^2v_2^2\omega_8^2 + 96\omega_6^2\omega_4v_2^4\omega_8 - 144\omega_6\omega_4v_2^2\omega_8cs^2 + 12\omega_6^2\omega_4^2\omega_8cs^2 - 36\omega_4^2v_2^4\omega_8^2 - \omega_6^2\omega_4^2\omega_8^2cs^4 + 432\omega_6^2\omega_4v_2^2\omega_8cs^2 + 48\omega_6\omega_4v_2^2\omega_8 + 36\omega_6\omega_4^2v_2^4\omega_8^2 + 24\omega_6\omega_4^2v_2^4\omega_8 + 24\omega_6^2\omega_4v_2^2 - 72\omega_4v_2^2\omega_8^2 - 144\omega_4^2v_2^2\omega_8^2cs^2 - 12\omega_6^2\omega_4^2v_2^2\omega_8^2cs^2 - 12\omega_6^2\omega_4^2cs^2 + 24\omega_6\omega_8^2cs^4 + 96\omega_6\omega_4v_2^2\omega_8^2 - 24\omega_6^2\omega_4cs^4 - 14\omega_6\omega_4^2\omega_8^2cs^2 - 48\omega_6^2v_2^4\omega_8 + 150\omega_6\omega_4^2v_2^2\omega_8^2cs^2 + 24\omega_4\omega_8^2cs^4 - 24\omega_6^2\omega_8cs^4 + 12\omega_6^2\omega_4^2v_2^4 + 12\omega_4^2\omega_8^2cs^2 - 48\omega_6v_2^2\omega_8^2 + 30\omega_6^2\omega_4^2v_2^2\omega_8 - 48\omega_6\omega_4\omega_8^2cs^4)\frac{v_1}{24\omega_6^2\omega_4^2\omega_8^2}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^4_y\rho} = (6v_2^4 + 2cs^4 - 3\omega_6v_2^4 - cs^4\omega_6 - 2cs^2 + 3\omega_6v_2^2 + 24cs^2v_2^2 - 6v_2^2 - 12cs^2\omega_6v_2^2 + cs^2\omega_6)\frac{v_1}{24\omega_6}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^4_y\rho} = (6v_2^4 + \omega_6cs^2 - 3\omega_6v_2^4 - 2cs^2 - 12\omega_6cs^2v_2^2 + 24cs^2v_2^2 + 3\omega_6v_2^2 + 2cs^4 - 6v_2^2 - \omega_6cs^4)\frac{v_1}{24\omega_6}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^4_y\rho} = (2cs^4 + 24v_2^2cs^2 + 6v_2^4 - cs^4\omega_2 - 3v_2^4\omega_2 + 3v_2^2\omega_2 - 6v_2^2 - 2cs^2 - 12v_2^2cs^2\omega_2 + cs^2\omega_2)\frac{v_1}{24\omega_2}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}^4_y\rho} = (-cs^4\omega_1\omega_2 + 12cs^2v_2^2\omega_2 - cs^2\omega_2 - 3\omega_1v_2^2 + cs^2\omega_1\omega_2 + 3\omega_1v_2^2\omega_2 + 3v_2^4\omega_2 + cs^4\omega_1 + 12cs^2\omega_1v_2^2 + cs^4\omega_2 + 3\omega_1v_2^4 - 3\omega_1v_2^4\omega_2 - 3v_2^2\omega_2 - cs^2\omega_1 - 12cs^2\omega_1v_2^2\omega_2)\frac{v_1}{24\omega_1\omega_2}$

coefficient $C^{(1)}_{\mathrm{D}^4_y v_1}$ **at** $\frac{\partial^4 v_1}{\partial x_2^4}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}^4_y v_1} = (36cs^2\omega - 72v_2^4 + 108v_2^4\omega + cs^2\omega^3 + 48cs^4 - 42v_2^4\omega^2 - 14cs^2\omega^2 + 3v_2^4\omega^3 - 24cs^2 - 108v_2^2\omega + 216cs^2v_2^2\omega - 144cs^2v_2^2 - 72cs^4\omega + 30cs^4\omega^2 + 72v_2^2 + 6cs^2v_2^2\omega^3 - 3v_2^2\omega^3 - 84cs^2v_2^2\omega^2 - 3cs^4\omega^3 + 42v_2^2\omega^2)\frac{\rho}{24\omega^3}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}^4_y v_1} = (24\omega_4^2v_2^2\omega_8^2 + 24cs^4\omega_8^2 - 24cs^2\omega_4\omega_8 + 3\omega_4^3v_2^4\omega_8^2 - 48\omega_4v_2^4\omega_8 + 12cs^2\omega_4^3v_2^2 - 48cs^4\omega_4\omega_8^2 - 24\omega_4^2v_2^4 - 72cs^2\omega_4^2v_2^2\omega_8^2 + 48cs^2\omega_4^2v_2^2\omega_8 + 24cs^4\omega_4\omega_8 - 18\omega_4^3v_2^4\omega_8 + 12cs^2\omega_4\omega_8^2 + 24\omega_4v_2^4\omega_8^2 + 12\omega_4^3v_2^4 - 96cs^2v_2^2\omega_8^2 - 72\omega_4^2v_2^2\omega_8 - 24cs^2\omega_4^2v_2^2 - 24cs^2\omega_4v_2^2\omega_8 - 8cs^2\omega_4^2\omega_8^2 + 6cs^2\omega_4^3v_2^2\omega_8^2 - 3cs^4\omega_4^3\omega_8^2 - 24\omega_4^2v_2^4\omega_8^2 - 6cs^2\omega_4^3\omega_8 - 3\omega_4^3v_2^2\omega_8^2 - 24cs^4\omega_4^2\omega_8 + 48\omega_4v_2^2\omega_8 - 12\omega_4^3v_2^2 + 24cs^4\omega_4^2\omega_8^2 + 18\omega_4^3v_2^2\omega_8 - 24\omega_4v_2^2\omega_8^2 + 72\omega_4^2v_2^4\omega_8 + cs^2\omega_4^3\omega_8^2 + 24\omega_4^2v_2^2 + 6cs^4\omega_4^3\omega_8 + 156cs^2\omega_4v_2^2\omega_8^2 + 24cs^2\omega_4^2\omega_8 - 12cs^2\omega_4^3v_2^2\omega_8)\frac{\rho}{24\omega_4^3\omega_8^2}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}^4_y v_1} = (24\omega_4^2v_2^2\omega_8^2 + 24\omega_4\omega_8cs^4 - 24\omega_4^2v_2^2cs^2 + 24\omega_4^2\omega_8cs^2 + 3\omega_4^3v_2^4\omega_8^2 - 48\omega_4v_2^4\omega_8 - 96v_2^2\omega_8^2cs^2 + 24\omega_4^2\omega_8^2cs^4 + 48\omega_4^2v_2^2\omega_8cs^2 - 24\omega_4^2v_2^4 + 12\omega_4\omega_8^2cs^2 - 12\omega_4^3v_2^2\omega_8cs^2 + \omega_4^3\omega_8^2cs^2 + 156\omega_4v_2^2\omega_8^2cs^2 - 18\omega_4^3v_2^4\omega_8 + 24\omega_4v_2^4\omega_8^2 + 12\omega_4^3v_2^4 - 72\omega_4^2v_2^2\omega_8 + 6\omega_4^3\omega_8cs^4 - 3\omega_4^3\omega_8^2cs^4 - 24\omega_4^2v_2^4\omega_8^2 + 6\omega_4^3v_2^2\omega_8^2cs^2 - 6\omega_4^3\omega_8cs^2 - 3\omega_4^3v_2^2\omega_8^2 - 24\omega_4v_2^2\omega_8cs^2 + 12\omega_4^3v_2^2cs^2 + 48\omega_4v_2^2\omega_8 - 12\omega_4^3v_2^2 - 24\omega_4^2\omega_8cs^4 + 18\omega_4^3v_2^2\omega_8 - 24\omega_4v_2^2\omega_8^2 - 72\omega_4^2v_2^2\omega_8^2cs^2 + 24\omega_8^2cs^4 + 72\omega_4^2v_2^4\omega_8 - 24\omega_4\omega_8cs^2 + 24\omega_4^2v_2^2 - 48\omega_4\omega_8^2cs^4 - 8\omega_4^2\omega_8^2cs^2)\frac{\rho}{24\omega_4^3\omega_8^2}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}^4_y v_1} =$
$(12\omega_4^2v_2^2\omega_8^2 + cs^2\omega_4^3\omega_8^2 + 3\omega_4^3v_2^4\omega_8^2 + 24cs^4\omega_4^2\omega_8^2 + 24cs^2\omega_4^2\omega_8 + 6cs^2\omega_4^3v_2^2\omega_8^2 + 72cs^2\omega_4v_2^2\omega_8 - 72\omega_4^2v_2^4 + 6cs^4\omega_4^3\omega_8 - 3cs^4\omega_4^3\omega_8^2 - 8cs^2\omega_4^2\omega_8^2 - 72cs^2\omega_4^3v_2^2\omega_8 - 36cs^2\omega_4v_2^2\omega_8^2 - 30\omega_4^3v_2^4\omega_8 - 24cs^4\omega_4^2\omega_8 + 36\omega_4^3v_2^4 - 72\omega_4^2v_2^2\omega_8 - 6cs^2\omega_4^3\omega_8 + 24cs^4\omega_4\omega_8 - 12cs^2\omega_4^2v_2^2\omega_8^2 - 12\omega_4^2v_2^4\omega_8^2 - 216cs^2\omega_4^2v_2^2 - 3\omega_4^3v_2^2\omega_8^2 + 12cs^2\omega_4\omega_8^2 - 36\omega_4^3v_2^2 + 30\omega_4^3v_2^2\omega_8 - 24cs^2\omega_4\omega_8 + 72\omega_4^2v_2^4\omega_8 + 144cs^2\omega_4^2v_2^2\omega_8 + 72\omega_4^2v_2^2 + 24cs^4\omega_8^2 - 48cs^4\omega_4\omega_8^2 + 108cs^2\omega_4^3v_2^2)\frac{\rho}{24\omega_4^3\omega_8^2}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}^4_y v_1} =$
$(12\omega_4^2v_2^2\omega_8^2 + 24cs^4\omega_4\omega_8 + 3\omega_4^3v_2^4\omega_8^2 + 24cs^4\omega_8^2 - 216cs^2\omega_4^2v_2^2 + 6cs^2\omega_4^3v_2^2\omega_8^2 - 72\omega_4^2v_2^4 + 12cs^2\omega_4\omega_8^2 + 72cs^2\omega_4v_2^2\omega_8 - 72cs^2\omega_4^3v_2^2\omega_8 - 36cs^2\omega_4v_2^2\omega_8^2 - 24cs^2\omega_4\omega_8 - 30\omega_4^3v_2^4\omega_8 + 36\omega_4^3v_2^4 - 72\omega_4^2v_2^2\omega_8 - 48cs^4\omega_4\omega_8^2 + 108cs^2\omega_4^3v_2^2 + cs^2\omega_4^3\omega_8^2 - 12cs^2\omega_4^2v_2^2\omega_8^2 + 24cs^4\omega_4^2\omega_8^2 - 12\omega_4^2v_2^4\omega_8^2 + 24cs^2\omega_4^2\omega_8 - 3\omega_4^3v_2^2\omega_8^2 + 6cs^4\omega_4^3\omega_8 - 36\omega_4^3v_2^2 + 30\omega_4^3v_2^2\omega_8 - 3cs^4\omega_4^3\omega_8^2 + 72\omega_4^2v_2^4\omega_8 - 8cs^2\omega_4^2\omega_8^2 + 72\omega_4^2v_2^2 - 24cs^4\omega_4^2\omega_8 + 144cs^2\omega_4^2v_2^2\omega_8 - 6cs^2\omega_4^3\omega_8)\frac{\rho}{24\omega_4^3\omega_8^2}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}^4_y v_1} =$

$(24\omega_6\omega_3cs^4+12\omega_6^2\omega_3cs^2+72\omega_3^2v_2^2-36\omega_6^2\omega_3v_2^2cs^2-72\omega_6\omega_3^2v_2^2+24\omega_6^2\omega_3^2cs^4+24\omega_6\omega_3^2cs^2-12\omega_6^2\omega_3^2v_2^4+6\omega_6^2\omega_3^3v_2^2cs^2-6\omega_6\omega_3^3cs^2-216\omega_3^2v_2^2cs^2+3\omega_6^2\omega_3^3v_2^4+30\omega_6\omega_3^3v_2^2-3\omega_6^2\omega_3^3cs^4-36\omega_3^3v_2^2+144\omega_6\omega_3^2v_2^2cs^2-30\omega_6\omega_3^3v_2^4+\omega_6^2\omega_3^3cs^2+36\omega_3^3v_2^4+72\omega_6\omega_3v_2^2cs^2+24\omega_6^2cs^4+6\omega_6\omega_3^3cs^4-3\omega_6^2\omega_3^3v_2^2-48\omega_6^2\omega_3cs^4-72\omega_6\omega_3^3v_2^2cs^2-24\omega_6\omega_3cs^2+108\omega_3^3v_2^2cs^2-24\omega_6\omega_3^2cs^4-12\omega_6^2\omega_3^2v_2^2cs^2+12\omega_6^2\omega_3^2v_2^2-72\omega_3^2v_2^4+72\omega_6\omega_3^2v_2^4-8\omega_6^2\omega_3^2cs^2)\frac{\rho}{24\omega_6^2\omega_3^3}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_y^4v_1} = (-12\omega_3^2\omega_1^2v_2^4-24cs^4\omega_3\omega_1^2-72\omega_3\omega_1^2v_2^2+6cs^4\omega_3\omega_1^3+36\omega_1^3v_2^4+108cs^2\omega_1^3v_2^2+6cs^2\omega_3^2\omega_1^3v_2^2-24cs^2\omega_3\omega_1+72cs^2\omega_3\omega_1v_2^2+30\omega_3\omega_1^3v_2^2+24cs^4\omega_3^2+24cs^2\omega_3\omega_1^2+3\omega_3^2\omega_1^3v_2^4-6cs^2\omega_3\omega_1^3-12cs^2\omega_3^2\omega_1^2v_2^2-216cs^2\omega_1^2v_2^2+24cs^4\omega_3\omega_1-72\omega_1^2v_2^4+cs^2\omega_3^2\omega_1^3-3\omega_3^2\omega_1^3v_2^2-36cs^2\omega_3^2\omega_1v_2^2-30\omega_3\omega_1^3v_2^4-48cs^4\omega_3^2\omega_1+144cs^2\omega_3\omega_1^2v_2^2-8cs^2\omega_3^2\omega_1^2+72\omega_1^2v_2^2-3cs^4\omega_3^2\omega_1^3+72\omega_3\omega_1^2v_2^4+12\omega_3^2\omega_1^2v_2^2+12cs^2\omega_3^2\omega_1+24cs^4\omega_3^2\omega_1^2-36\omega_1^3v_2^2-72cs^2\omega_3\omega_1^3v_2^2)\frac{\rho}{24\omega_3^2\omega_1^3}$

coefficient $C^{(1)}_{\mathrm{D}_y^4v_2}$ **at** $\frac{\partial^4v_2}{\partial x_2^4}$**:**

$C^{(1),\mathrm{SRT}}_{\mathrm{D}_y^4v_2} = (-4-3cs^2\omega+6cs^2-5v_2^2\omega+10v_2^2+2\omega)\frac{v_1\rho v_2}{12\omega}$

$C^{(1),\mathrm{MRT1}}_{\mathrm{D}_y^4v_2} = (-24\omega_6cs^2\omega_4\omega_8-60\omega_4^2v_2^2\omega_8^2-12\omega_6^2\omega_4^2-3\omega_6^2cs^2\omega_4^2\omega_8^2+61\omega_6\omega_4^2v_2^2\omega_8^2-25\omega_6\omega_4^2\omega_8^2-60\omega_6^2cs^2\omega_8+24\omega_4^2\omega_8^2+24\omega_6^2\omega_4^2v_2^2+168\omega_6^2\omega_4v_2^2\omega_8-84\omega_6^2v_2^2\omega_8-72\omega_6^2\omega_4\omega_8-12\omega_6\omega_4^2\omega_8+72cs^2\omega_4\omega_8^2+36\omega_6\omega_4^2v_2^2\omega_8-36\omega_6\omega_8^2-120\omega_6cs^2\omega_4\omega_8^2-33\omega_6^2cs^2\omega_4^2\omega_8+24\omega_6^2\omega_4-36cs^2\omega_4^2\omega_8^2+24\omega_6\omega_4\omega_8-5\omega_6^2\omega_4^2v_2^2\omega_8^2-48\omega_6^2cs^2\omega_4+39\omega_6cs^2\omega_4^2\omega_8^2+120\omega_6^2cs^2\omega_4\omega_8+60\omega_6cs^2\omega_8^2+21\omega_6^2\omega_4^2\omega_8-72\omega_6\omega_4v_2^2\omega_8-48\omega_6^2\omega_4v_2^2+120\omega_4v_2^2\omega_8^2-168\omega_6\omega_4v_2^2\omega_8^2+2\omega_6^2\omega_4^2\omega_8^2+12\omega_6cs^2\omega_4^2\omega_8+24\omega_6^2cs^2\omega_4^2+36\omega_6^2\omega_8+72\omega_6\omega_4\omega_8^2+84\omega_6v_2^2\omega_8^2-51\omega_6^2\omega_4^2v_2^2\omega_8-48\omega_4\omega_8^2)\frac{v_1\rho v_2}{12\omega_6^2\omega_4^2\omega_8^2}$

$C^{(1),\mathrm{MRT2}}_{\mathrm{D}_y^4v_2} = (-60\omega_4^2v_2^2\omega_8^2+12\omega_6\omega_4^2\omega_8cs^2-12\omega_6^2\omega_4^2+60\omega_6\omega_8^2cs^2+61\omega_6\omega_4^2v_2^2\omega_8^2-25\omega_6\omega_4^2\omega_8^2+24\omega_4^2\omega_8^2-60\omega_6^2\omega_8cs^2+24\omega_6^2\omega_4^2v_2^2-120\omega_6\omega_4\omega_8^2cs^2-48\omega_6^2\omega_4cs^2+168\omega_6^2\omega_4v_2^2\omega_8+72\omega_4\omega_8^2cs^2-84\omega_6^2v_2^2\omega_8-72\omega_6^2\omega_4\omega_8+120\omega_6^2\omega_4\omega_8cs^2-12\omega_6\omega_4^2\omega_8+36\omega_6\omega_4^2v_2^2\omega_8-36\omega_6\omega_8^2-3\omega_6^2\omega_4^2\omega_8^2cs^2+24\omega_6^2\omega_4+24\omega_6\omega_4\omega_8-5\omega_6^2\omega_4^2v_2^2\omega_8^2-33\omega_6^2\omega_4^2\omega_8cs^2+21\omega_6^2\omega_4^2\omega_8-72\omega_6\omega_4v_2^2\omega_8-48\omega_6^2\omega_4v_2^2+120\omega_4v_2^2\omega_8^2-24\omega_6\omega_4\omega_8cs^2+24\omega_6^2\omega_4^2cs^2-168\omega_6\omega_4v_2^2\omega_8^2+2\omega_6^2\omega_4^2\omega_8^2+39\omega_6\omega_4^2\omega_8^2cs^2+36\omega_6^2\omega_8+72\omega_6\omega_4\omega_8^2-36\omega_4^2\omega_8^2cs^2+84\omega_6v_2^2\omega_8^2-51\omega_6^2\omega_4^2v_2^2\omega_8-48\omega_4\omega_8^2)\frac{v_1\rho v_2}{12\omega_6^2\omega_4^2\omega_8^2}$

$C^{(1),\mathrm{CLBM1}}_{\mathrm{D}_y^4v_2} = (-4+2\omega_6+6cs^2-5\omega_6v_2^2+10v_2^2-3cs^2\omega_6)\frac{v_1\rho v_2}{12\omega_6}$

$C^{(1),\mathrm{CLBM2}}_{\mathrm{D}_y^4v_2} = (-4-3\omega_6cs^2+2\omega_6+6cs^2-5\omega_6v_2^2+10v_2^2)\frac{v_1\rho v_2}{12\omega_6}$

$C^{(1),\mathrm{CuLBM1}}_{\mathrm{D}_y^4v_2} = (-4-5v_2^2\omega_2+10v_2^2+6cs^2+2\omega_2-3cs^2\omega_2)\frac{v_1\rho v_2}{12\omega_2}$

$C^{(1),\mathrm{CuLBM2}}_{\mathrm{D}_y^4v_2} = (3cs^2\omega_2+5\omega_1v_2^2-3cs^2\omega_1\omega_2-5\omega_1v_2^2\omega_2+2\omega_1\omega_2-2\omega_1+5v_2^2\omega_2+3cs^2\omega_1-2\omega_2)\frac{v_1\rho v_2}{12\omega_1\omega_2}$

3.3 Conservation of momentum: ρv_2

$$v_2\frac{\partial\rho}{\partial t}+\rho\frac{\partial v_2}{\partial t}+v_1v_2\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_1}+\rho v_2\frac{\delta_l}{\delta_t}\frac{\partial v_1}{\partial x_1}+v_1\rho\frac{\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_1}+C^{(2)}_{\mathrm{D}_y\rho}\frac{\delta_l}{\delta_t}\frac{\partial\rho}{\partial x_2}+2\rho v_2\frac{\delta_l}{\delta_t}\frac{\partial v_2}{\partial x_2}+C^{(2)}_{\mathrm{D}_x\rho,\mathrm{D}_xv_2}\frac{\delta_l^2}{\delta_t}\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_1}+C^{(2)}_{\mathrm{D}_x\rho,\mathrm{D}_yv_1}\frac{\delta_l^2}{\delta_t}\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_2}+C^{(2)}_{\mathrm{D}_xv_1,\mathrm{D}_yv_1}\frac{\delta_l^2}{\delta_t}\frac{\partial v_1}{\partial x_1}\frac{\partial v_1}{\partial x_2}+C^{(2)}_{\mathrm{D}_y\rho,\mathrm{D}_xv_1}\frac{\delta_l^2}{\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_1}{\partial x_1}+C^{(2)}_{\mathrm{D}_y\rho,\mathrm{D}_yv_2}\frac{\delta_l^2}{\delta_t}\frac{\partial\rho}{\partial x_2}\frac{\partial v_2}{\partial x_2}+C^{(2)}_{\mathrm{D}_yv_2,\mathrm{D}_yv_2}\frac{\delta_l^2}{\delta_t}\left(\frac{\partial v_2}{\partial x_2}\right)^2+C^{(2)}_{\mathrm{D}_x^2v_2}\frac{\delta_l^2}{\delta_t}\frac{\partial^2v_2}{\partial x_1^2}+C^{(2)}_{\mathrm{D}_x\mathrm{D}_y\rho}\frac{\delta_l^2}{\delta_t}\frac{\partial^2\rho}{\partial x_1\partial x_2}+C^{(2)}_{\mathrm{D}_x\mathrm{D}_yv_1}\frac{\delta_l^2}{\delta_t}\frac{\partial^2v_1}{\partial x_1\partial x_2}+C^{(2)}_{\mathrm{D}_y^2\rho}\frac{\delta_l^2}{\delta_t}\frac{\partial^2\rho}{\partial x_2^2}+C^{(2)}_{\mathrm{D}_y^2v_2}\frac{\delta_l^2}{\delta_t}\frac{\partial^2v_2}{\partial x_2^2}+C^{(2)}_{\mathrm{D}_x^3\rho}\frac{\delta_l^3}{\delta_t}\frac{\partial^3\rho}{\partial x_1^3}+C^{(2)}_{\mathrm{D}_x^3v_1}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_1}{\partial x_1^3}+C^{(2)}_{\mathrm{D}_x^3v_2}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_2}{\partial x_1^3}+C^{(2)}_{\mathrm{D}_x^2\mathrm{D}_y\rho}\frac{\delta_l^3}{\delta_t}\frac{\partial^3\rho}{\partial x_1^2\partial x_2}+C^{(2)}_{\mathrm{D}_x^2\mathrm{D}_yv_1}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_1}{\partial x_1^2\partial x_2}+C^{(2)}_{\mathrm{D}_x^2\mathrm{D}_yv_2}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_2}{\partial x_1^2\partial x_2}+C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^2\rho}\frac{\delta_l^3}{\delta_t}\frac{\partial^3\rho}{\partial x_1\partial x_2^2}+C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^2v_1}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_1}{\partial x_1\partial x_2^2}+C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^2v_2}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_2}{\partial x_1\partial x_2^2}+C^{(2)}_{\mathrm{D}_y^3\rho}\frac{\delta_l^3}{\delta_t}\frac{\partial^3\rho}{\partial x_2^3}+C^{(2)}_{\mathrm{D}_y^3v_2}\frac{\delta_l^3}{\delta_t}\frac{\partial^3v_2}{\partial x_2^3}+C^{(2)}_{\mathrm{D}_x^4\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1^4}+C^{(2)}_{\mathrm{D}_x^4v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_1}{\partial x_1^4}+C^{(2)}_{\mathrm{D}_x^4v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_2}{\partial x_1^4}+C^{(2)}_{\mathrm{D}_x^3\mathrm{D}_y\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1^3\partial x_2}+C^{(2)}_{\mathrm{D}_x^3\mathrm{D}_yv_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_1}{\partial x_1^3\partial x_2}+C^{(2)}_{\mathrm{D}_x^3\mathrm{D}_yv_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_2}{\partial x_1^3\partial x_2}+C^{(2)}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2}+C^{(2)}_{\mathrm{D}_x^2\mathrm{D}_y^2v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_1}{\partial x_1^2\partial x_2^2}+C^{(2)}_{\mathrm{D}_x^2\mathrm{D}_y^2v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_2}{\partial x_1^2\partial x_2^2}+C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^3\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_1\partial x_2^3}+C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^3v_1}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_1}{\partial x_1\partial x_2^3}+C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^3v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_2}{\partial x_1\partial x_2^3}+C^{(2)}_{\mathrm{D}_y^4\rho}\frac{\delta_l^4}{\delta_t}\frac{\partial^4\rho}{\partial x_2^4}+C^{(2)}_{\mathrm{D}_y^4v_2}\frac{\delta_l^4}{\delta_t}\frac{\partial^4v_2}{\partial x_2^4}=0,$$

where:

coefficient $C^{(2)}_{\mathrm{D}_y\rho}$ **at** $\frac{\partial\rho}{\partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_y\rho} = (cs^2+v_2^2)$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y\rho} = (v_2^2 + cs^2)$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_y\rho} = (cs^2 + v_2^2)$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_y\rho} = (cs^2 + v_2^2)$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_y\rho} = (cs^2 + v_2^2)$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_y\rho} = (cs^2 + v_2^2)$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_y\rho} = (v_2^2 + cs^2)$

coefficient $C^{(2)}_{\mathrm{D}_x\rho,\mathrm{D}_x v_2}$ **at** $\frac{\partial\rho}{\partial x_1}\frac{\partial v_2}{\partial x_1}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_2} = (-2+\omega)\frac{cs^2}{2\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_2} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_2} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_2} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_2} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_2} = (-2+\omega_3)\frac{cs^2}{2\omega_3}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x\rho,\mathrm{D}_x v_2} = (-2+\omega_1)\frac{cs^2}{2\omega_1}$

coefficient $C^{(2)}_{\mathrm{D}_x\rho,\mathrm{D}_y v_1}$ **at** $\frac{\partial\rho}{\partial x_1}\frac{\partial v_1}{\partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_1} = (-2+\omega)\frac{cs^2}{2\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_1} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_1} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_1} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_1} = (-2+\omega_4)\frac{cs^2}{2\omega_4}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_1} = (-2+\omega_3)\frac{cs^2}{2\omega_3}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x\rho,\mathrm{D}_y v_1} = (-3v_1^2\omega_2 + 3\omega_1 cs^2 + \omega_1 cs^2\omega_2 - \omega_1 + 3v_1^2\omega_1 + \omega_2 - 5cs^2\omega_2)\frac{1}{2\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}_x v_1,\mathrm{D}_y v_1}$ **at** $\frac{\partial v_1}{\partial x_1}\frac{\partial v_1}{\partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x v_1,\mathrm{D}_y v_1} = 0$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x v_1,\mathrm{D}_y v_1} = 0$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x v_1,\mathrm{D}_y v_1} = 0$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x v_1,\mathrm{D}_y v_1} = 0$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x v_1,\mathrm{D}_y v_1} = 0$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x v_1,\mathrm{D}_y v_1} = 0$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x v_1,\mathrm{D}_y v_1} = (\omega_1 - \omega_2)\frac{3v_1\rho}{\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}_y \rho,\mathrm{D}_x v_1}$ **at** $\frac{\partial \rho}{\partial x_2}\frac{\partial v_1}{\partial x_1}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_y \rho,\mathrm{D}_x v_1} = 0$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y \rho,\mathrm{D}_x v_1} = 0$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_y \rho,\mathrm{D}_x v_1} = 0$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_y \rho,\mathrm{D}_x v_1} = 0$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_y \rho,\mathrm{D}_x v_1} = 0$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_y \rho,\mathrm{D}_x v_1} = 0$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_y \rho,\mathrm{D}_x v_1} = (-3v_1^2\omega_2 + \omega_1 cs^2 - \omega_1 + 3v_1^2\omega_1 + \omega_2 - cs^2\omega_2)\frac{1}{2\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}_y \rho,\mathrm{D}_y v_2}$ **at** $\frac{\partial \rho}{\partial x_2}\frac{\partial v_2}{\partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_y \rho,\mathrm{D}_y v_2} = (-2 + 4cs^2 - 3v_2^2\omega + 6v_2^2 + \omega - 2\omega cs^2)\frac{1}{\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y \rho,\mathrm{D}_y v_2} = (-2 + \omega_6 - 3\omega_6 v_2^2 - 2\omega_6 cs^2 + 6v_2^2 + 4cs^2)\frac{1}{\omega_6}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_y \rho,\mathrm{D}_y v_2} = (-2 - 2\omega_6 cs^2 + \omega_6 + 4cs^2 - 3\omega_6 v_2^2 + 6v_2^2)\frac{1}{\omega_6}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_y \rho,\mathrm{D}_y v_2} = (-2 + \omega_6 + 4cs^2 - 2\omega_6 cs^2 - 3\omega_6 v_2^2 + 6v_2^2)\frac{1}{\omega_6}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_y \rho,\mathrm{D}_y v_2} = (-2 + \omega_6 + 4cs^2 - 3\omega_6 v_2^2 + 6v_2^2 - 2cs^2\omega_6)\frac{1}{\omega_6}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_y \rho,\mathrm{D}_y v_2} = (-2 + 4cs^2 - 2cs^2\omega_2 - 3v_2^2\omega_2 + 6v_2^2 + \omega_2)\frac{1}{\omega_2}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_y \rho,\mathrm{D}_y v_2} = (3\omega_1 v_2^2 + 2\omega_1 cs^2 - 2\omega_1 cs^2\omega_2 - 3\omega_1 v_2^2\omega_2 + \omega_1\omega_2 - \omega_1 + 3v_2^2\omega_2 - \omega_2 + 2cs^2\omega_2)\frac{1}{\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2}$ **at** $\left(\frac{\partial v_2}{\partial x_2}\right)^2$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2} = (2 - \omega)\frac{3\rho v_2}{\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2} = (2 - \omega_6)\frac{3\rho v_2}{\omega_6}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2} = C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2} = C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2} = C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2} = (2 - \omega_2)\frac{3\rho v_2}{\omega_2}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_y v_2,\mathrm{D}_y v_2} = (-\omega_1\omega_2 + \omega_1 + \omega_2)\frac{3\rho v_2}{\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}_x^2 v_2}$ **at** $\frac{\partial^2 v_2}{\partial x_1^2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x^2 v_2} = (-2 + \omega)\frac{\rho cs^2}{2\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x^2 v_2} = (-2+\omega_4)\frac{cs^2\rho}{2\omega_4}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x^2 v_2} = (-2+\omega_4)\frac{\rho cs^2}{2\omega_4}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x^2 v_2} = (-2+\omega_4)\frac{\rho cs^2}{2\omega_4}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x^2 v_2} = (-2+\omega_4)\frac{cs^2\rho}{2\omega_4}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x^2 v_2} = (-2+\omega_3)\frac{\rho cs^2}{2\omega_3}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x^2 v_2} = (-2+\omega_1)\frac{\rho cs^2}{2\omega_1}$

coefficient $C^{(2)}_{\mathrm{D}_x\mathrm{D}_y\rho}$ **at** $\frac{\partial^2\rho}{\partial x_1\partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y\rho} = 0$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y\rho} = (-v_1^2\omega_2+3\omega_1 cs^2-\omega_1+v_1^2\omega_1+\omega_2-3cs^2\omega_2)\frac{v_1}{2\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}_x\mathrm{D}_y v_1}$ **at** $\frac{\partial^2 v_1}{\partial x_1\partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y v_1} = (-2+\omega)\frac{\rho cs^2}{2\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y v_1} = (-2+\omega_4)\frac{cs^2\rho}{2\omega_4}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y v_1} = (-2+\omega_4)\frac{\rho cs^2}{2\omega_4}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y v_1} = (-2+\omega_4)\frac{\rho cs^2}{2\omega_4}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y v_1} = (-2+\omega_4)\frac{cs^2\rho}{2\omega_4}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y v_1} = (-2+\omega_3)\frac{\rho cs^2}{2\omega_3}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y v_1} = (-3v_1^2\omega_2+\omega_1 cs^2+\omega_1 cs^2\omega_2-\omega_1+3v_1^2\omega_1+\omega_2-3cs^2\omega_2)\frac{\rho}{2\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}_y^2\rho}$ **at** $\frac{\partial^2\rho}{\partial x_2^2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_y^2\rho} = (-2+6cs^2-v_2^2\omega+2v_2^2+\omega-3\omega cs^2)\frac{v_2}{2\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y^2\rho} = (-2+\omega_6-\omega_6 v_2^2-3\omega_6 cs^2+2v_2^2+6cs^2)\frac{v_2}{2\omega_6}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_y^2\rho} = (-2-3\omega_6 cs^2+\omega_6+6cs^2-\omega_6 v_2^2+2v_2^2)\frac{v_2}{2\omega_6}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_y^2\rho} = (-2+\omega_6+6cs^2-3\omega_6 cs^2-\omega_6 v_2^2+2v_2^2)\frac{v_2}{2\omega_6}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^2_y\rho} = (-2+\omega_6+6cs^2-\omega_6 v_2^2+2v_2^2-3cs^2\omega_6)\frac{v_2}{2\omega_6}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^2_y\rho} = (-2+6cs^2-3cs^2\omega_2-v_2^2\omega_2+2v_2^2+\omega_2)\frac{v_2}{2\omega_2}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^2_y\rho} = (\omega_1 v_2^2+3\omega_1 cs^2-3\omega_1 cs^2\omega_2-\omega_1 v_2^2\omega_2+\omega_1\omega_2-\omega_1+v_2^2\omega_2-\omega_2+3cs^2\omega_2)\frac{v_2}{2\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}^2_y v_2}$ **at** $\frac{\partial^2 v_2}{\partial x_2^2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^2_y v_2} = (-2+2cs^2-3v_2^2\omega+6v_2^2+\omega-\omega cs^2)\frac{\rho}{2\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^2_y v_2} = (-2+\omega_6-3\omega_6 v_2^2-\omega_6 cs^2+6v_2^2+2cs^2)\frac{\rho}{2\omega_6}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^2_y v_2} = (-2-\omega_6 cs^2+\omega_6+2cs^2-3\omega_6 v_2^2+6v_2^2)\frac{\rho}{2\omega_6}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^2_y v_2} = (-2+\omega_6+2cs^2-\omega_6 cs^2-3\omega_6 v_2^2+6v_2^2)\frac{\rho}{2\omega_6}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^2_y v_2} = (-2+\omega_6+2cs^2-3\omega_6 v_2^2+6v_2^2-cs^2\omega_6)\frac{\rho}{2\omega_6}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^2_y v_2} = (-2+2cs^2-cs^2\omega_2-3v_2^2\omega_2+6v_2^2+\omega_2)\frac{\rho}{2\omega_2}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^2_y v_2} = (3\omega_1 v_2^2+\omega_1 cs^2-\omega_1 cs^2\omega_2-3\omega_1 v_2^2\omega_2+\omega_1\omega_2-\omega_1+3v_2^2\omega_2-\omega_2+cs^2\omega_2)\frac{\rho}{2\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}^3_x\rho}$ **at** $\frac{\partial^3\rho}{\partial x_1^3}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^3_x\rho} = (-1+3cs^2+v_1^2)\frac{v_1 v_2}{12}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^3_x\rho} = (6v_1^2\omega_4\omega_5+12v_1^2\omega_7-18cs^2\omega_7\omega_4-\omega_7\omega_4\omega_5+18cs^2\omega_4\omega_5-12v_1^2\omega_5+v_1^2\omega_7\omega_4\omega_5-12\omega_7-6v_1^2\omega_7\omega_4+36cs^2\omega_7-6\omega_4\omega_5+3cs^2\omega_7\omega_4\omega_5-36cs^2\omega_5+6\omega_7\omega_4+12\omega_5)\frac{v_1 v_2}{12\omega_7\omega_4\omega_5}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^3_x\rho} = (6v_1^2\omega_4\omega_5+12v_1^2\omega_7-\omega_7\omega_4\omega_5+36\omega_7 cs^2-12v_1^2\omega_5+v_1^2\omega_7\omega_4\omega_5-12\omega_7-6v_1^2\omega_7\omega_4-36cs^2\omega_5-6\omega_4\omega_5-18\omega_7 cs^2\omega_4+6\omega_7\omega_4+12\omega_5+18cs^2\omega_4\omega_5+3\omega_7 cs^2\omega_4\omega_5)\frac{v_1 v_2}{12\omega_7\omega_4\omega_5}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^3_x\rho} = (-1+v_1^2+3cs^2)\frac{v_1 v_2}{12}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^3_x\rho} = (-1+v_1^2+3cs^2)\frac{v_1 v_2}{12}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^3_x\rho} = (-1+v_1^2+3cs^2)\frac{v_1 v_2}{12}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^3_x\rho} = (-1+v_1^2+3cs^2)\frac{v_1 v_2}{12}$

coefficient $C^{(2)}_{\mathrm{D}^3_x v_1}$ **at** $\frac{\partial^3 v_1}{\partial x_1^3}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^3_x v_1} = (-1+cs^2+3v_1^2)\frac{\rho v_2}{12}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^3_x v_1} = (18v_1^2\omega_4\omega_5+36v_1^2\omega_7-6cs^2\omega_7\omega_4-\omega_7\omega_4\omega_5+6cs^2\omega_4\omega_5-36v_1^2\omega_5+3v_1^2\omega_7\omega_4\omega_5-12\omega_7-18v_1^2\omega_7\omega_4+12cs^2\omega_7-6\omega_4\omega_5+cs^2\omega_7\omega_4\omega_5-12cs^2\omega_5+6\omega_7\omega_4+12\omega_5)\frac{\rho v_2}{12\omega_7\omega_4\omega_5}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^3_x v_1} = (18v_1^2\omega_4\omega_5+36v_1^2\omega_7-\omega_7\omega_4\omega_5+12\omega_7 cs^2-36v_1^2\omega_5+3v_1^2\omega_7\omega_4\omega_5-12\omega_7-18v_1^2\omega_7\omega_4-12cs^2\omega_5-6\omega_4\omega_5-6\omega_7 cs^2\omega_4+6\omega_7\omega_4+12\omega_5+6cs^2\omega_4\omega_5+\omega_7 cs^2\omega_4\omega_5)\frac{\rho v_2}{12\omega_7\omega_4\omega_5}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^3_x v_1} = (-1+3v_1^2+cs^2)\frac{\rho v_2}{12}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^3_x v_1} = (-1+3v_1^2+cs^2)\frac{\rho v_2}{12}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^3_x v_1} = (-1+3v_1^2+cs^2)\frac{\rho v_2}{12}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^3_x v_1} = (-1+3v_1^2+cs^2)\frac{\rho v_2}{12}$

coefficient $C^{(2)}_{\mathrm{D}^3_x v_2}$ **at** $\frac{\partial^3 v_2}{\partial x_1^3}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^3_x v_2} = (6-18cs^2-6v_1^2-3\omega^2cs^2+\omega^2-v_1^2\omega^2+6v_1^2\omega-6\omega+18\omega cs^2)\frac{v_1\rho}{6\omega^2}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^3_x v_2} = (-v_1^2\omega_7\omega_4^2+3cs^2\omega_4^2+15cs^2\omega_7\omega_4-3cs^2\omega_7\omega_4^2-6cs^2\omega_4+3v_1^2\omega_7\omega_4+6\omega_4-12cs^2\omega_7+\omega_7\omega_4^2+3v_1^2\omega_4^2-3\omega_4^2-6v_1^2\omega_4-3\omega_7\omega_4)\frac{v_1\rho}{6\omega_7\omega_4^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^3_x v_2} = (-v_1^2\omega_7\omega_4^2-6cs^2\omega_4-12\omega_7cs^2+3cs^2\omega_4^2+3v_1^2\omega_7\omega_4+6\omega_4+\omega_7\omega_4^2+15\omega_7cs^2\omega_4+3v_1^2\omega_4^2-3\omega_4^2-3\omega_7cs^2\omega_4^2-6v_1^2\omega_4-3\omega_7\omega_4)\frac{v_1\rho}{6\omega_7\omega_4^2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^3_x v_2} = (6+3v_1^2\omega_7-6v_1^2+9\omega_7cs^2-18cs^2-3\omega_7\omega_4cs^2-3\omega_7-v_1^2\omega_7\omega_4-3\omega_4+3v_1^2\omega_4+\omega_7\omega_4+9\omega_4cs^2)\frac{v_1\rho}{6\omega_7\omega_4}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^3_x v_2} = (6+3v_1^2\omega_7-6v_1^2+9cs^2\omega_7-3\omega_7-v_1^2\omega_7\omega_4-3\omega_4-3cs^2\omega_7\omega_4-18cs^2+9cs^2\omega_4+3v_1^2\omega_4+\omega_7\omega_4)\frac{v_1\rho}{6\omega_7\omega_4}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^3_x v_2} = (6+3\omega_3v_1^2-6v_1^2-3\omega_3-18cs^2+9cs^2\omega_4+9\omega_3cs^2-\omega_3v_1^2\omega_4-3\omega_4+\omega_3\omega_4-3\omega_3cs^2\omega_4+3v_1^2\omega_4)\frac{v_1\rho}{6\omega_3\omega_4}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^3_x v_2} = (6+3\omega_3v_1^2-6v_1^2-3\omega_3+9\omega_1cs^2-\omega_3v_1^2\omega_1-3\omega_1-18cs^2+9\omega_3cs^2-3\omega_3\omega_1cs^2+\omega_3\omega_1+3v_1^2\omega_1)\frac{v_1\rho}{6\omega_3\omega_1}$

coefficient $C^{(2)}_{\mathrm{D}^2_x \mathrm{D}_y \rho}$ **at** $\frac{\partial^3 \rho}{\partial x_1^2 \partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = (-12-\omega^2+12\omega)\frac{cs^4}{6\omega^2}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = (-12+12\omega_4-\omega_4^2)\frac{cs^4}{6\omega_4^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = (-12+12\omega_4-\omega_4^2)\frac{cs^4}{6\omega_4^2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = (-12+12\omega_4-\omega_4^2)\frac{cs^4}{6\omega_4^2}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = (-12+12\omega_4-\omega_4^2)\frac{cs^4}{6\omega_4^2}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = (-12+12\omega_3-\omega_3^2)\frac{cs^4}{6\omega_3^2}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^2_x \mathrm{D}_y \rho} = (9v_1^4\omega_1\omega_2^2+45v_1^2\omega_1^2cs^2-30cs^4\omega_2^2-45v_1^2cs^2\omega_2^2-6\omega_1cs^2\omega_2^2-6\omega_1^2cs^4\omega_2+9v_1^4\omega_1^2-2\omega_1^2cs^4\omega_2^2-9v_1^2\omega_1\omega_2^2+6\omega_1^2cs^4+45v_1^2\omega_1cs^2\omega_2^2+9v_1^2\omega_2^2+6cs^2\omega_2^2-9v_1^4\omega_1^2\omega_2+30\omega_1cs^4\omega_2^2+6\omega_1^2cs^2\omega_2-9v_1^2\omega_1^2-6\omega_1^2cs^2+9v_1^2\omega_1^2\omega_2-45v_1^2\omega_1^2cs^2\omega_2-9v_1^4\omega_2^2)\frac{1}{12\omega_1^2\omega_2^2}$

coefficient $C^{(2)}_{\mathrm{D}^2_x \mathrm{D}_y v_1}$ **at** $\frac{\partial^3 v_1}{\partial x_1^2 \partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = 0$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = (-2\omega_7+2\omega_4-\omega_4^2+\omega_7\omega_4)\frac{cs^2 v_1\rho}{\omega_7\omega_4^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = (-2\omega_7+2\omega_4-\omega_4^2+\omega_7\omega_4)\frac{v_1\rho cs^2}{\omega_7\omega_4^2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = 0$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^2_x \mathrm{D}_y v_1} = 0$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y v_1} = 0$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y v_1} = (9\omega_1 cs^2\omega_2^2 + 11v_1^2\omega_1\omega_2^2 + 5\omega_1^2\omega_2 + 5\omega_2^2 - 11v_1^2\omega_2^2 - 9cs^2\omega_2^2 - 9\omega_1^2 cs^2\omega_2 + 11v_1^2\omega_1^2 - 5\omega_1^2 + 9\omega_1^2 cs^2 - 11v_1^2\omega_1^2\omega_2 - 5\omega_1\omega_2^2)\frac{v_1\rho}{4\omega_1^2\omega_2^2}$

coefficient $C^{(2)}_{\mathrm{D}_x^2\mathrm{D}_y v_2}$ **at** $\frac{\partial^3 v_2}{\partial x_1^2\partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-\rho v_2 cs^2}{6}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = (-12\omega_6\omega_8 - \omega_6\omega_4^2\omega_8 + 12\omega_6\omega_4\omega_8 - 12\omega_4\omega_8 + 12\omega_6\omega_4 + 12\omega_4^2 - 12\omega_6\omega_4^2)\frac{cs^2\rho v_2}{6\omega_6\omega_4^2\omega_8}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = (-12\omega_6\omega_8 - \omega_6\omega_4^2\omega_8 + 12\omega_6\omega_4\omega_8 - 12\omega_4\omega_8 + 12\omega_6\omega_4 + 12\omega_4^2 - 12\omega_6\omega_4^2)\frac{\rho cs^2 v_2}{6\omega_6\omega_4^2\omega_8}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-\rho v_2 cs^2}{6}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-cs^2\rho v_2}{6}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-\rho cs^2 v_2}{6}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y v_2} = \frac{-\rho v_2 cs^2}{6}$

coefficient $C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^2\rho}$ **at** $\frac{\partial^3\rho}{\partial x_1\partial x_2^2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = 0$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = (-\omega_6\omega_4 v_2^2 - \omega_6\omega_8 - 3\omega_6^2 cs^2 - 3\omega_6 cs^2\omega_4\omega_8 - 3\omega_6 cs^2\omega_4 + 3cs^2\omega_4\omega_8 - \omega_6^2\omega_4 - \omega_6^2 v_2^2 + \omega_6\omega_4\omega_8 + \omega_6 v_2^2\omega_8 - \omega_4\omega_8 + \omega_6\omega_4 + 3\omega_6^2 cs^2\omega_4 - \omega_6\omega_4 v_2^2\omega_8 + \omega_4 v_2^2\omega_8 + \omega_6^2\omega_4 v_2^2 + 3\omega_6 cs^2\omega_8 + \omega_6^2)\frac{v_1 v_2}{\omega_6^2\omega_4\omega_8}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = (-\omega_6\omega_4 v_2^2 - \omega_6\omega_8 - 3\omega_6 cs^2\omega_4 - \omega_6^2\omega_4 - \omega_6^2 v_2^2 + \omega_6\omega_4\omega_8 + \omega_6 v_2^2\omega_8 - \omega_4\omega_8 + \omega_6\omega_4 + 3\omega_6 cs^2\omega_8 - \omega_6\omega_4 v_2^2\omega_8 + \omega_4 v_2^2\omega_8 + \omega_6^2\omega_4 v_2^2 + 3\omega_6^2 cs^2\omega_4 - 3\omega_6^2 cs^2 - 3\omega_6 cs^2\omega_4\omega_8 + \omega_6^2 + 3cs^2\omega_4\omega_8)\frac{v_1 v_2}{\omega_6^2\omega_4\omega_8}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = 0$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = 0$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} = 0$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2\rho} =$
$(3\omega_1 cs^2\omega_2^2 + v_1^2\omega_1\omega_2^2 - 6\omega_1 cs^2\omega_2 - 2\omega_1 v_2^2\omega_2 + \omega_1^2\omega_2 - v_1^2\omega_2^2 + 2\omega_1\omega_2 - 3\omega_1^2 cs^2\omega_2 + v_1^2\omega_1^2 - 2\omega_1^2 + \omega_1^2 v_2^2 + 6\omega_1^2 cs^2 + v_2^2\omega_2^2 - v_1^2\omega_1^2\omega_2 - \omega_1\omega_2^2)\frac{3v_1 v_2}{4\omega_1^2\omega_2^2}$

coefficient $C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^2 v_1}$ **at** $\frac{\partial^3 v_1}{\partial x_1\partial x_2^2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = (12 - 36cs^2 - 11\omega^2 cs^2 + 3\omega^2 + 12v_2^2\omega - 12v_2^2 - 12\omega + 36\omega cs^2 - 3v_2^2\omega^2)\frac{\rho v_2}{12\omega^2}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = (-12\omega_6^2\omega_4^2 - 11\omega_6^2 cs^2\omega_4^2\omega_8 - 12\omega_6 cs^2\omega_4^2 + 12\omega_6^2\omega_4^2 v_2^2 - 24\omega_6^2 cs^2\omega_8 + 6\omega_6^2\omega_4 v_2^2\omega_8 - 6\omega_6^2\omega_4\omega_8 + 6\omega_6\omega_4^2\omega_8 - 6\omega_6\omega_4^2 v_2^2\omega_8 - 24\omega_6 cs^2\omega_4\omega_8 - 12\omega_4^2\omega_8 + 12\omega_4^2 v_2^2\omega_8 + 12\omega_6^2\omega_4 - 18\omega_6 cs^2\omega_4^2\omega_8 + 36cs^2\omega_4^2\omega_8 - 12\omega_6^2 cs^2\omega_4 + 3\omega_6^2\omega_4^2\omega_8 - 12\omega_6^2\omega_4 v_2^2 + 12\omega_6^2 cs^2\omega_4^2 + 12\omega_6\omega_4^2 - 12\omega_6\omega_4^2 v_2^2 - 3\omega_6^2\omega_4^2 v_2^2\omega_8 + 42\omega_6^2 cs^2\omega_4\omega_8)\frac{\rho v_2}{12\omega_6^2\omega_4^2\omega_8}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = (-12\omega_6^2\omega_4^2 - 18\omega_6 cs^2\omega_4^2\omega_8 + 36cs^2\omega_4^2\omega_8 + 12\omega_6^2\omega_4^2 v_2^2 + 6\omega_6^2\omega_4 v_2^2\omega_8 - 6\omega_6^2\omega_4\omega_8 - 12\omega_6 cs^2\omega_4^2 + 6\omega_6\omega_4^2\omega_8 - 6\omega_6\omega_4^2 v_2^2\omega_8 - 12\omega_4^2\omega_8 - 24\omega_6^2 cs^2\omega_8 + 42\omega_6^2 cs^2\omega_4\omega_8 + 12\omega_4^2 v_2^2\omega_8 + 12\omega_6^2\omega_4 - 11\omega_6^2 cs^2\omega_4^2\omega_8 + 12\omega_6^2 cs^2\omega_4^2 + 3\omega_6^2\omega_4^2\omega_8 - 12\omega_6^2\omega_4 v_2^2 - 12\omega_6^2 cs^2\omega_4 - 24\omega_6 cs^2\omega_4\omega_8 + 12\omega_6\omega_4^2 - 12\omega_6\omega_4^2 v_2^2 - 3\omega_6^2\omega_4^2 v_2^2\omega_8)\frac{\rho v_2}{12\omega_6^2\omega_4^2\omega_8}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = (-12\omega_6\omega_4 v_2^2 + 18\omega_6^2\omega_8 cs^2 - 3\omega_6^2\omega_4 v_2^2\omega_8 + 36\omega_6^2\omega_4 cs^2 + 6\omega_6^2 v_2^2\omega_8 + 3\omega_6^2\omega_4\omega_8 - 11\omega_6^2\omega_4\omega_8 cs^2 - 12\omega_6^2\omega_4 - 12\omega_6^2 v_2^2 + 6\omega_6\omega_4\omega_8 - 36\omega_6^2 cs^2 - 12\omega_4\omega_8 + 12\omega_6\omega_4 - 6\omega_6\omega_4 v_2^2\omega_8 + 12\omega_4 v_2^2\omega_8 - 18\omega_6\omega_4\omega_8 cs^2 + 12\omega_6^2\omega_4 v_2^2 + 36\omega_4\omega_8 cs^2 + 12\omega_6^2 - 6\omega_6^2\omega_8 - 36\omega_6\omega_4 cs^2)\frac{\rho v_2}{12\omega_6^2\omega_4\omega_8}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = (-18cs^2\omega_6\omega_4\omega_8 - 12\omega_6\omega_4 v_2^2 - 3\omega_6^2\omega_4 v_2^2\omega_8 + 36cs^2\omega_6^2\omega_4 + 6\omega_6^2 v_2^2\omega_8 + 3\omega_6^2\omega_4\omega_8 - 12\omega_6^2\omega_4 - 12\omega_6^2 v_2^2 + 6\omega_6\omega_4\omega_8 - 36cs^2\omega_6^2 - 12\omega_4\omega_8 + 12\omega_6\omega_4 - 6\omega_6\omega_4 v_2^2\omega_8 + 18cs^2\omega_6^2\omega_8 + 12\omega_4 v_2^2\omega_8 + 12\omega_6^2\omega_4 v_2^2 - 11cs^2\omega_6^2\omega_4\omega_8 + 36cs^2\omega_4\omega_8 - 36cs^2\omega_6\omega_4 + 12\omega_6^2 - 6\omega_6^2\omega_8)\frac{\rho v_2}{12\omega_6^2\omega_4\omega_8}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = (12\omega_3\omega_2 - 36\omega_3 cs^2\omega_2 + 6\omega_6\omega_3\omega_2 + 12\omega_3 v_2^2\omega_2^2 - 18\omega_6\omega_3 cs^2\omega_2 - 3\omega_6\omega_3 v_2^2\omega_2^2 - 6\omega_6\omega_2^2 - 11\omega_6\omega_3 cs^2\omega_2^2 - 6\omega_6\omega_3 v_2^2\omega_2 - 12\omega_3\omega_2^2 + 36\omega_6\omega_3 cs^2 + 36\omega_3 cs^2\omega_2^2 + 3\omega_6\omega_3\omega_2^2 - 12\omega_3 v_2^2\omega_2 + 12\omega_2^2 + 6\omega_6 v_2^2\omega_2^2 - 12v_2^2\omega_2^2 - 36cs^2\omega_2^2 + 12\omega_6\omega_3 v_2^2 + 18\omega_6 cs^2\omega_2^2 - 12\omega_6\omega_3)\frac{\rho v_2}{12\omega_6\omega_3\omega_2^2}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_1} = (27\omega_3\omega_1^2 cs^2 + 6\omega_3 v_2^2\omega_2^2 - 18\omega_1 v_2^2\omega_2^2 - 12\omega_1^2\omega_2^2 + 6\omega_3\omega_1^2 v_2^2 + 27\omega_3 v_1^2\omega_1^2 - 54\omega_1 cs^2\omega_2^2 + 9\omega_3 cs^2\omega_2^2 + 27\omega_3 v_1^2\omega_1\omega_2^2 + 18\omega_3\omega_1 cs^2\omega_2^2 - 12\omega_3\omega_1\omega_2^2 + 6\omega_1^2\omega_2 + 3\omega_3\omega_2^2 + 3\omega_3\omega_1 v_2^2\omega_2^2 - 11\omega_3\omega_1^2 cs^2\omega_2^2 - 18\omega_1^2 cs^2\omega_2 - 15\omega_3\omega_1^2 - 27\omega_3 v_1^2\omega_1^2\omega_2 + 3\omega_3\omega_1^2\omega_2^2 - 6\omega_1^2 v_2^2\omega_2 - 3\omega_3\omega_1^2 v_2^2\omega_2^2 - 3\omega_3\omega_1^2 v_2^2\omega_2 - 27\omega_3 v_1^2\omega_2^2 + 12\omega_1^2 v_2^2\omega_2^2 + 12\omega_3\omega_1^2\omega_2 + 36\omega_1^2 cs^2\omega_2^2 - 18\omega_3\omega_1^2 cs^2\omega_2 + 18\omega_1\omega_2^2)\frac{\rho v_2}{12\omega_3\omega_1^2\omega_2^2}$

coefficient $C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^2 v_2}$ **at** $\frac{\partial^3 v_2}{\partial x_1\partial x_2^2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = 0$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = (-3\omega_6\omega_4 v_2^2 - \omega_6\omega_8 - \omega_6^2 cs^2 - \omega_6 cs^2\omega_4\omega_8 - \omega_6 cs^2\omega_4 + cs^2\omega_4\omega_8 - \omega_6^2\omega_4 - 3\omega_6^2 v_2^2 + \omega_6\omega_4\omega_8 + 3\omega_6 v_2^2\omega_8 - \omega_4\omega_8 + \omega_6\omega_4 + \omega_6^2 cs^2\omega_4 - 3\omega_6\omega_4 v_2^2\omega_8 + 3\omega_4 v_2^2\omega_8 + 3\omega_6^2\omega_4 v_2^2 + \omega_6 cs^2\omega_8 + \omega_6^2)\frac{v_1\rho}{\omega_6^2\omega_4\omega_8}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = (-3\omega_6\omega_4 v_2^2 - \omega_6\omega_8 - \omega_6 cs^2\omega_4 - \omega_6^2\omega_4 - 3\omega_6^2 v_2^2 + \omega_6\omega_4\omega_8 + 3\omega_6 v_2^2\omega_8 - \omega_4\omega_8 + \omega_6\omega_4 + \omega_6 cs^2\omega_8 - 3\omega_6\omega_4 v_2^2\omega_8 + 3\omega_4 v_2^2\omega_8 + 3\omega_6^2\omega_4 v_2^2 + \omega_6^2 cs^2\omega_4 - \omega_6^2 cs^2 - \omega_6 cs^2\omega_4\omega_8 + \omega_6^2 + cs^2\omega_4\omega_8)\frac{v_1\rho}{\omega_6^2\omega_4\omega_8}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = 0$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = 0$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} = 0$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^2 v_2} =$
$(9\omega_3\omega_1^2 cs^2 - 18\omega_3\omega_1 v_2^2\omega_2 + 9\omega_3 v_2^2\omega_2^2 + 9\omega_3\omega_1^2 v_2^2 + 2\omega_3 v_1^2\omega_1^2 + 6\omega_1 cs^2\omega_2^2 - 3\omega_3 cs^2\omega_2^2 + \omega_3 v_1^2\omega_1\omega_2^2 + 6\omega_3\omega_1\omega_2 - 6\omega_3\omega_1 cs^2\omega_2 + 3\omega_3\omega_1 cs^2\omega_2^2 - \omega_3\omega_1\omega_2^2 + 2v_1^2\omega_1\omega_2^2 + 2\omega_1^2\omega_2 - \omega_3\omega_2^2 - 6\omega_1^2 cs^2\omega_2 - 5\omega_3\omega_1^2 - \omega_3 v_1^2\omega_1^2\omega_2 - 2v_1^2\omega_1^2\omega_2 - 2\omega_3 v_1^2\omega_2^2 + \omega_3\omega_1^2\omega_2 - 3\omega_3\omega_1^2 cs^2\omega_2 - 2\omega_1\omega_2^2)\frac{v_1\rho}{4\omega_3\omega_1^2\omega_2^2}$

coefficient $C^{(2)}_{\mathrm{D}_y^3\rho}$ **at** $\frac{\partial^3\rho}{\partial x_2^3}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_y^3\rho} =$
$(-12\omega cs^4 + 24v_2^2\omega^2 cs^2 + 36v_2^4 - 12cs^2 - 36v_2^4\omega - \omega^2 cs^2 + 7v_2^4\omega^2 + 36v_2^2\omega - 36v_2^2 + 12cs^4 + 12\omega cs^2 + 144v_2^2 cs^2 + \omega^2 cs^4 - 144v_2^2\omega cs^2 - 7v_2^2\omega^2)\frac{1}{12\omega^2}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y^3\rho} =$
$(36v_2^4 + 12cs^4 - \omega_6^2 cs^2 - 36\omega_6 v_2^4 + 144cs^2 v_2^2 - 144\omega_6 cs^2 v_2^2 - 12\omega_6 cs^4 - 7\omega_6^2 v_2^2 + 36\omega_6 v_2^2 + \omega_6^2 cs^4 + 24\omega_6^2 cs^2 v_2^2 + 7\omega_6^2 v_2^4 + 12\omega_6 cs^2 - 36v_2^2 - 12cs^2)\frac{1}{12\omega_6^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_y^3\rho} =$
$(12\omega_6 cs^2 + 36v_2^4 + 144cs^2 v_2^2 - 144\omega_6 cs^2 v_2^2 + \omega_6^2 cs^4 - 36\omega_6 v_2^4 - 12cs^2 - 7\omega_6^2 v_2^2 + 12cs^4 + 36\omega_6 v_2^2 + 7\omega_6^2 v_2^4 - 36v_2^2 - 12\omega_6 cs^4 + 24\omega_6^2 cs^2 v_2^2 - \omega_6^2 cs^2)\frac{1}{12\omega_6^2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_y^3\rho} =$
$(36v_2^4 - 12cs^2 + 24\omega_6^2 v_2^2 cs^2 - 36\omega_6 v_2^4 + \omega_6^2 cs^4 + 12\omega_6 cs^2 - 7\omega_6^2 v_2^2 - \omega_6^2 cs^2 + 36\omega_6 v_2^2 + 7\omega_6^2 v_2^4 - 12\omega_6 cs^4 - 36v_2^2 + 12cs^4 + 144v_2^2 cs^2 - 144\omega_6 v_2^2 cs^2)\frac{1}{12\omega_6^2}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_y^3\rho} =$
$(36v_2^4 + cs^4\omega_6^2 + 24cs^2\omega_6^2 v_2^2 + 12cs^4 - 36\omega_6 v_2^4 - 12cs^4\omega_6 - 7\omega_6^2 v_2^2 - cs^2\omega_6^2 - 12cs^2 + 36\omega_6 v_2^2 + 7\omega_6^2 v_2^4 + 144cs^2 v_2^2 - 36v_2^2 - 144cs^2\omega_6 v_2^2 + 12cs^2\omega_6)\frac{1}{12\omega_6^2}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^3_y\rho} = (-144cs^2v_2^2\omega_2 - 12cs^4\omega_2 + 36v_2^4 + 7v_2^4\omega_2^2 + 24cs^2v_2^2\omega_2^2 + cs^4\omega_2^2 - 36v_2^4\omega_2 + 144cs^2v_2^2 - 12cs^2 + 12cs^4 + 12cs^2\omega_2 - 7v_2^2\omega_2^2 - cs^2\omega_2^2 + 36v_2^2\omega_2 - 36v_2^2)\frac{1}{12\omega_2^2}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^3_y\rho} = (-18\omega_1^2v_2^4\omega_2 - 72\omega_1^2v_2^2cs^2\omega_2 + 18\omega_1v_2^2\omega_2^2 + 9v_2^4\omega_2^2 + 6cs^4\omega_2^2 + 6\omega_1cs^2\omega_2^2 - 6\omega_1^2cs^4\omega_2 + \omega_1^2cs^4\omega_2^2 + 6\omega_1^2cs^4 + 24\omega_1^2v_2^2cs^2\omega_2^2 - 18\omega_1v_2^2\omega_2 + 45\omega_1^2v_2^2cs^2 + 7\omega_1^2v_2^4\omega_2^2 + 9\omega_1^2v_2^4 - 6cs^2\omega_2^2 - 6\omega_1cs^4\omega_2^2 + 54\omega_1v_2^2cs^2\omega_2 + 6\omega_1^2cs^2\omega_2 + 45v_2^2cs^2\omega_2^2 + 18\omega_1^2v_2^2\omega_2 - 9\omega_1^2v_2^2 - 6\omega_1^2cs^2 - 18\omega_1v_2^4\omega_2^2 - 9v_2^2\omega_2^2 + 18\omega_1v_2^4\omega_2 - 7\omega_1^2v_2^2\omega_2^2 - \omega_1^2cs^2\omega_2^2 - 72\omega_1v_2^2cs^2\omega_2^2)\frac{1}{12\omega_1^2\omega_2^2}$

coefficient $C^{(2)}_{\mathrm{D}^3_y v_2}$ at $\frac{\partial^3 v_2}{\partial x_2^3}$:

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^3_y v_2} = (-24 + 36cs^2 + 5\omega^2cs^2 - 4\omega^2 - 60v_2^2\omega + 60v_2^2 + 24\omega - 36\omega cs^2 + 11v_2^2\omega^2)\frac{\rho v_2}{6\omega^2}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^3_y v_2} = (-24 + 24\omega_6 + 5\omega_6^2cs^2 + 11\omega_6^2v_2^2 - 60\omega_6v_2^2 - 36\omega_6cs^2 + 60v_2^2 - 4\omega_6^2 + 36cs^2)\frac{\rho v_2}{6\omega_6^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^3_y v_2} = (-24 - 36\omega_6cs^2 + 24\omega_6 + 36cs^2 + 11\omega_6^2v_2^2 - 60\omega_6v_2^2 + 60v_2^2 + 5\omega_6^2cs^2 - 4\omega_6^2)\frac{\rho v_2}{6\omega_6^2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^3_y v_2} = (-24 + 24\omega_6 + 36cs^2 - 36\omega_6cs^2 + 11\omega_6^2v_2^2 + 5\omega_6^2cs^2 - 60\omega_6v_2^2 + 60v_2^2 - 4\omega_6^2)\frac{\rho v_2}{6\omega_6^2}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^3_y v_2} = (-24 + 24\omega_6 + 11\omega_6^2v_2^2 + 5cs^2\omega_6^2 + 36cs^2 - 60\omega_6v_2^2 + 60v_2^2 - 4\omega_6^2 - 36cs^2\omega_6)\frac{\rho v_2}{6\omega_6^2}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^3_y v_2} = (-24 + 36cs^2 - 4\omega_2^2 - 36cs^2\omega_2 + 11v_2^2\omega_2^2 + 5cs^2\omega_2^2 - 60v_2^2\omega_2 + 60v_2^2 + 24\omega_2)\frac{\rho v_2}{6\omega_2^2}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^3_y v_2} = (-60\omega_1v_2^2\omega_2^2 - 8\omega_1^2\omega_2^2 - 36\omega_1cs^2\omega_2^2 + 18\omega_1cs^2\omega_2 + 54\omega_1v_2^2\omega_2 + 24\omega_1^2\omega_2 - 15\omega_2^2 + 27cs^2\omega_2^2 - 18\omega_1\omega_2 - 36\omega_1^2cs^2\omega_2 - 15\omega_1^2 - 60\omega_1^2v_2^2\omega_2 + 33\omega_1^2v_2^2 + 27\omega_1^2cs^2 + 33v_2^2\omega_2^2 + 22\omega_1^2v_2^2\omega_2^2 + 10\omega_1^2cs^2\omega_2^2 + 24\omega_1\omega_2^2)\frac{\rho v_2}{12\omega_1^2\omega_2^2}$

coefficient $C^{(2)}_{\mathrm{D}^4_x\rho}$ at $\frac{\partial^4 \rho}{\partial x_1^4}$:

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^4_x\rho} = (-\omega cs^4 + 24v_1^2cs^2 - 2cs^2 - 6v_1^2 + 3v_1^2\omega - 12v_1^2\omega cs^2 + 2cs^4 + \omega cs^2 - 3v_1^4\omega + 6v_1^4)\frac{v_2}{24\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^4_x\rho} = (-126cs^2v_1^2\omega_7\omega_4^2\omega_5^2 + 48cs^2\omega_7^2\omega_4\omega_5 + 24v_1^4\omega_7\omega_4^2\omega_5 - 96v_1^2\omega_7\omega_4\omega_5^2 - cs^4\omega_7^2\omega_4^2\omega_5^2 - 144cs^2v_1^2\omega_7^2\omega_4^2 + 24cs^4\omega_7^2\omega_5 + 24cs^2\omega_4\omega_5^2 - 96v_1^4\omega_7^2\omega_4\omega_5 - 24v_1^4\omega_4\omega_5^2 - 48v_1^2\omega_7^2\omega_5 + 3v_1^2\omega_7^2\omega_4^2\omega_5^2 + 48cs^4\omega_7\omega_4\omega_5^2 - 36v_1^2\omega_7^2\omega_4^2\omega_5 + 12cs^2\omega_7\omega_4^2\omega_5^2 - 432cs^2v_1^2\omega_7^2\omega_4\omega_5 - 216cs^2v_1^2\omega_7\omega_5^2 + 48v_1^2\omega_7\omega_4\omega_5 - 24cs^4\omega_4\omega_5^2 + 288cs^2v_1^2\omega_7^2\omega_4 - 24cs^2\omega_7^2\omega_5 + 14cs^4\omega_7^2\omega_4^2\omega_5 + 72cs^2v_1^2\omega_4^2\omega_5^2 + 48v_1^4\omega_7^2\omega_5 + 24v_1^2\omega_4\omega_5^2 + 72cs^2v_1^2\omega_7\omega_4^2\omega_5 - 30v_1^4\omega_7\omega_4^2\omega_5^2 - 48cs^4\omega_7^2\omega_4\omega_5 + 12cs^4\omega_4^2\omega_5^2 - 24v_1^2\omega_7\omega_4^2\omega_5 - 144cs^2v_1^2\omega_4\omega_5^2 + 24cs^4\omega_7^2\omega_4 - 12v_1^2\omega_4^2\omega_5^2 + 96v_1^4\omega_7\omega_4\omega_5^2 - 72v_1^2\omega_7^2\omega_4 + cs^2\omega_7^2\omega_4^2\omega_5^2 - 144cs^2v_1^2\omega_7\omega_4\omega_5 + 48v_1^2\omega_7\omega_5^2 + 96v_1^2\omega_7^2\omega_4\omega_5 - 36v_1^4\omega_7^2\omega_4^2 - 3v_1^4\omega_7^2\omega_4^2\omega_5^2 - 48cs^2\omega_7\omega_4\omega_5^2 + 150cs^2v_1^2\omega_7^2\omega_4^2\omega_5 - 24cs^4\omega_7\omega_5^2 + 12cs^2\omega_7^2\omega_4^2 - 12cs^2\omega_4^2\omega_5^2 + 36v_1^4\omega_7^2\omega_4^2\omega_5 - 12cs^2v_1^2\omega_7^2\omega_4^2\omega_5^2 - 24cs^2\omega_7^2\omega_4 + 216cs^2v_1^2\omega_7^2\omega_5 + 12v_1^4\omega_4^2\omega_5^2 - 12cs^4\omega_7\omega_4^2\omega_5^2 + 72v_1^4\omega_7^2\omega_4 - 48v_1^4\omega_7\omega_5^2 + 36v_1^2\omega_7^2\omega_4^2 - 48v_1^4\omega_7\omega_4\omega_5 + 432cs^2v_1^2\omega_7\omega_4\omega_5^2 - 14cs^2\omega_7^2\omega_4^2\omega_5 + 24cs^2\omega_7\omega_5^2 + 30v_1^2\omega_7\omega_4^2\omega_5^2 - 12cs^4\omega_7^2\omega_4^2)\frac{v_2}{24\omega_7^2\omega_4^2\omega_5^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^4_x\rho} = (12cs^4\omega_4^2\omega_5^2 + 24v_1^4\omega_7\omega_4^2\omega_5 + 12\omega_7^2cs^2\omega_4^2 + 72v_1^2cs^2\omega_4^2\omega_5^2 - 96v_1^2\omega_7\omega_4\omega_5^2 - 48\omega_7^2cs^4\omega_4\omega_5 + 288v_1^2\omega_7^2cs^2\omega_4 - 96v_1^4\omega_7^2\omega_4\omega_5 - 12\omega_7cs^4\omega_4^2\omega_5^2 - 24v_1^4\omega_4\omega_5^2 - 216v_1^2\omega_7cs^2\omega_5^2 - 48v_1^2\omega_7^2\omega_5 + 150v_1^2\omega_7^2cs^2\omega_4^2\omega_5 + 3v_1^2\omega_7^2\omega_4^2\omega_5^2 + 432v_1^2\omega_7cs^2\omega_4\omega_5^2 - 12v_1^2\omega_7^2cs^2\omega_4^2\omega_5^2 - 144v_1^2\omega_7cs^2\omega_4\omega_5 - 12cs^2\omega_4^2\omega_5^2 - 36v_1^2\omega_7^2\omega_4^2\omega_5 - 144v_1^2\omega_7^2cs^2\omega_4^2 + 48v_1^2\omega_7\omega_4\omega_5 + 48\omega_7^2cs^2\omega_4\omega_5 + 24\omega_7cs^2\omega_5^2 + 12\omega_7cs^2\omega_4^2\omega_5^2 + 48v_1^4\omega_7^2\omega_5 + 24\omega_7^2cs^4\omega_5 + 24v_1^2\omega_4\omega_5^2 - 24\omega_7^2cs^2\omega_4 - 30v_1^4\omega_7\omega_4^2\omega_5^2 - 24v_1^2\omega_7\omega_4^2\omega_5 - 14\omega_7^2cs^2\omega_4^2\omega_5 - 48\omega_7cs^2\omega_4\omega_5^2 + 216v_1^2\omega_7^2cs^2\omega_5 - 12v_1^2\omega_4^2\omega_5^2 + 96v_1^4\omega_7\omega_4\omega_5^2 - 72v_1^2\omega_7^2\omega_4 + 48v_1^2\omega_7\omega_5^2 + 96v_1^2\omega_7^2\omega_4\omega_5 - 12\omega_7^2cs^4\omega_4^2 - 36v_1^4\omega_7^2\omega_4^2 + 72v_1^2\omega_7cs^2\omega_4^2\omega_5 + 24cs^2\omega_4\omega_5^2 - \omega_7^2cs^4\omega_4^2\omega_5^2 - 3v_1^4\omega_7^2\omega_4^2\omega_5^2 + 36v_1^4\omega_7^2\omega_4^2\omega_5 + 14\omega_7^2cs^4\omega_4^2\omega_5 - 24\omega_7cs^4\omega_5^2 + 48\omega_7cs^4\omega_4\omega_5^2 - 432v_1^2\omega_7^2cs^2\omega_4\omega_5 - 24\omega_7^2cs^2\omega_5 + 12v_1^2\omega_4^2\omega_5^2 - 126v_1^2\omega_7cs^2\omega_4^2\omega_5^2 + 72v_1^4\omega_7^2\omega_4 + 24\omega_7^2cs^4\omega_4 - 48v_1^4\omega_7\omega_5^2 + 36v_1^2\omega_7^2\omega_4^2 - 24cs^4\omega_4\omega_5^2 - 48v_1^4\omega_7\omega_4\omega_5 + \omega_7^2cs^2\omega_4^2\omega_5^2 + 30v_1^2\omega_7\omega_4^2\omega_5^2 - 144v_1^2cs^2\omega_4\omega_5^2)\frac{v_2}{24\omega_7^2\omega_4^2\omega_5^2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^4_x\rho} = (-6v_1^2 - 2cs^2 + 24v_1^2cs^2 + cs^2\omega_5 + 3v_1^2\omega_5 - 3v_1^4\omega_5 + 2cs^4 - cs^4\omega_5 + 6v_1^4 - 12v_1^2cs^2\omega_5)\frac{v_2}{24\omega_5}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^4_x\rho} = (cs^2\omega_5 - 12cs^2v_1^2\omega_5 - 6v_1^2 + 2cs^4 + 24cs^2v_1^2 + 3v_1^2\omega_5 - 2cs^2 - cs^4\omega_5 - 3v_1^4\omega_5 + 6v_1^4)\frac{v_2}{24\omega_5}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^4_x\rho} = (-6v_1^2 - 3v_1^4\omega_1 + cs^2\omega_1 - 2cs^2 + 24v_1^2cs^2 + 2cs^4 + 3v_1^2\omega_1 - cs^4\omega_1 + 6v_1^4 - 12v_1^2cs^2\omega_1)\frac{v_2}{24\omega_1}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^4_x\rho} = (-12v_1^2\omega_1cs^2\omega_2 - 3v_1^2\omega_2 + 3v_1^2\omega_1\omega_2 + 3v_1^4\omega_1 + cs^4\omega_2 - \omega_1cs^2 + \omega_1cs^2\omega_2 + 12v_1^2cs^2\omega_2 - 3v_1^4\omega_1\omega_2 + \omega_1cs^4 + 3v_1^4\omega_2 - 3v_1^2\omega_1 - cs^2\omega_2 + 12v_1^2\omega_1cs^2 - \omega_1cs^4\omega_2)\frac{v_2}{24\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}^4_x v_1}$ **at** $\frac{\partial^4 v_1}{\partial x_1^4}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^4_x v_1} = (-4 + 6cs^2 + 10v_1^2 - 5v_1^2\omega + 2\omega - 3\omega cs^2)\frac{v_1\rho v_2}{12\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^4_x v_1} = (-120cs^2\omega_7^2\omega_4\omega_5 + 36\omega_7\omega_5^2 - 25\omega_7^2\omega_4^2\omega_5 + 168v_1^2\omega_7\omega_4\omega_5^2 + 12cs^2\omega_7\omega_4^2\omega_5 - 48cs^2\omega_4\omega_5^2 + 84v_1^2\omega_7^2\omega_5 - 48\omega_7^2\omega_4 + 24\omega_7\omega_4\omega_5 - 5v_1^2\omega_7^2\omega_4^2\omega_5^2 - 12\omega_4^2\omega_5^2 + 24\omega_7^2\omega_4^2 + 61v_1^2\omega_7^2\omega_4^2\omega_5 - 72\omega_7\omega_4\omega_5^2 - 33cs^2\omega_7\omega_4^2\omega_5^2 - 72v_1^2\omega_7\omega_4\omega_5 + 2\omega_7^2\omega_4^2\omega_5^2 + 60cs^2\omega_7^2\omega_5 - 48v_1^2\omega_4\omega_5^2 + 36v_1^2\omega_7\omega_4^2\omega_5 + 24v_1^2\omega_4^2\omega_5^2 - 36\omega_7^2\omega_5 + 120v_1^2\omega_7^2\omega_4 - 3cs^2\omega_7^2\omega_4^2\omega_5^2 - 84v_1^2\omega_7\omega_5^2 - 168v_1^2\omega_7^2\omega_4\omega_5 + 21\omega_7\omega_4^2\omega_5^2 + 120cs^2\omega_7\omega_4\omega_5^2 - 36cs^2\omega_7^2\omega_4^2 + 24cs^2\omega_4^2\omega_5^2 - 24cs^2\omega_7\omega_4\omega_5 + 72cs^2\omega_7^2\omega_4 + 24\omega_4\omega_5^2 - 12\omega_7\omega_4^2\omega_5 - 60v_1^2\omega_7^2\omega_4^2 + 39cs^2\omega_7^2\omega_4^2\omega_5 - 60cs^2\omega_7\omega_5^2 + 72\omega_7^2\omega_4\omega_5 - 51v_1^2\omega_7\omega_4^2\omega_5^2)\frac{v_1\rho v_2}{12\omega_7^2\omega_4^2\omega_5^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^4_x v_1} = (36\omega_7\omega_5^2 - 36\omega_7^2cs^2\omega_4^2 - 25\omega_7^2\omega_4^2\omega_5 + 168v_1^2\omega_7\omega_4\omega_5^2 + 12\omega_7cs^2\omega_4^2\omega_5 + 84v_1^2\omega_7^2\omega_5 - 48\omega_7^2\omega_4 + 24\omega_7\omega_4\omega_5 - 5v_1^2\omega_7^2\omega_4^2\omega_5^2 - 12\omega_4^2\omega_5^2 + 24\omega_7^2\omega_4^2 + 24cs^2\omega_4^2\omega_5^2 + 61v_1^2\omega_7^2\omega_4^2\omega_5 - 72\omega_7\omega_4\omega_5^2 - 72v_1^2\omega_7\omega_4\omega_5 + 2\omega_7^2\omega_4^2\omega_5^2 - 120\omega_7^2cs^2\omega_4\omega_5 - 60\omega_7cs^2\omega_5^2 - 33\omega_7cs^2\omega_4^2\omega_5^2 - 48v_1^2\omega_4\omega_5^2 + 72\omega_7^2cs^2\omega_4 + 36v_1^2\omega_7\omega_4^2\omega_5 + 39\omega_7^2cs^2\omega_4^2\omega_5 + 120\omega_7cs^2\omega_4\omega_5^2 + 24v_1^2\omega_4^2\omega_5^2 - 36\omega_7^2\omega_5 + 120v_1^2\omega_7^2\omega_4 - 84v_1^2\omega_7\omega_5^2 - 168v_1^2\omega_7^2\omega_4\omega_5 + 21\omega_7\omega_4^2\omega_5^2 - 48cs^2\omega_4\omega_5^2 + 60\omega_7^2cs^2\omega_5 + 24\omega_4\omega_5^2 - 12\omega_7\omega_4^2\omega_5 - 60v_1^2\omega_7^2\omega_4^2 - 3\omega_7^2cs^2\omega_4^2\omega_5^2 + 72\omega_7^2\omega_4\omega_5 - 51v_1^2\omega_7\omega_4^2\omega_5^2 - 24\omega_7cs^2\omega_4\omega_5)\frac{v_1\rho v_2}{12\omega_7^2\omega_4^2\omega_5^2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^4_x v_1} = (-4 + 10v_1^2 + 6cs^2 - 3cs^2\omega_5 - 5v_1^2\omega_5 + 2\omega_5)\frac{v_1\rho v_2}{12\omega_5}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^4_x v_1} = (-4 - 3cs^2\omega_5 + 10v_1^2 - 5v_1^2\omega_5 + 6cs^2 + 2\omega_5)\frac{v_1\rho v_2}{12\omega_5}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^4_x v_1} = (-4 + 10v_1^2 - 3cs^2\omega_1 + 6cs^2 + 2\omega_1 - 5v_1^2\omega_1)\frac{v_1\rho v_2}{12\omega_1}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^4_x v_1} = (5v_1^2\omega_2 - 5v_1^2\omega_1\omega_2 + 3\omega_1cs^2 - 3\omega_1cs^2\omega_2 + 2\omega_1\omega_2 - 2\omega_1 + 5v_1^2\omega_1 - 2\omega_2 + 3cs^2\omega_2)\frac{v_1\rho v_2}{12\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}^4_x v_2}$ **at** $\frac{\partial^4 v_2}{\partial x_1^4}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^4_x v_2} = (-72\omega cs^4 - 3v_1^2\omega^3 - 144v_1^2cs^2 - 24cs^2 + 72v_1^2 - 14\omega^2cs^2 + 42v_1^2\omega^2 - 108v_1^2\omega + \omega^3cs^2 + 216v_1^2\omega cs^2 - 42v_1^4\omega^2 - 84v_1^2\omega^2cs^2 + 3v_1^4\omega^3 - 3\omega^3cs^4 + 6v_1^2\omega^3cs^2 + 48cs^4 + 36\omega cs^2 + 30\omega^2cs^4 + 108v_1^4\omega - 72v_1^4)\frac{\rho}{24\omega^3}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^4_x v_2} = (-72v_1^2\omega_7\omega_4^2 - 72cs^2v_1^2\omega_7^2\omega_4^2 - 24cs^4\omega_7\omega_4^2 - 24v_1^4\omega_4^2 + 18v_1^2\omega_7\omega_4^3 - 24cs^2\omega_7\omega_4 + 12v_1^4\omega_4^3 + 6cs^4\omega_7\omega_4^3 - 48v_1^4\omega_7\omega_4 + 6cs^2v_1^2\omega_7^2\omega_4^3 - 24cs^2v_1^2\omega_4^2 + 72v_1^4\omega_7\omega_4^2 + 24cs^4\omega_7^2 + 24cs^2\omega_7\omega_4^2 + 156cs^2v_1^2\omega_7^2\omega_4 - 18v_1^4\omega_7\omega_4^3 + 24cs^4\omega_7\omega_4 + 12cs^2v_1^2\omega_4^3 - 6cs^2\omega_7\omega_4^3 + 48v_1^2\omega_7\omega_4 + 3v_1^4\omega_7^2\omega_4^3 - 24cs^2v_1^2\omega_7\omega_4 - 48cs^4\omega_7^2\omega_4 - 12v_1^2\omega_4^3 + cs^2\omega_7^2\omega_4^3 - 24v_1^2\omega_7^2\omega_4 - 96cs^2v_1^2\omega_7^2 - 24v_1^4\omega_7^2\omega_4^2 - 8cs^2\omega_7^2\omega_4^2 + 24v_1^2\omega_4^2 - 3v_1^2\omega_7^2\omega_4^3 + 12cs^2\omega_7^2\omega_4 - 3cs^4\omega_7^2\omega_4^3 - 12cs^2v_1^2\omega_7\omega_4^3 + 24v_1^4\omega_7^2\omega_4 + 24v_1^2\omega_7^2\omega_4^2 + 48cs^2v_1^2\omega_7\omega_4^2 + 24cs^4\omega_7^2\omega_4^2)\frac{\rho}{24\omega_7^2\omega_4^3}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^4_x v_2} = (-96v_1^2\omega_7^2cs^2 - 72v_1^2\omega_7\omega_4^2 - 8\omega_7^2cs^2\omega_4^2 + 24\omega_7cs^4\omega_4 - 24v_1^4\omega_4^2 + \omega_7^2cs^2\omega_4^3 + 18v_1^2\omega_7\omega_4^3 + 156v_1^2\omega_7^2cs^2\omega_4 + 12v_1^4\omega_4^3 - 48v_1^4\omega_7\omega_4 + 72v_1^4\omega_7\omega_4^2 + 6\omega_7cs^4\omega_4^3 - 72v_1^2\omega_7^2cs^2\omega_4^2 - 24\omega_7cs^4\omega_4^2 - 18v_1^4\omega_7\omega_4^3 + 24\omega_7^2cs^4 + 6v_1^2\omega_7^2cs^2\omega_4^3 + 48v_1^2\omega_7\omega_4 + 12\omega_7^2cs^2\omega_4 + 3v_1^4\omega_7^2\omega_4^3 - 3\omega_7^2cs^4\omega_4^3 - 12v_1^2\omega_4^3 + 48v_1^2\omega_7cs^2\omega_4^2 - 24v_1^2\omega_7^2\omega_4 + 24\omega_7^2cs^4\omega_4^2 - 24v_1^4\omega_7^2\omega_4^2 - 24\omega_7cs^2\omega_4 - 12v_1^2\omega_7cs^2\omega_4^3 + 24v_1^2\omega_4^2 + 24\omega_7cs^2\omega_4^2 - 3v_1^2\omega_7^2\omega_4^3 + 12v_1^2cs^2\omega_4^3 + 24v_1^4\omega_7^2\omega_4 - 48\omega_7^2cs^4\omega_4 + 24v_1^2\omega_7^2\omega_4^2 - 24v_1^2\omega_7cs^2\omega_4 - 6\omega_7cs^2\omega_4^3 - 24v_1^2cs^2\omega_4^2)\frac{\rho}{24\omega_7^2\omega_4^3}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^4_x v_2} = (6\omega_7\omega_4^3cs^4 - 72v_1^2\omega_7\omega_4^2 - 12v_1^2\omega_7^2\omega_4^2cs^2 + 24\omega_7^2cs^4 + \omega_7^2\omega_4^3cs^2 - 72v_1^4\omega_4^2 + 30v_1^2\omega_7\omega_4^3 + 36v_1^4\omega_4^3 + 72v_1^2\omega_7\omega_4cs^2 - 8\omega_7^2\omega_4^2cs^2 + 6v_1^2\omega_7^2\omega_4^3cs^2 + 72v_1^4\omega_7\omega_4^2 - 24\omega_7\omega_4^2cs^4 - 30v_1^4\omega_7\omega_4^3 - 24\omega_7\omega_4cs^2 - 48\omega_7^2\omega_4cs^4 + 3v_1^4\omega_7^2\omega_4^3 + 24\omega_7\omega_4^2cs^2 - 72v_1^2\omega_7\omega_4^3cs^2 - 36v_1^2\omega_4^3 + 24\omega_7^2\omega_4^2cs^4 + 12\omega_7^2\omega_4cs^2 - 12v_1^4\omega_7^2\omega_4^2 - 216v_1^2\omega_4^2cs^2 + 24\omega_7\omega_4cs^4 + 72v_1^2\omega_4^2 - 3v_1^2\omega_7^2\omega_4^3 - 3\omega_7^2\omega_4^3cs^4 + 144v_1^2\omega_7\omega_4^2cs^2 - 6\omega_7\omega_4^3cs^2 + 12v_1^2\omega_7^2\omega_4^2 + 108v_1^2\omega_4^3cs^2 - 36v_1^2\omega_7^2\omega_4cs^2)\frac{\rho}{24\omega_7^2\omega_4^3}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^4_x v_2} = (-8cs^2\omega_7^2\omega_4^2 - 72v_1^2\omega_7\omega_4^2 - 36cs^2v_1^2\omega_7^2\omega_4 - 72v_1^2\omega_4^2 + 30v_1^2\omega_7\omega_4^3 + cs^2\omega_7^2\omega_4^3 + 36v_1^4\omega_4^3 - 48cs^4\omega_7^2\omega_4 + 24cs^4\omega_7^2\omega_4^2 + 6cs^2v_1^2\omega_7^2\omega_4^3 + 72v_1^4\omega_7\omega_4^2 - 30v_1^4\omega_7\omega_4^3 - 12cs^2v_1^2\omega_7^2\omega_4^2 - 3cs^4\omega_7^2\omega_4^3 + 12cs^2\omega_7^2\omega_4 + 3v_1^4\omega_7^2\omega_4^3 + 24cs^4\omega_7^2 + 6cs^4\omega_7\omega_4^3 + 144cs^2v_1^2\omega_7\omega_4^2 - 36v_1^2\omega_4^3 - 24cs^2\omega_7\omega_4 - 72cs^2v_1^2\omega_7\omega_4^3 - 24cs^4\omega_7\omega_4^2 - 12v_1^4\omega_7^2\omega_4^2 + 72v_1^2\omega_4^2 - 3v_1^2\omega_7^2\omega_4^3 - 6cs^2\omega_7\omega_4^3 + 108cs^2v_1^2\omega_4^3 + 24cs^4\omega_7\omega_4 + 24cs^2\omega_7\omega_4^2 + 12v_1^2\omega_7^2\omega_4^2 - 216cs^2v_1^2\omega_4^2 + 72cs^2v_1^2\omega_7\omega_4)\frac{\rho}{24\omega_7^2\omega_4^3}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^4_x v_2} = (30\omega_3^3v_1^2\omega_4 + 24\omega_3^2cs^2\omega_4 - 216\omega_3^2v_1^2cs^2 + 72\omega_3^2v_1^4\omega_4 - 72\omega_3^2v_1^4 - 48\omega_3cs^4\omega_4^2 + 6\omega_3^3cs^4\omega_4 + 144\omega_3^2v_1^2cs^2\omega_4 + 6\omega_3^3v_1^2cs^2\omega_4^2 + 36\omega_3^3v_1^4 - 72\omega_3^3v_1^2cs^2\omega_4 - 12\omega_3^2v_1^2cs^2\omega_4^2 - 12\omega_3^2v_1^4\omega_4^2 + 24\omega_3cs^4\omega_4 - 3\omega_3^3cs^4\omega_4^2 - 3\omega_3^3v_1^2\omega_4^2 - 8\omega_3^2cs^2\omega_4^2 - 36\omega_3^3v_1^2 + 24cs^4\omega_4^2 - 30\omega_3^3v_1^4\omega_4 - 24\omega_3^2cs^4\omega_4 - 72\omega_3^2v_1^2\omega_4 + 12\omega_3cs^2\omega_4^2 + 72\omega_3v_1^2cs^2\omega_4 + 108\omega_3^3v_1^2cs^2 - 6\omega_3^3cs^2\omega_4 + 12\omega_3^2v_1^2\omega_4^2 + 72\omega_3^2v_1^2 - 24\omega_3cs^2\omega_4 - 36\omega_3v_1^2cs^2\omega_4^2 + \omega_3^3cs^2\omega_4^2 + 3\omega_3^3v_1^4\omega_4^2 + 24\omega_3^2cs^4\omega_4^2)\frac{\rho}{24\omega_3^3\omega_4^2}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^4_x v_2} =$
$(24\omega_3\omega_1^2cs^2 - 36\omega_3^2v_1^2\omega_1cs^2 + 30\omega_3v_1^2\omega_1^3 + 36v_1^4\omega_1^3 + 24\omega_3^2\omega_1^2cs^4 - 216v_1^2\omega_1^2cs^2 - 72\omega_3v_1^2\omega_1^3cs^2 + 12\omega_3^2\omega_1cs^2 - 72\omega_3v_1^2\omega_1^2 + 24\omega_3\omega_1cs^4 - 72v_1^4\omega_1^2 +$

$108v_1^2\omega_1^3cs^2 - 3\omega_3^2\omega_1^3cs^4 - 12\omega_3^2v_1^4\omega_1^2 - 6\omega_3\omega_1^3cs^2 + 3\omega_3^2v_1^4\omega_1^3 + 144\omega_3v_1^2\omega_1^2cs^2 + 6\omega_3\omega_1^3cs^4 + 72\omega_3v_1^4\omega_1^2 + \omega_3^2\omega_1^3cs^2 + 72v_1^2\omega_1^2 + 72\omega_3v_1^2\omega_1cs^2 - 30\omega_3v_1^4\omega_1^3 - 36v_1^2\omega_1^3 + 6\omega_3^2v_1^2\omega_1^3cs^2 - 3\omega_3^2v_1^2\omega_1^3 - 8\omega_3^2\omega_1^2cs^2 - 24\omega_3\omega_1^2cs^4 - 24\omega_3\omega_1cs^2 + 12\omega_3^2v_1^2\omega_1^2 - 12\omega_3^2v_1^2\omega_1^2cs^2 + 24\omega_3^2cs^4 - 48\omega_3^2\omega_1cs^4)\frac{\rho}{24\omega_3^2\omega_1^3}$

coefficient $C^{(2)}_{\mathrm{D}_x^3\mathrm{D}_y\rho}$ **at** $\frac{\partial^4\rho}{\partial x_1^3\partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = (24 - \omega^3 + v_1^2\omega^3 - 72cs^2 - 24v_1^2 - 42\omega^2cs^2 + 14\omega^2 - 14v_1^2\omega^2 + 36v_1^2\omega + 3\omega^3cs^2 - 36\omega + 108\omega cs^2)\frac{v_1cs^2}{12\omega^3}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = (48\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 - 12\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 + 36\omega_6cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 - 36\omega_9\omega_6cs^2\omega_7^2\omega_4^2v_2^2\omega_5 + 12\omega_6\omega_7^2\omega_4^3v_2^2\omega_5^2 - 72\omega_9\omega_6cs^2\omega_7\omega_4v_2^2\omega_8\omega_5^2 + 6\omega_6cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_4^2v_2^2\omega_8\omega_5^2 + 12\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 + 54\omega_9\omega_6cs^4\omega_7^2\omega_4^2\omega_8\omega_5 - 12\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 + 6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 18\omega_9\omega_6cs^2\omega_7^2\omega_4^2\omega_8\omega_5 - 18\omega_6cs^4\omega_7\omega_4^3\omega_8\omega_5^2 + 6\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 + 36\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 + 36\omega_9\omega_6cs^2\omega_7^2\omega_4^2v_2^2\omega_8 + 12\omega_6\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 - 5\omega_9\omega_6cs^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5 + 12\omega_9cs^2\omega_7^2\omega_4^3\omega_5 + 24\omega_9v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 + 12\omega_6cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_6cs^4\omega_7\omega_4\omega_8\omega_5^2 - 12\omega_7^2\omega_4^3v_2^2\omega_5^2 + 12\omega_9\omega_6cs^2v_1^2\omega_7^2\omega_4\omega_8\omega_5^2 + 9\omega_9\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 24\omega_9\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 + 12\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5 - 36\omega_6cs^4\omega_7^2\omega_4^2\omega_8\omega_5^2 - 36\omega_6cs^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 + 15\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 + 36\omega_9\omega_6cs^4\omega_7^2\omega_4^3\omega_5 + 36\omega_6cs^4\omega_7^2\omega_4^2\omega_5^2 + 36\omega_6cs^2\omega_7^2\omega_4^2v_2^2\omega_5^2 + 6\omega_9\omega_6cs^2v_1^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6cs^2\omega_7\omega_4\omega_8\omega_5^2 - 6\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8\omega_5 + 12\omega_9\omega_6cs^4\omega_4^2\omega_8\omega_5^2 + 6\omega_9\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 36\omega_9\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 + 72\omega_9\omega_6cs^2\omega_7^2\omega_4v_2^2\omega_8\omega_5 + 3\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 6\omega_9cs^2v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 12\omega_9\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_5 + 36cs^4\omega_7^2\omega_4^3\omega_5^2 - 6\omega_6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 + \omega_9\omega_6cs^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 15\omega_9\omega_6cs^4\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_5 - 6\omega_6cs^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_6cs^2v_1^2\omega_7^2\omega_4\omega_8\omega_5 + 18\omega_6cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 48\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 - 36\omega_6cs^4\omega_7^2\omega_4^3\omega_5^2 - 24\omega_9v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 - 6\omega_9\omega_6\omega_4^3v_2^2\omega_8\omega_5^2 + 12\omega_9\omega_6cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 36\omega_9\omega_6cs^4\omega_7^2\omega_4^2\omega_5 + 24\omega_9\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 - 15\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 + 12\omega_9\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_8 - 18\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - 9\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 12\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5 + 6\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_8 - 6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 + 12\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_5^2 - 6cs^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 12\omega_6cs^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 6\omega_6\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - 6\omega_9\omega_6cs^2\omega_4^3\omega_8\omega_5^2 + 18\omega_9\omega_6cs^2v_1^2\omega_7\omega_4^2\omega_8\omega_5^2 - 60\omega_9\omega_6cs^4\omega_7^2\omega_4^2\omega_8\omega_5^2 + 18\omega_9\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 - 36\omega_9cs^2\omega_7^2\omega_4^3v_2^2\omega_5 + 18\omega_9\omega_6cs^2\omega_4^3v_2^2\omega_8\omega_5^2 - 24\omega_9\omega_6\omega_7^2\omega_4v_2^2\omega_8\omega_5^2 + 18\omega_6cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2 + 18\omega_9cs^4\omega_7^2\omega_4^3\omega_8\omega_5 - 12\omega_9\omega_6cs^2v_1^2\omega_4^2\omega_8\omega_5^2 - 36\omega_6cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2 + 18\omega_9cs^4\omega_7^2\omega_4^3\omega_8\omega_5 - 12\omega_6v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 27\omega_9\omega_6cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 + 36\omega_9\omega_6cs^2\omega_7^2\omega_4^3v_2^2\omega_5 - 12\omega_6cs^2\omega_7^2\omega_4^2\omega_5^2 - 12\omega_9\omega_6cs^2v_1^2\omega_7\omega_4\omega_8\omega_5^2 + 156\omega_9\omega_6cs^4\omega_7^2\omega_4\omega_8\omega_5^2 - 15\omega_9\omega_6cs^4\omega_7^2\omega_4^3\omega_8\omega_5 + 72\omega_9cs^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 - 12\omega_9\omega_6cs^2\omega_7^2\omega_4^3\omega_5 - 12\omega_6cs^2\omega_7\omega_4^2\omega_8\omega_5^2 - 36\omega_9\omega_6cs^4\omega_7^2\omega_4\omega_8\omega_5 - 12\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_5^2 + 6\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_8 - 12cs^2\omega_7^2\omega_4^3\omega_5^2 - 12\omega_6cs^2v_1^2\omega_7^2\omega_4^3\omega_5^2 + 24\omega_9\omega_6\omega_7\omega_4v_2^2\omega_8\omega_5^2 + 3\omega_9\omega_6cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2 - 12\omega_9cs^2v_1^2\omega_7^2\omega_4^3\omega_5 - 3\omega_9\omega_6cs^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_7^2\omega_4^3v_2^2\omega_5 + 6\omega_9\omega_6v_1^2\omega_4^3v_2^2\omega_8\omega_5^2 + 6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6cs^2\omega_4^2\omega_8\omega_5^2 + 6\omega_6cs^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 12\omega_9v_1^2\omega_7^2\omega_4^3\omega_5^2 + 36cs^2\omega_7^2\omega_4^3v_2^2\omega_5^2 + 12\omega_9\omega_6cs^2\omega_7^2\omega_4\omega_8\omega_5 - 18\omega_9cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 + 24\omega_9\omega_6v_1^2\omega_7^2\omega_4v_2^2\omega_8\omega_5 - 6\omega_9\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8 - 18cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2 - 108\omega_9\omega_6cs^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 - \omega_9\omega_6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_6cs^2v_1^2\omega_7\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_5 - 42\omega_9\omega_6cs^4\omega_7\omega_4^2\omega_8\omega_5^2 - 12\omega_9\omega_6cs^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_6cs^2\omega_7^2\omega_4^2\omega_5 - 36\omega_9\omega_6cs^2\omega_4^2v_2^2\omega_8\omega_5^2 + 12\omega_6cs^2\omega_7^2\omega_4^3\omega_5^2 - 18cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 96\omega_9\omega_6cs^4\omega_7^2\omega_8\omega_5^2 - 36\omega_9\omega_6cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5 - 18\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_8\omega_5^2 - 6\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - 45\omega_9\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - 6\omega_9\omega_6cs^4\omega_4^3\omega_8\omega_5^2 - 72\omega_9cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 + 12\omega_9\omega_6cs^2v_1^2\omega_7^2\omega_4^3\omega_5 + 12\omega_9\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_5)\frac{v_1}{12\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = (48\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 + 36\omega_7^2cs^2\omega_4^3v_2^2\omega_5^2 - 12\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_7^2cs^2\omega_4\omega_8\omega_5 - 42\omega_9\omega_6\omega_7cs^4\omega_4^2\omega_8\omega_5^2 - 72\omega_9\omega_7cs^2\omega_4^2v_2^2\omega_8\omega_5^2 + 12\omega_6\omega_7^2\omega_4^3v_2^2\omega_5^2 + 12\omega_9\omega_6\omega_4^2v_2^2\omega_8\omega_5^2 + 12\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - \omega_9\omega_6\omega_7^2cs^2\omega_4^3\omega_8\omega_5^2 - 36\omega_9\omega_7^2cs^4\omega_4^3\omega_5 - 45\omega_9\omega_6\omega_7cs^2\omega_4^3v_2^2\omega_8\omega_5^2 - 12\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 + 72\omega_9\omega_7^2cs^2\omega_4^2v_2^2\omega_8\omega_5 - 36\omega_9\omega_6\omega_7cs^2\omega_4^2v_2^2\omega_8\omega_5 + 6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 + 27\omega_9\omega_6\omega_7^2cs^2\omega_4^3v_2^2\omega_8\omega_5 - 12\omega_9\omega_6v_1^2\omega_7cs^2\omega_4\omega_8\omega_5^2 + 6\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5 + 6\omega_7^2cs^2\omega_4^3\omega_8\omega_5^2 + 36\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 + 12\omega_6v_1^2\omega_7^2cs^2\omega_4^2\omega_5^2 + 12v_1^2\omega_7^2cs^2\omega_4^3\omega_5^2 - 12\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4^2\omega_5 + 12\omega_6\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2 + 24\omega_9v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 - 5\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4^3\omega_8\omega_5 - 12\omega_7^2\omega_4^3v_2^2\omega_5^2 + 9\omega_9\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 24\omega_9\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 + 12\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 + 12\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4\omega_8\omega_5^2 + 15\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - 60\omega_9\omega_6\omega_7^2cs^4\omega_4^2\omega_8\omega_5^2 + 3\omega_9\omega_6\omega_7cs^2\omega_4^3\omega_8\omega_5^2 - 6\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8\omega_5 - 18\omega_7^2cs^2\omega_4^3v_2^2\omega_8\omega_5^2 + 6\omega_9\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 36\omega_9\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 - 18\omega_9\omega_6\omega_7^2cs^2\omega_4^3v_2^2\omega_8 + 12\omega_9\omega_6\omega_7cs^2\omega_4\omega_8\omega_5^2 + 6\omega_9v_1^2\omega_7^2cs^2\omega_4^3\omega_8\omega_5 - 12\omega_6v_1^2\omega_7^2cs^2\omega_4^3\omega_5^2 + 54\omega_9\omega_6\omega_7^2cs^4\omega_4^2\omega_8\omega_5 - 6\omega_6\omega_7^2cs^2\omega_4^3\omega_8\omega_5^2 - 6\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 12\omega_9\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_5 - 6\omega_9\omega_7^2cs^2\omega_4^3\omega_8\omega_5 + 36\omega_6\omega_7cs^4\omega_4^2\omega_8\omega_5^2 - 12\omega_9v_1^2\omega_7^2cs^2\omega_4^3\omega_5 + 12\omega_6v_1^2\omega_7cs^2\omega_4^2\omega_8\omega_5^2 - 6\omega_6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 96\omega_9\omega_6\omega_7^2cs^4\omega_8\omega_5^2 + 12\omega_9\omega_7^2cs^2\omega_4^3\omega_5 - 12\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_5 + 12\omega_9\omega_6cs^4\omega_4^2\omega_8\omega_5^2 + \omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4^3\omega_8\omega_5^2 - 36\omega_9\omega_7^2cs^2\omega_4^3v_2^2\omega_5 - 36\omega_6\omega_7^2cs^2\omega_4^3v_2^2\omega_5^2 - 12\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4\omega_8\omega_5 - 48\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 + 144\omega_9\omega_6\omega_7cs^2\omega_4^2v_2^2\omega_8\omega_5^2 - 24\omega_9v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 - 6\omega_9\omega_6\omega_4^3v_2^2\omega_8\omega_5^2 + 36\omega_9\omega_6\omega_7^2cs^2\omega_4^3v_2^2\omega_5 - 3\omega_9\omega_6v_1^2\omega_7cs^2\omega_4^3\omega_8\omega_5^2 + 36\omega_9\omega_7cs^2\omega_4^3v_2^2\omega_8\omega_5^2 + 24\omega_9\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 - 15\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_8 - 9\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 12\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5 + 72\omega_9\omega_6cs^2\omega_7^2\omega_4v_2^2\omega_8\omega_5 + 3\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 6\omega_9cs^2v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 12\omega_9\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_5 + 36cs^4\omega_7^2\omega_4^3\omega_5^2 - 6\omega_6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 + \omega_9\omega_6cs^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 15\omega_9\omega_6cs^4\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_5 - 6\omega_6cs^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_6cs^2v_1^2\omega_7^2\omega_4\omega_8\omega_5 + 18\omega_6cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2 - 48\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5^2 - 36\omega_6cs^4\omega_7^2\omega_4^3\omega_5^2 - 24\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5 + 12\omega_9\omega_6cs^2\omega_4^2\omega_8\omega_5^2 - 12\omega_6\omega_7^2cs^2\omega_4^2\omega_5^2 - 6\omega_9\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8 - 12\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4^2\omega_8\omega_5^2 - 6\omega_9\omega_6cs^4\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_5 + 36\omega_7^2cs^4\omega_4^3\omega_5^2 + 72\omega_9\omega_6\omega_7^2cs^2\omega_4v_2^2\omega_8\omega_5 + 36\omega_6\omega_7^2cs^2\omega_4^2v_2^2\omega_5^2 - 6\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2 - 15\omega_9\omega_6\omega_7^2cs^4\omega_4^3\omega_8\omega_5 + 12\omega_6\omega_7^2cs^2\omega_4^2\omega_8\omega_5^2 + 18\omega_6\omega_7^2cs^2\omega_4^3v_2^2\omega_8\omega_5^2 + 36\omega_9\omega_6\omega_7^2cs^2\omega_4^2v_2^2\omega_8 - 6\omega_6v_1^2\omega_7cs^2\omega_4^3\omega_8\omega_5^2 + 156\omega_9\omega_6\omega_7^2cs^4\omega_4\omega_8\omega_5^2 - 72\omega_9\omega_6\omega_7cs^2\omega_4v_2^2\omega_8\omega_5^2 + 12\omega_9\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_5 - 18\omega_6\omega_7cs^4\omega_4^3\omega_8\omega_5^2 + 36\omega_6\omega_7cs^2\omega_4^2v_2^2\omega_8\omega_5^2)\frac{v_1}{12\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2}$

$$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = (18\omega_9\omega_6 v_1^2\omega_7\omega_4\omega_8\omega_5 + 12\omega_9\omega_6\omega_4\omega_8\omega_5 + 12\omega_6\omega_7^2\omega_4^2\omega_5 + 12\omega_6\omega_7^2\omega_4\omega_8\omega_5 - 12\omega_7^2\omega_4^2\omega_5 + 36\omega_7^2\omega_4^2 cs^2\omega_5 + 6\omega_6 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5 - 36\omega_6\omega_7^2\omega_4\omega_8 cs^2\omega_5 - 12\omega_9\omega_6 v_1^2\omega_7^2\omega_4 + 6\omega_9\omega_6 v_1^2\omega_4^2\omega_8\omega_5 - 12\omega_9 v_1^2\omega_7^2\omega_4^2 - 36\omega_9\omega_6\omega_7^2\omega_4 cs^2 + 36\omega_6\omega_7\omega_4\omega_8 cs^2\omega_5 - 36\omega_9\omega_6\omega_7^2\omega_8 cs^2 + 18\omega_9\omega_7^2\omega_4^2\omega_8 cs^2 + 12\omega_9\omega_6\omega_7^2\omega_4\omega_8\omega_5 - 36\omega_6\omega_7^2\omega_4^2 cs^2\omega_5 - 36\omega_9\omega_6\omega_4\omega_8 cs^2\omega_5 - 6v_1^2\omega_7^2\omega_4^2\omega_8\omega_5 + 6\omega_6\omega_7\omega_4^2\omega_8\omega_5 + 12v_1^2\omega_7^2\omega_4^2\omega_5 + 12\omega_6 v_1^2\omega_7\omega_4\omega_8\omega_5 - 36\omega_9\omega_6\omega_7^2\omega_4\omega_8 cs^2\omega_5 + \omega_9\omega_6 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5 - 18\omega_9\omega_6\omega_7^2\omega_4\omega_8 - 36\omega_9\omega_6\omega_7\omega_8 cs^2\omega_5 + 54\omega_9\omega_6\omega_7^2\omega_4\omega_8 cs^2 - 5\omega_9\omega_6 v_1^2\omega_7^2\omega_4^2\omega_8 - 12\omega_6 v_1^2\omega_7^2\omega_4^2\omega_5 + 12\omega_9\omega_6 v_1^2\omega_7^2\omega_4^2 - 12\omega_9\omega_6 v_1^2\omega_7\omega_8\omega_5 + 3\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5 + 54\omega_9\omega_6\omega_7^2\omega_4\omega_8 cs^2 - 6\omega_6 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5 + 18\omega_6\omega_7^2\omega_4^2\omega_8 cs^2\omega_5 - 12\omega_9\omega_6\omega_7^2\omega_4^2 - 12\omega_6\omega_7\omega_4\omega_8\omega_5 - 36\omega_9\omega_7^2\omega_4^2 cs^2 - 12\omega_9\omega_6 v_1^2\omega_7^2\omega_8 - 12\omega_9\omega_6 v_1^2\omega_7^2\omega_4\omega_8\omega_5 + 12\omega_9\omega_7^2\omega_4^2 - 15\omega_9\omega_6\omega_7^2\omega_4^2\omega_8 cs^2 + 18\omega_9\omega_6\omega_4^2\omega_8 cs^2\omega_5 - 18\omega_9\omega_6\omega_7\omega_4\omega_8\omega_5 + 12\omega_9\omega_6\omega_7\omega_8\omega_5 + 5\omega_9\omega_6\omega_7^2\omega_4^2\omega_8 + 12\omega_9\omega_6 v_1^2\omega_7^2\omega_8\omega_5 - 18\omega_6\omega_7\omega_4^2\omega_8 cs^2\omega_5 + 36\omega_9\omega_6\omega_7^2\omega_4^2 cs^2 - 6\omega_9\omega_6\omega_4^2\omega_8\omega_5 + 3\omega_9\omega_6\omega_7^2\omega_4^2\omega_8 cs^2\omega_5 - 3\omega_9\omega_6 v_1^2\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_9\omega_6 v_1^2\omega_4\omega_8\omega_5 - 12\omega_6 v_1^2\omega_7^2\omega_4\omega_8\omega_5 - 6\omega_6\omega_7^2\omega_4^2\omega_8\omega_5 - 18\omega_7^2\omega_4^2\omega_8 cs^2\omega_5 - 12\omega_6\omega_7^2\omega_4\omega_5 + 6\omega_7^2\omega_4^2\omega_8\omega_5 + 12\omega_9\omega_6\omega_7^2\omega_4 - 9\omega_9\omega_6\omega_7\omega_4^2\omega_8 cs^2\omega_5 + 36\omega_9\omega_6\omega_7^2\omega_8 cs^2\omega_5 - \omega_9\omega_6\omega_7^2\omega_4^2\omega_8\omega_5 + 36\omega_6\omega_7^2\omega_4 cs^2\omega_5 - 6\omega_9\omega_7^2\omega_4^2\omega_8 + 6\omega_9 v_1^2\omega_7^2\omega_4^2\omega_8)\frac{v_1 cs^2}{12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8\omega_5}$$

$$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = (18\omega_9\omega_6 v_1^2\omega_7\omega_4\omega_8\omega_5 + 12\omega_9\omega_6\omega_4\omega_8\omega_5 + 12\omega_6\omega_7^2\omega_4^2\omega_5 - 15\omega_9 cs^2\omega_6\omega_7^2\omega_4^2\omega_8 - 36 cs^2\omega_6\omega_7^2\omega_4^2\omega_5 - 9\omega_9 cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5 + 12\omega_6\omega_7^2\omega_4\omega_8\omega_5 - 12\omega_7^2\omega_4^2\omega_5 - 36 cs^2\omega_6\omega_7^2\omega_4\omega_8\omega_5 - 36\omega_9 cs^2\omega_6\omega_7\omega_8\omega_5 + 6\omega_6 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5 - 12\omega_9\omega_6 v_1^2\omega_7^2\omega_4 + 6\omega_9\omega_6 v_1^2\omega_4^2\omega_8\omega_5 - 12\omega_9 v_1^2\omega_7^2\omega_4^2 + 18\omega_9 cs^2\omega_7^2\omega_4^2\omega_8 - 36\omega_9 cs^2\omega_6\omega_7^2\omega_4 + 12\omega_9\omega_6\omega_7^2\omega_4\omega_8\omega_5 - 6v_1^2\omega_7^2\omega_4^2\omega_8\omega_5 + 6\omega_6\omega_7\omega_4^2\omega_8\omega_5 - 18 cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5 + 12v_1^2\omega_7^2\omega_4^2\omega_5 + 12\omega_6 v_1^2\omega_7\omega_4\omega_8\omega_5 + \omega_9\omega_6 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5 - 18\omega_9\omega_6\omega_7^2\omega_4\omega_8 + 36\omega_9 cs^2\omega_6\omega_7^2\omega_4^2 - 36\omega_9 cs^2\omega_6\omega_7^2\omega_4\omega_8\omega_5 - 12\omega_9\omega_6\omega_7^2\omega_8\omega_5 + 3\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5 - 5\omega_9\omega_6 v_1^2\omega_7^2\omega_4^2\omega_8 - 12\omega_6 v_1^2\omega_7^2\omega_4^2\omega_5 + 12\omega_9\omega_6 v_1^2\omega_7^2\omega_4^2 - 12\omega_9\omega_6 v_1^2\omega_7\omega_8\omega_5 + 12\omega_9\omega_6\omega_7^2\omega_8 + 18\omega_9 cs^2\omega_6\omega_4^2\omega_8\omega_5 + 12\omega_6 v_1^2\omega_7^2\omega_4^2\omega_5 + 18\omega_9\omega_6 v_1^2\omega_7^2\omega_4\omega_8 - 6\omega_6 v_1^2\omega_7\omega_4^2\omega_8\omega_5 - 12\omega_9\omega_6\omega_7^2\omega_4^2 - 12\omega_6\omega_7\omega_4\omega_8\omega_5 + 36 cs^2\omega_6\omega_7\omega_4\omega_8\omega_5 + 3\omega_9 cs^2\omega_6\omega_7^2\omega_4^2\omega_8\omega_5 + 36 cs^2\omega_7^2\omega_4^2\omega_5 - 12\omega_9\omega_6 v_1^2\omega_7^2\omega_8 - 12\omega_9\omega_6 v_1^2\omega_7^2\omega_4\omega_8\omega_5 + 12\omega_9\omega_7^2\omega_4^2 - 36\omega_9 cs^2\omega_6\omega_7^2\omega_8 - 18\omega_9\omega_6\omega_7\omega_4\omega_8\omega_5 + 12\omega_9\omega_6\omega_7\omega_8\omega_5 + 5\omega_9\omega_6\omega_7^2\omega_4^2\omega_8 - 36\omega_9 cs^2\omega_6\omega_4\omega_8\omega_5 + 12\omega_9\omega_6 v_1^2\omega_7^2\omega_8\omega_5 + 54\omega_9 cs^2\omega_6\omega_7\omega_4\omega_8\omega_5 - 6\omega_9\omega_6\omega_4^2\omega_8\omega_5 - 3\omega_9\omega_6 v_1^2\omega_7\omega_4^2\omega_8\omega_5 - 36\omega_9 cs^2\omega_7^2\omega_4^2 - 12\omega_9\omega_6 v_1^2\omega_4\omega_8\omega_5 + 36\omega_9 cs^2\omega_6\omega_7^2\omega_8\omega_5 - 12\omega_6 v_1^2\omega_7^2\omega_4\omega_8\omega_5 - 6\omega_6\omega_7^2\omega_4^2\omega_8\omega_5 + 18 cs^2\omega_6\omega_7^2\omega_4^2\omega_8\omega_5 - 12\omega_6\omega_7^2\omega_4\omega_5 + 36 cs^2\omega_6\omega_7^2\omega_4\omega_5 + 54\omega_9 cs^2\omega_6\omega_7^2\omega_4\omega_8 + 6\omega_7^2\omega_4^2\omega_8\omega_5 - 18 cs^2\omega_7^2\omega_4^2\omega_8\omega_5 + 12\omega_9\omega_6\omega_7^2\omega_4 - \omega_9\omega_6\omega_7^2\omega_4^2\omega_8\omega_5 - 6\omega_9\omega_7^2\omega_4^2\omega_8 + 6\omega_9 v_1^2\omega_7^2\omega_4^2\omega_8)\frac{cs^2 v_1}{12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8\omega_5}$$

$$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = (-9\omega_3^2 cs^2\omega_4\omega_1 - 6\omega_3^2\omega_1 - 36 cs^2\omega_4^2 - 12\omega_3 v_1^2\omega_4^2\omega_1 - 18\omega_3^2 cs^2\omega_4 + 6\omega_3 v_1^2\omega_4^2 + 36 cs^2\omega_4^2\omega_1 + 12\omega_4\omega_1 + 6\omega_3^2\omega_4 + 18\omega_3^2 cs^2\omega_1 - \omega_3^2\omega_4^2 - 12\omega_3 v_1^2\omega_1 + 3\omega_3^2\omega_4\omega_1 + 12 v_1^2\omega_4^2\omega_1 + 12\omega_3\omega_4^2\omega_1 - 3\omega_3^2 v_1^2\omega_4\omega_1 + 3\omega_3^2 cs^2\omega_4^2 + 12\omega_3 v_1^2\omega_4 - 36\omega_3 cs^2\omega_4^2\omega_1 - 12 v_1^2\omega_4\omega_1 - 18\omega_3\omega_4\omega_1 + \omega_3^2 v_1^2\omega_4^2\omega_1 + 6\omega_3^2 v_1^2\omega_1 + 54\omega_3 cs^2\omega_4\omega_1 - 6\omega_3^2 v_1^2\omega_4 - 6\omega_3\omega_4^2 + 18\omega_3 cs^2\omega_4^2 - \omega_3^2\omega_4^2\omega_1 - 12 v_1^2\omega_4^2 + 12\omega_4^2 + \omega_3^2 v_1^2\omega_4^2 - 12\omega_3\omega_4 + 36\omega_3 cs^2\omega_4 - 12\omega_4^2\omega_1 - 36\omega_3 cs^2\omega_1 + 12\omega_3\omega_1 + 3\omega_3^2 cs^2\omega_4^2\omega_1 + 18\omega_3 v_1^2\omega_4\omega_1 - 36 cs^2\omega_4\omega_1)\frac{v_1 cs^2}{12\omega_3^2\omega_4^2\omega_1}$$

$$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x^3\mathrm{D}_y\rho} = (72\omega_3^2\omega_1^3 cs^4\omega_2^2 + 3\omega_3^2\omega_1^2 v_2^2\omega_3^2 + 126\omega_3\omega_1^2 cs^4\omega_2^2 - 46\omega_3^2 v_1^2\omega_1^3\omega_2^2 + 6\omega_3^2\omega_1^2\omega_2 - 12\omega_3^2\omega_1^2 cs^2\omega_2^2 + 6\omega_3\omega_1^3 cs^2\omega_2^2 + 6\omega_3^2\omega_1^3 cs^4\omega_2^2 + 12 v_1^2\omega_1^3 cs^2\omega_2^2 - 90\omega_3^2 v_1^4\omega_1^3\omega_2 + 72\omega_3\omega_1^2 cs^4\omega_2^2 - 39\omega_3^2 v_1^4\omega_1^2\omega_2^2 + 51\omega_3^2 v_1^2\omega_2^2 + 3\omega_3^2\omega_1^3 v_2^4\omega_2^2 + 81\omega_3^2\omega_1^2 cs^2\omega_2^2 + 18\omega_3\omega_1^3 cs^2\omega_2^2 + 141\omega_3^2 v_1^2\omega_1^2 cs^2\omega_2 - 51\omega_3^2 v_1^2\omega_1^2\omega_2 + 7\omega_3^2\omega_1^3\omega_2^2 + 90\omega_3^2\omega_1^3 cs^4 - 6\omega_3\omega_1^3 cs^2\omega_2 - 7\omega_3^2\omega_1^2\omega_2^2 - 12\omega_3^2\omega_1^3\omega_2 + 12\omega_3^2 v_1^2\omega_1^2 cs^2\omega_2^2 + 42\omega_3 v_1^2\omega_1^2 cs^2\omega_2^2 + 39\omega_3^2 v_1^4\omega_1^3\omega_2^2 + 225\omega_3^2\omega_1 cs^4\omega_2^2 + 6\omega_3^2\omega_1^3 + 30\omega_3\omega_1 cs^2\omega_2^2 - 219\omega_3^2 v_1^2\omega_1^2 cs^2\omega_2^2 + 46\omega_3^2 v_1^2\omega_1^2\omega_2^2 + 102\omega_3^2 v_1^2\omega_1^3\omega_2 + 45\omega_3^2 v_1^4\omega_1^3 - 24\omega_3^2\omega_1^2 cs^2\omega_2 - 72\omega_1^2 cs^4\omega_2^2 - 90\omega_3^2 cs^4\omega_2^2 - 90\omega_3^2\omega_1 cs^4\omega_2^2 - 12\omega_1^3 cs^2\omega_2^2 + 45\omega_3^2 v_1^4\omega_1^2\omega_2 + 24\omega_3 v_1^2\omega_1^2 cs^2\omega_2^2 - 153\omega_3^2\omega_1^3 cs^4\omega_2 - 24\omega_3\omega_1^2 cs^2\omega_2^2 - 6\omega_3^2\omega_1\omega_2^2 - 165\omega_3^2 v_1^2\omega_1 cs^2\omega_2^2 - 2\omega_3^2\omega_1^3 cs^2\omega_2^2 - 102\omega_3^2 v_1^2\omega_1\omega_2^2 - 465\omega_3^2 v_1^2\omega_1^3 cs^2\omega_2 - 45\omega_3^2 v_1^4\omega_1^3 - 72\omega_3^2\omega_1^3 cs^2 - 54\omega_3\omega_1^3 cs^4\omega_2^2 - 3\omega_3^2\omega_1^3 v_2^2\omega_2^2 - 24 v_1^2\omega_1^2 cs^2\omega_2^3 - 138\omega_3^2\omega_1^2 cs^4\omega_2^3 - 30\omega_3 v_1^2\omega_1 cs^2\omega_2^3 + 51\omega_3^2 v_1^2\omega_1\omega_2^2 - 42\omega_3\omega_1^2 cs^2\omega_2^3 - 59\omega_3^2\omega_1^2 cs^2\omega_2^2 + 489\omega_3^2 v_1^2\omega_1 cs^2\omega_2^3 - 3\omega_3^2\omega_1^2 v_2^4\omega_2^3 + 12\omega_3^2\omega_1\omega_2^3 - 18\omega_3\omega_1^3 cs^4\omega_2^3 + 6\omega_3 v_1^2\omega_1^3 cs^2\omega_2 + 36\omega_3^2\omega_1^2 cs^4\omega_2^2 - 6\omega_3^2\omega_2^3 - 9\omega_3^2\omega_1^2 v_2^2 cs^2\omega_2^3 + 261\omega_3^2 v_1^2\omega_1^3 cs^2 + 90\omega_3^2 v_1^4\omega_1\omega_2^3 - 90\omega_3\omega_1 cs^4\omega_2^3 - 51\omega_3^2 v_1^2\omega_1^3 + 18\omega_3^2\omega_1^2 cs^4\omega_2 - 18\omega_3 v_1^2\omega_1^3 cs^2\omega_2^2 + 24\omega_1^2 cs^2\omega_2^3 + 72\omega_3^2 cs^2\omega_2^3 + 48\omega_3^2\omega_1 cs^2\omega_2^2 + 2\omega_3^2 v_1^2\omega_1^3 cs^2\omega_2^3 + 36\omega_1^3 cs^4\omega_2^3 + 123\omega_3^2\omega_1^3 cs^2\omega_2 - 6\omega_3 v_1^2\omega_1^3 cs^2\omega_2^3 + 18\omega_3\omega_1^3 cs^4\omega_2 - 45\omega_3^2 v_1^4\omega_1\omega_2^2 + 197\omega_3^2 v_1^2\omega_1^3 cs^2\omega_2^2 - 147\omega_3^2\omega_1 cs^2\omega_2^3 - 261\omega_3^2 v_1^2 cs^2\omega_2^3 + 9\omega_3^2\omega_1^3 v_2^2 cs^2\omega_2^2)\frac{v_1}{24\omega_3^2\omega_1^3\omega_2^3}$$

coefficient $C^{(2)}_{\mathrm{D}_x^3\mathrm{D}_y v_1}$ **at** $\frac{\partial^4 v_1}{\partial x_1^3 \partial x_2}$**:**

$$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x^3\mathrm{D}_y v_1} = (-12 + 36 v_1^2 + 2\omega^2 cs^2 - 6\omega^2 + 18 v_1^2\omega^2 - 54 v_1^2\omega - \omega^3 cs^2 + 18\omega)\frac{\rho cs^2}{12\omega^3}$$

$$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x^3\mathrm{D}_y v_1} = (144\omega_9\omega_6 v_1^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 - 12\omega_9\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 + 12\omega_6 cs^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 - 12\omega_9\omega_6 cs^2\omega_7^2\omega_4^2 v_2^2\omega_5 + 12\omega_6\omega_7^2\omega_4^3 v_2^2\omega_5^2 - 24\omega_9\omega_6 cs^2\omega_7\omega_4 v_2^2\omega_8\omega_5^2 + 6\omega_6 cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6\omega_4^2 v_2^2\omega_8\omega_5^2 + 36\omega_9 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 + 18\omega_9\omega_6 cs^4\omega_7^2\omega_4^2\omega_8\omega_5 - 12\omega_6\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 + 6\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 18\omega_9\omega_6 cs^2\omega_7^2\omega_4^2\omega_8\omega_5 - 6\omega_6 cs^4\omega_7\omega_4^3\omega_8\omega_5^2 + 18\omega_9\omega_6 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5 + 36\omega_9\omega_6\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5 + 12\omega_9\omega_6 cs^2\omega_7^2\omega_4^2 v_2^2\omega_8 + 12\omega_6\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^2 - 15\omega_9\omega_6 cs^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5 + 12\omega_9 cs^2\omega_7^2\omega_4^3\omega_5 + 72\omega_9 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5 - 48\omega_9\omega_6 cs^2 v_1^2\omega_7^2\omega_8\omega_5^2 + 12\omega_6 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_6 cs^4\omega_7\omega_4\omega_8\omega_5^2 - 12\omega_7^2\omega_4^3 v_2^2\omega_5^2 + 60\omega_9\omega_6 cs^2 v_1^2\omega_7^2\omega_4\omega_8\omega_5^2 + 27\omega_9\omega_6 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5 - 24\omega_9\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5 + 12\omega_9\omega_6\omega_7\omega_4^2 v_2^2\omega_8\omega_5 - 12\omega_6 cs^4\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12\omega_6 cs^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5^2 + 15\omega_9\omega_6\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 + 12\omega_9\omega_6 cs^4\omega_7^2\omega_4^3\omega_5 + 12\omega_6 cs^4\omega_7^2\omega_4^2\omega_5^2 + 12\omega_6 cs^2\omega_7^2\omega_4^2 v_2^2\omega_5^2 - 12\omega_9\omega_6 cs^2 v_1^2\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_6 cs^2\omega_7\omega_4\omega_8\omega_5^2 - 6\omega_9\omega_6\omega_7\omega_4^3 v_2^2\omega_8\omega_5 + 6\omega_9\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5 - 108\omega_9\omega_6 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_8\omega_5 + 24\omega_9\omega_6 cs^2\omega_7^2\omega_4 v_2^2\omega_8\omega_5 - 6\omega_9\omega_6 cs^2\omega_7\omega_4^3\omega_8\omega_5^2 + 18\omega_9 cs^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5 - 18\omega_9 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5 - 36\omega_9\omega_6 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_5 + 12 cs^4\omega_7^2\omega_4^3\omega_5^2 - 6\omega_6\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 + 6\omega_9\omega_6 cs^4\omega_7\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^3 v_2^2\omega_5 - 18\omega_6 cs^2 v_1^2\omega_7\omega_4^3\omega_8\omega_5^2 - 36\omega_9\omega_6 cs^2 v_1^2\omega_7^2\omega_4\omega_8\omega_5 + 6\omega_6 cs^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 48\omega_9\omega_6\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 - 12\omega_6 cs^4\omega_7^2\omega_4^3\omega_5^2 - 72\omega_9 v_1^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 - 6\omega_9\omega_6\omega_4^3 v_2^2\omega_8\omega_5^2 + \omega_9\omega_6 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12\omega_9\omega_6 cs^4\omega_7^2\omega_4^2\omega_5 + 24\omega_9\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 - 45\omega_9\omega_6 v_1^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 + 36\omega_9\omega_6 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_8 - 6\omega_6 cs^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 - 9\omega_9\omega_6\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5 - 36\omega_9\omega_6 v_1^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5 + 6\omega_9\omega_6\omega_7^2\omega_4^3 v_2^2\omega_8 - 18 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_8\omega_5^2 + 36\omega_6 v_1^2\omega_7^2\omega_4^2 v_2^2\omega_5^2 - 18 cs^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 36\omega_6 cs^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 6\omega_6\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 - 102\omega_9\omega_6 cs^2 v_1^2\omega_7\omega_4^2\omega_8\omega_5^2 - 5\omega_9\omega_6 cs^4\omega_7^2\omega_4^2\omega_8\omega_5^2 + 6\omega_9\omega_6 cs^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5 - 12\omega_9 cs^2\omega_7^2\omega_4^3 v_2^2\omega_5 + 6\omega_9\omega_6 cs^2\omega_4^3 v_2^2\omega_8\omega_5^2 - 24\omega_9\omega_6\omega_7^2\omega_4 v_2^2\omega_8\omega_5 + 6\omega_6 cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2 + 6\omega_9 cs^4\omega_7^2\omega_4^3\omega_8\omega_5 + 24\omega_9\omega_6 cs^2 v_1^2\omega_4^2\omega_8\omega_5^2 - 12\omega_6 cs^2\omega_7^2\omega_4^3 v_2^2\omega_5^2 - 6\omega_6 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 6\omega_9\omega_6 cs^2\omega_7^2\omega_4^3 v_2^2\omega_8 + 54\omega_9\omega_6 cs^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5 + 12\omega_9 cs^2\omega_7\omega_4^3 v_2^2\omega_8\omega_5^2 - 72\omega_9\omega_6 v_1^2\omega_7\omega_4 v_2^2\omega_8\omega_5^2 + 36 v_1^2\omega_7^2\omega_4^3 v_2^2\omega_5^2 + 36\omega_6 cs^2 v_1^2\omega_7^2\omega_4^2\omega_5^2 + 36\omega_6 v_1^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 + 36 cs^2 v_1^2\omega_7^2\omega_4^3\omega_5^2 + 48\omega_9\omega_6 cs^2\omega_7\omega_4^2 v_2^2\omega_8\omega_5^2 - 6\omega_9 cs^2\omega_7^2\omega_4^3\omega_8\omega_5 - 36\omega_9\omega_6 cs^2 v_1^2\omega_7^2\omega_4^2\omega_5 - 36\omega_9\omega_6 v_1^2\omega_4^2 v_2^2\omega_8\omega_5^2 +$$

$$12\omega_6 cs^4\omega_7\omega_4^2\omega_8\omega_5^2+5\omega_9\omega_6 cs^2\omega_7^2\omega_4^3\omega_8\omega_5-12\omega_9 cs^4\omega_7^2\omega_4^3\omega_5-36\omega_6 v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2-12\omega_6\omega_7^2\omega_4^2v_2^2\omega_5^2+9\omega_9\omega_6 cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5+12\omega_9\omega_6 cs^2\omega_7^2\omega_4^3v_2^2\omega_5-12\omega_6 cs^2\omega_7^2\omega_4^2\omega_5^2+60\omega_9\omega_6 cs^2v_1^2\omega_7\omega_4\omega_8\omega_5^2+18\omega_9\omega_6 cs^4\omega_7^2\omega_4\omega_8\omega_5^2-5\omega_9\omega_6 cs^4\omega_7^2\omega_4^3\omega_8\omega_5+24\omega_9 cs^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5-12\omega_9\omega_6 cs^2\omega_7^2\omega_4^3\omega_5-12\omega_6 cs^2\omega_7\omega_4^2\omega_8\omega_5^2-12\omega_9\omega_6 cs^4\omega_7^2\omega_4\omega_8\omega_5-36\omega_6 v_1^2\omega_7^2\omega_4^3v_2^2\omega_5^2+18\omega_6 v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2-12\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_8-12cs^2\omega_7^2\omega_4^3\omega_5^2-36\omega_6 cs^2v_1^2\omega_7^2\omega_4^3\omega_5^2+24\omega_9\omega_6\omega_7\omega_4v_2^2\omega_8\omega_5^2-\omega_9\omega_6 cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2-36\omega_9 cs^2v_1^2\omega_7^2\omega_4^3\omega_5+30\omega_9\omega_6 cs^2v_1^2\omega_7\omega_4^3\omega_8\omega_5^2+12\omega_9\omega_7^2\omega_4^3v_2^2\omega_5+18\omega_9\omega_6v_1^2\omega_4^3v_2^2\omega_8\omega_5^2+6cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2+18\omega_6 cs^2v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2-36\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_5+12cs^2\omega_7^2\omega_4^3v_2^2\omega_5^2+12\omega_9\omega_6 cs^2\omega_7^2\omega_4\omega_8\omega_5-6\omega_9 cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5+72\omega_9\omega_6v_1^2\omega_7^2\omega_4v_2^2\omega_8\omega_5-18\omega_9\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8-6cs^4\omega_7^2\omega_4^3\omega_8\omega_5^2-36\omega_9\omega_6 cs^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5+36\omega_6 cs^2v_1^2\omega_7\omega_4^2\omega_8\omega_5^2+12\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_5-18\omega_9\omega_6 cs^4\omega_7\omega_4^2\omega_8\omega_5^2-15\omega_9\omega_6 cs^2v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2+12\omega_9\omega_6 cs^2\omega_7^2\omega_4^2\omega_5-12\omega_9\omega_6 cs^2\omega_4^2v_2^2\omega_8\omega_5^2+12\omega_6 cs^2\omega_7^2\omega_4^3\omega_5^2-6cs^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2-12\omega_9\omega_6 cs^4\omega_7^2\omega_8\omega_5^2-12\omega_9\omega_6 cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5+18\omega_9\omega_6 cs^2\omega_7\omega_4^2\omega_8\omega_5^2-18\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2-15\omega_9\omega_6 cs^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2-24\omega_9 cs^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2+36\omega_9\omega_6 cs^2v_1^2\omega_7^2\omega_4^3\omega_5+36\omega_9\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_5)\frac{\rho}{12\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2}$$

$$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x^3\mathrm{D}_y v_1}=(144\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2+12\omega_7^2cs^2\omega_4^3v_2^2\omega_5^2-12\omega_9\omega_7\omega_4^3v_2^2\omega_8\omega_5^2+12\omega_9\omega_6\omega_7^2cs^2\omega_4\omega_8\omega_5-18\omega_9\omega_6\omega_7cs^4\omega_4^2\omega_8\omega_5^2-24\omega_9\omega_7cs^2\omega_4^2v_2^2\omega_8\omega_5^2+12\omega_6\omega_7^2\omega_4^3v_2^2\omega_5^2+12\omega_9\omega_6\omega_4^2v_2^2\omega_8\omega_5^2+36\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2-12\omega_9\omega_7^2cs^4\omega_4^3\omega_5-15\omega_9\omega_6\omega_7cs^2\omega_4^3v_2^2\omega_8\omega_5^2-12\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5^2+24\omega_9\omega_7^2cs^2\omega_4^2v_2^2\omega_8\omega_5-12\omega_9\omega_6\omega_7cs^2\omega_4^2v_2^2\omega_8\omega_5+6\omega_7^2cs^2\omega_4^3v_2^2\omega_5^2+12\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2+72\omega_9v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5-15\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4^3\omega_8\omega_5-12\omega_7^2\omega_4^3v_2^2\omega_5^2+27\omega_9\omega_6v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5-24\omega_9\omega_7^2\omega_4^2v_2^2\omega_8\omega_5+12\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5^2+60\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4\omega_8\omega_5^2+15\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8\omega_5^2-5\omega_9\omega_6\omega_7^2cs^4\omega_4^2\omega_8\omega_5^2-6\omega_9\omega_6\omega_7cs^2\omega_4^3\omega_8\omega_5^2-6\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8\omega_5-6\omega_7^2cs^2\omega_4^3v_2^2\omega_8\omega_5^2+6\omega_9\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2-108\omega_9\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5-6\omega_9\omega_6\omega_7^2cs^2\omega_4^3v_2^2\omega_8-12\omega_9\omega_6\omega_7cs^2\omega_4\omega_8\omega_5^2+18\omega_9v_1^2\omega_7^2cs^2\omega_4^3\omega_8\omega_5-36\omega_6v_1^2\omega_7^2cs^2\omega_4^3\omega_5^2+18\omega_9\omega_6\omega_7^2cs^4\omega_4^2\omega_8\omega_5-6\omega_6\omega_7^2cs^2\omega_4^3\omega_8\omega_5^2-18\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5-36\omega_9\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_5-6\omega_9\omega_7^2cs^2\omega_4^3\omega_8\omega_5+12\omega_6\omega_7cs^4\omega_4^2\omega_8\omega_5^2-36\omega_9v_1^2\omega_7^2cs^2\omega_4^3\omega_5+36\omega_6v_1^2\omega_7cs^2\omega_4^2\omega_8\omega_5^2-6\omega_6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2-12\omega_9\omega_6\omega_7^2cs^4\omega_8\omega_5^2+12\omega_9\omega_7^2cs^2\omega_4^3\omega_5-12\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_5-12\omega_9\omega_7^2cs^2\omega_4^3v_2^2\omega_5-12\omega_6\omega_7^2cs^2\omega_4^3v_2^2\omega_5^2-36\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4\omega_8\omega_5-48\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8\omega_5^2+48\omega_9\omega_6\omega_7cs^2\omega_4^2v_2^2\omega_8\omega_5^2-72\omega_9v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2-6\omega_9\omega_6\omega_7^3v_2^2\omega_8\omega_5^2+12\omega_9\omega_6\omega_7^2cs^2\omega_4^3v_2^2\omega_5+30\omega_9\omega_6v_1^2\omega_7cs^2\omega_4^3\omega_8\omega_5^2+12\omega_9\omega_7cs^2\omega_4^3v_2^2\omega_8\omega_5^2+24\omega_9\omega_7\omega_4^2v_2^2\omega_8\omega_5^2-45\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8\omega_5^2+36\omega_9\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_8-9\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5-36\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5-36\omega_9\omega_6\omega_7^2cs^2\omega_4^2v_2^2\omega_8\omega_5^2+6\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_8-18v_1^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5^2+6\omega_6\omega_7cs^2\omega_4^3\omega_8\omega_5^2+36\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_5^2+24\omega_9\omega_6v_1^2cs^2\omega_4^2\omega_8\omega_5^2+5\omega_9\omega_6\omega_7^2cs^2\omega_4^3\omega_8\omega_5-12\omega_6\omega_7^2cs^4\omega_4^2\omega_8\omega_5^2+36\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4^3\omega_5^2+6\omega_9\omega_6\omega_7cs^2\omega_4^3v_2^2\omega_8\omega_5-6\omega_9\omega_7^2cs^2\omega_4^3\omega_5^2+6\omega_6\omega_7^2cs^2\omega_4^3\omega_8\omega_5^2-18v_1^2\omega_7^2cs^2\omega_4^3\omega_8\omega_5^2-36\omega_6v_1^2cs^2\omega_4^2\omega_8\omega_5^2-\omega_9\omega_6\omega_7^2cs^4\omega_4^3\omega_8\omega_5^2+12\omega_6\omega_7^2cs^2\omega_4^3\omega_5^2-24\omega_9\omega_6\omega_7^2\omega_4v_2^2\omega_8\omega_5-12\omega_9\omega_6\omega_7^2cs^4\omega_4\omega_8\omega_5+12\omega_9\omega_6\omega_7^2cs^2\omega_4^2\omega_5+18\omega_9\omega_6\omega_7cs^2\omega_4^2\omega_8\omega_5^2+54\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_4^2\omega_8\omega_5-6\omega_6\omega_7cs^2\omega_4^3v_2^2\omega_8\omega_5^2+12\omega_9\omega_6\omega_7^2cs^4\omega_4^3\omega_5-6\omega_7^2cs^4\omega_4^3\omega_8\omega_5^2-72\omega_9\omega_6v_1^2\omega_7\omega_4v_2^2\omega_8\omega_5^2+36v_1^2\omega_7^2\omega_4^3v_2^2\omega_5^2-12\omega_6\omega_7^2cs^2\omega_4^2v_2^2\omega_8\omega_5^2+12\omega_6\omega_7^2cs^4\omega_4^2\omega_5^2+36\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8\omega_5^2+6\omega_9\omega_6cs^2\omega_4^3v_2^2\omega_8\omega_5^2-48\omega_9\omega_6v_1^2\omega_7^2cs^2\omega_8\omega_5^2-36\omega_9\omega_6v_1^2\omega_4^2v_2^2\omega_8\omega_5^2-12\omega_7^2cs^2\omega_4^3\omega_5^2-36\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5^2-12\omega_6\omega_7^2\omega_4^2v_2^2\omega_5^2+6\omega_9\omega_6\omega_7cs^4\omega_4^3\omega_8\omega_5^2+\omega_9\omega_6\omega_7^2cs^2\omega_4^2\omega_8\omega_5^2+6\omega_9\omega_7^2cs^4\omega_4^3\omega_8\omega_5-12\omega_6\omega_7^2cs^2\omega_4^3\omega_5^2-24\omega_9\omega_6\omega_7^2\omega_4v_2^2\omega_8\omega_5+12\omega_9\omega_6\omega_7^2cs^4\omega_4^2\omega_5+18\omega_6v_1^2\omega_7^2cs^2\omega_4^3\omega_8\omega_5^2+12\omega_9\omega_6\omega_7cs^4\omega_4\omega_8\omega_5^2+12\omega_9\omega_7^2\omega_4^3v_2^2\omega_5+18\omega_9\omega_6v_1^2\omega_4^3v_2^2\omega_8\omega_5^2-36\omega_9v_1^2\omega_7^2\omega_4^3v_2^2\omega_5-18\omega_9\omega_6\omega_7^2cs^2\omega_4^2\omega_8\omega_5+6\omega_6\omega_7^2cs^2\omega_4^3\omega_8\omega_5^2+12\omega_9\omega_6\omega_7^2cs^2\omega_4^2v_2^2\omega_8-18\omega_6v_1^2\omega_7cs^2\omega_4^3\omega_8\omega_5^2+18\omega_9\omega_6\omega_7^2cs^4\omega_4\omega_8\omega_5^2-24\omega_9\omega_6\omega_7cs^2\omega_4v_2^2\omega_8\omega_5^2+36\omega_9\omega_6v_1^2\omega_7^2\omega_4^2v_2^2\omega_5-6\omega_6\omega_7cs^4\omega_4^3\omega_8\omega_5^2+12\omega_6\omega_7cs^2\omega_4^2v_2^2\omega_8\omega_5^2)\frac{\rho}{12\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2}$$

$$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x^3\mathrm{D}_y v_1}=(-12\omega_9\omega_6\omega_4\omega_8\omega_5-12\omega_9\omega_6\omega_7\omega_4^2cs^2-12\omega_6\omega_7\omega_4^3cs^2\omega_5-12\omega_9\omega_7\omega_4^3cs^2+6\omega_9\omega_7\omega_4^3\omega_8cs^2-54\omega_9\omega_6v_1^2\omega_4^2\omega_8\omega_5+5\omega_9\omega_6\omega_7\omega_4^3\omega_8+18\omega_9\omega_6\omega_7\omega_4^2\omega_8cs^2+18\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_5+12\omega_7\omega_4^3cs^2\omega_5+12\omega_9\omega_6\omega_4\omega_8cs^2\omega_5+36\omega_6v_1^2\omega_4^2\omega_8\omega_5+12\omega_6\omega_7\omega_4^2\omega_8\omega_5-36\omega_9\omega_6v_1^2\omega_7\omega_4\omega_8-12\omega_9\omega_6\omega_7\omega_4^3+12\omega_9\omega_6\omega_7\omega_4^3cs^2-12\omega_6\omega_4^2\omega_8\omega_5+12\omega_9\omega_6\omega_7\omega_4^2-12\omega_9\omega_6\omega_7\omega_8cs^2\omega_5+18\omega_9\omega_6\omega_7\omega_4\omega_8cs^2\omega_5+\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5+18\omega_9v_1^2\omega_7\omega_4^3\omega_8+12\omega_9\omega_7\omega_4^3-6\omega_9\omega_7\omega_4^3\omega_8-18v_1^2\omega_7\omega_4^3\omega_8\omega_5-18\omega_9\omega_6\omega_7\omega_4^2\omega_8-6\omega_9\omega_6\omega_4^3\omega_8\omega_5-6\omega_7\omega_4^3\omega_8cs^2\omega_5-36\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5-12\omega_7\omega_4^3\omega_5-5\omega_9\omega_6\omega_7\omega_4^3\omega_8cs^2+12\omega_6\omega_4^2\omega_8cs^2\omega_5-36\omega_9\omega_6v_1^2\omega_7\omega_4^2-18\omega_6v_1^2\omega_4^3\omega_8\omega_5+12\omega_6\omega_7\omega_4^3\omega_5-\omega_9\omega_6\omega_7\omega_4^3\omega_8cs^2\omega_5+12\omega_9\omega_6\omega_7\omega_4\omega_8+36\omega_9\omega_6v_1^2\omega_7\omega_4^3+18\omega_9\omega_6v_1^2\omega_4^3\omega_8\omega_5+36\omega_6v_1^2\omega_7\omega_4^2\omega_5+54\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8+12\omega_6\omega_7\omega_4^2cs^2\omega_5-18\omega_9\omega_6\omega_4^2\omega_8cs^2\omega_5-12\omega_6\omega_7\omega_4^2\omega_8cs^2\omega_5+6\omega_9\omega_6\omega_4^3\omega_8cs^2\omega_5+18\omega_9\omega_6\omega_4^2\omega_8\omega_5-12\omega_6\omega_7\omega_4^2\omega_5-3\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5+36\omega_9\omega_6v_1^2\omega_4\omega_8\omega_5+6\omega_6\omega_7\omega_4^2\omega_8cs^2\omega_5+36v_1^2\omega_7\omega_4^3\omega_5+6\omega_7\omega_4^3\omega_8\omega_5-6\omega_6\omega_4^3\omega_8cs^2\omega_5-36\omega_9v_1^2\omega_7\omega_4^3+6\omega_6\omega_4^3\omega_8\omega_5-15\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8-36\omega_6v_1^2\omega_7\omega_4^3\omega_5-6\omega_6\omega_7\omega_4^2\omega_8\omega_5-5\omega_9\omega_6\omega_7\omega_4^2\omega_8cs^2\omega_5-12\omega_9\omega_6\omega_7\omega_4\omega_8cs^2)\frac{\rho cs^2}{12\omega_9\omega_6\omega_7\omega_4^3\omega_8\omega_5}$$

$$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x^3\mathrm{D}_y v_1}=(-12\omega_9\omega_6\omega_4\omega_8\omega_5+12cs^2\omega_7\omega_4^3\omega_5-12\omega_9cs^2\omega_7\omega_4^3-5\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5-12\omega_9cs^2\omega_6\omega_7\omega_8\omega_5-54\omega_9\omega_6v_1^2\omega_4^2\omega_8\omega_5+5\omega_9\omega_6\omega_7\omega_4^3\omega_8-12\omega_9cs^2\omega_6\omega_7\omega_4\omega_8+18\omega_6v_1^2\omega_7\omega_4^3\omega_8\omega_5+36\omega_6v_1^2\omega_4^2\omega_8\omega_5+12\omega_6\omega_7\omega_4^2\omega_8\omega_5-12cs^2\omega_6\omega_7\omega_4^2\omega_8\omega_5-36\omega_9\omega_6v_1^2\omega_7\omega_4\omega_8-12\omega_9\omega_6\omega_7\omega_4^3+12cs^2\omega_6\omega_4^2\omega_8\omega_5-12\omega_6\omega_4^2\omega_8\omega_5+12\omega_9\omega_6\omega_7\omega_4^2+\omega_9\omega_6\omega_7\omega_4^2\omega_8\omega_5+18\omega_9v_1^2\omega_7\omega_4^3\omega_8+12\omega_9\omega_7\omega_4^3-6\omega_9\omega_7\omega_4^3\omega_8-18v_1^2\omega_7\omega_4^3\omega_8\omega_5-18\omega_9\omega_6\omega_7\omega_4^2\omega_8-18\omega_9cs^2\omega_6\omega_4^2\omega_8\omega_5-6\omega_9\omega_6\omega_4^3\omega_8\omega_5-36\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5-12\omega_7\omega_4^3\omega_5-36\omega_9\omega_6v_1^2\omega_7\omega_4^2-18\omega_6v_1^2\omega_4^3\omega_8\omega_5-5\omega_9cs^2\omega_6\omega_7\omega_4^3\omega_8-12cs^2\omega_6\omega_7\omega_4^3\omega_5+12\omega_6\omega_7\omega_4^3\omega_5+12\omega_9cs^2\omega_6\omega_7\omega_4^3+12\omega_9\omega_6\omega_7\omega_4\omega_8+36\omega_9\omega_6v_1^2\omega_7\omega_4^3+18\omega_9\omega_6v_1^2\omega_4^3\omega_8\omega_5+36\omega_6v_1^2\omega_7\omega_4^2\omega_5+54\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8+12\omega_9cs^2\omega_6\omega_4\omega_8\omega_5+6\omega_9cs^2\omega_7\omega_4^3\omega_8-12\omega_9cs^2\omega_6\omega_7\omega_4^2-\omega_9cs^2\omega_6\omega_7\omega_4^3\omega_8\omega_5+18\omega_9cs^2\omega_6\omega_7\omega_4\omega_8\omega_5+18\omega_9\omega_6\omega_4^2\omega_8\omega_5-12\omega_6\omega_7\omega_4^2\omega_5+12cs^2\omega_6\omega_7\omega_4^2\omega_5+18\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8+6\omega_9cs^2\omega_6\omega_4^3\omega_8\omega_5-3\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8\omega_5+36\omega_9\omega_6v_1^2\omega_4\omega_8\omega_5+36v_1^2\omega_7\omega_4^3\omega_5-6cs^2\omega_7\omega_4^3\omega_8\omega_5+6\omega_7\omega_4^3\omega_8\omega_5-36\omega_9v_1^2\omega_7\omega_4^3-6cs^2\omega_6\omega_4^3\omega_8\omega_5+6\omega_6\omega_4^3\omega_8\omega_5-15\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8-36\omega_6v_1^2\omega_7\omega_4^3\omega_5+6cs^2\omega_6\omega_7\omega_4^3\omega_8\omega_5-6\omega_6\omega_7\omega_4^3\omega_8\omega_5)\frac{cs^2\rho}{12\omega_9\omega_6\omega_7\omega_4^3\omega_8\omega_5}$$

$$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x^3\mathrm{D}_y v_1}=(-5\omega_3^2cs^2\omega_4\omega_1+18\omega_3^2\omega_1+3\omega_3^3v_1^2\omega_4+6\omega_3^2cs^2\omega_4+18\omega_3^3v_1^2\omega_1-6\omega_3^2\omega_4-18\omega_3^2cs^2\omega_1-6\omega_3^3\omega_1+36\omega_3v_1^2\omega_1+\omega_3^2\omega_4\omega_1-\omega_3^3cs^2\omega_4\omega_1-3\omega_3^2v_1^2\omega_4\omega_1-\omega_3^3\omega_4-36\omega_3v_1^2\omega_4-54\omega_3^2v_1^2\omega_1-18\omega_3^3v_1^2+18\omega_3cs^2\omega_4\omega_1+6\omega_3^3cs^2\omega_1+12\omega_3^2cs^2+18\omega_3^2v_1^2\omega_4+\omega_3^3cs^2\omega_4+12\omega_3\omega_4+36\omega_3^2v_1^2-12\omega_3cs^2\omega_4-6\omega_3^3cs^2-12\omega_3^2+12\omega_3cs^2\omega_1-12\omega_3\omega_1+6\omega_3^3-12cs^2\omega_4\omega_1)\frac{\rho cs^2}{12\omega_3^3\omega_4\omega_1}$$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^3_x\mathrm{D}_y v_1} = (-18\omega_1 cs^2\omega_2^3 - 99\omega_3 v_1^2\omega_1^3 - 54v_1^2\omega_1^3 cs^2\omega_2^2 + 63\omega_3 v_1^2\omega_1^2 cs^2\omega_2 - 25\omega_3\omega_1^2 cs^4\omega_2^3 - \omega_3\omega_1^3 v_2^2\omega_2^2 + 24\omega_3 cs^2\omega_2^3 - 180\omega_3 v_1^2\omega_1\omega_2^3 + 36v_1^2\omega_1^3 cs^2\omega_2^3 + 12\omega_3\omega_1^2 cs^4\omega_2^2 - 6\omega_1^3 cs^2\omega_2 + 207\omega_3 v_1^2\omega_1^3 cs^2 + 63\omega_3 v_1^2\omega_1\omega_2^2 - \omega_3\omega_1^2 v_2^4\omega_2^3 - 24\omega_3\omega_1^3 cs^2\omega_2^2 - 171\omega_3 v_1^4\omega_2^3 + 24\omega_1^2 cs^4\omega_2^2 + 45\omega_3\omega_1^3 cs^2\omega_2 + 36\omega_3\omega_1 cs^2\omega_2^2 - 6\omega_3\omega_1\omega_2^2 + 6\omega_3\omega_1^2 cs^4\omega_2 - 153\omega_3 v_1^2\omega_1^2 cs^2\omega_2^3 + 18\omega_1^3 cs^2\omega_2^2 + 324\omega_3 v_1^4\omega_1\omega_2^3 - 24\omega_3\omega_1^3 cs^2 + 54v_1^2\omega_1 cs^2\omega_2^3 - 6\omega_3\omega_2^3 - 45\omega_3\omega_1 cs^2\omega_2^3 + 12\omega_3\omega_1\omega_2^3 - 207\omega_3 v_1^2 cs^2\omega_2^3 - 30\omega_1^2 cs^4\omega_2^3 - 135\omega_3 v_1^4\omega_1\omega_2^2 - 12\omega_1^3 cs^2\omega_2^3 + 36\omega_3 v_1^2\omega_1^2 cs^2\omega_2^2 + 18v_1^2\omega_1^3 cs^2\omega_2 - 12\omega_3\omega_1^3\omega_2 - 12\omega_3\omega_1^2 cs^2\omega_2^2 + 6\omega_1^3 cs^4\omega_2 - 7\omega_3\omega_1^2\omega_2^3 + 18\omega_3\omega_1^3 cs^4 - 81\omega_3 v_1^2\omega_1^3\omega_2^2 - 3\omega_3\omega_1^2 v_2^2 cs^2\omega_2^3 + \omega_3\omega_1^2 v_2^2\omega_2^3 + 17\omega_3\omega_1^3 cs^4\omega_2^2 - 90v_1^2\omega_1^2 cs^2\omega_2^3 + 351\omega_3 v_1^2\omega_1 cs^2\omega_2^3 + 18\omega_1 cs^4\omega_2^3 - 63\omega_3 v_1^2\omega_1^2\omega_2 + 171\omega_3 v_1^4\omega_1^3 + 24\omega_3\omega_1^2 cs^2\omega_2^3 + \omega_3\omega_1^3 v_2^4\omega_2^2 - 135\omega_3 v_1^2\omega_1 cs^2\omega_2^2 - 2\omega_3\omega_1^3 cs^4\omega_2^3 - 351\omega_3 v_1^2\omega_1^3 cs^2\omega_2 + 72v_1^2\omega_1^2 cs^2\omega_2^2 - 324\omega_3 v_1^4\omega_1^3\omega_2 + 6\omega_3\omega_1^3 - 138\omega_3 v_1^4\omega_1^2\omega_2^3 - 42\omega_3 cs^4\omega_2^3 + 69\omega_3\omega_1 cs^4\omega_2^3 + 138\omega_3 v_1^4\omega_1^3\omega_2^2 + 153\omega_3 v_1^2\omega_1^3 cs^2\omega_2^2 + 3\omega_3\omega_1^3 v_2^2 cs^2\omega_2^2 + 30\omega_1^2 cs^2\omega_2^3 + 12\omega_1^3 cs^4\omega_2^3 + 6\omega_3\omega_2^2\omega_2 + 135\omega_3 v_1^4\omega_1^2\omega_2 - 24\omega_1^2 cs^2\omega_2^2 + 99\omega_3 v_1^2\omega_2^3 - 33\omega_3\omega_1^3 cs^4\omega_2 - 30\omega_3\omega_1 cs^4\omega_2^2 - 12\omega_3\omega_1^2 cs^2\omega_2 + 7\omega_3\omega_1^3\omega_2^2 - 18\omega_1^3 cs^4\omega_2^2 + 81\omega_3 v_1^2\omega_1^2\omega_2^3 + 180\omega_3 v_1^2\omega_1^3\omega_2)\frac{\rho}{24\omega_3\omega_1^3\omega_2^3}$

coefficient $C^{(2)}_{\mathrm{D}^3_x\mathrm{D}_y v_2}$ **at** $\frac{\partial^4 v_2}{\partial x_1^3\partial x_2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (2 - 6cs^2 - 2v_1^2 + v_1^2\omega - \omega + 3\omega cs^2)\frac{v_1\rho v_2}{12\omega}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (-12\omega_9\omega_6^2 cs^2\omega_7\omega_4^2\omega_8^2\omega_5 + 6\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2 - 6\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5 + 36\omega_9\omega_6^2\omega_7\omega_4\omega_8^2\omega_5^2 - 132\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 24\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_6^2 v_1^2\omega_4^3\omega_8^2\omega_5^2 + 12\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + \omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 24\omega_9\omega_6 cs^2\omega_7\omega_4^2\omega_8^2\omega_5^2 - 24\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4\omega_8^2\omega_5 - 48\omega_9\omega_6^2 cs^2\omega_4^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8^2 + 156\omega_9\omega_6^2 cs^2\omega_7^2\omega_4\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 18\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 12\omega_6 v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 66\omega_9\omega_6^2 v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^2 + 24\omega_6^2 cs^2\omega_7\omega_4^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^2 + 24\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5 - 72\omega_9\omega_6 cs^2\omega_7^2\omega_4\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2 v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_6^2 cs^2\omega_7^2\omega_4\omega_8^2\omega_5 + 12\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 24\omega_9\omega_6 v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2 + 3\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 12\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 4\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5 + 48\omega_9\omega_6 cs^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4\omega_8^2\omega_5^2 - 12\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 18\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 24\omega_6^2 v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_4^3\omega_8^2\omega_5^2 + 90\omega_9\omega_6^2 cs^2\omega_7\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 6\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2 + 36\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8^2 - 18\omega_9\omega_6^2 v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 12\omega_6^2 cs^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 84\omega_9\omega_6 cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 24\omega_6 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2 - 4\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 42\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_6 cs^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 24\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8^2 + 24\omega_9\omega_6^2 cs^2\omega_4^3\omega_8^2\omega_5^2 - 96\omega_9\omega_6^2 cs^2\omega_7^2\omega_8^2\omega_5^2 + 6\omega_9\omega_6^2 cs^2\omega_7\omega_4^3\omega_8^2\omega_5 + 12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5 - 24\omega_9\omega_6^2 v_1^2\omega_4^2\omega_8^2\omega_5^2 + 60\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 24\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_9\omega_6 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_6^2 v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 66\omega_9\omega_6^2 v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^2 - 24\omega_9\omega_6^2 cs^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_9\omega_6 cs^2\omega_7^2\omega_4^3\omega_8^2 - 18\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5 - 18\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2 + 24\omega_6 v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 84\omega_9\omega_6 cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5 - 24\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2 - 66\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 24\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - \omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_9 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6 v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 36\omega_9\omega_6^2 v_1^2\omega_7\omega_4\omega_8^2\omega_5^2 - 24\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^2 + 6\omega_9\omega_6^2 v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 - 24\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^3\omega_8^2 + 12\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2)\frac{v_1\rho v_2}{12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (6\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2 - 6\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5 + 36\omega_9\omega_6^2\omega_7\omega_4\omega_8^2\omega_5^2 - 84\omega_9\omega_6\omega_7^2 cs^2\omega_4^3\omega_8\omega_5^2 - 48\omega_9\omega_6^2 cs^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 24\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 90\omega_9\omega_6^2 cs^2\omega_7\omega_4^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2 v_1^2\omega_4^3\omega_8^2\omega_5^2 + \omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 72\omega_9\omega_6^2\omega_7^2 cs^2\omega_4\omega_8\omega_5^2 - 24\omega_6\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4\omega_8^2\omega_5 - 24\omega_6^2\omega_7^2 cs^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8^2 + 24\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 18\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5 - 12\omega_6 v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2 cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 66\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2 - 66\omega_9\omega_6^2\omega_7^2 cs^2\omega_4^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_9\omega_6\omega_7\omega_4^3\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7 cs^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 24\omega_6\omega_7^2 cs^2\omega_4^3\omega_8\omega_5^2 - 42\omega_9\omega_6^2\omega_7^2 cs^2\omega_4^2\omega_8^2\omega_5 - 12\omega_9\omega_6^2 v_1^2\omega_7\omega_4^2\omega_8^2\omega_5 + 12\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 24\omega_9\omega_6 v_1^2\omega_7\omega_4^2\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2 + 84\omega_9\omega_6\omega_7^2 cs^2\omega_4^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 + 12\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 4\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 24\omega_9\omega_6\omega_7 cs^2\omega_4^2\omega_8^2\omega_5^2 - 24\omega_6^2\omega_7^2 cs^2\omega_4^2\omega_8^2\omega_5^2 + 18\omega_9\omega_6^2\omega_7\omega_4^3\omega_8^2\omega_5^2 + 24\omega_6^2\omega_7^2 cs^2\omega_4^3\omega_8^2\omega_5^2 - 6\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8^2 - 12\omega_9\omega_6^2\omega_7 cs^2\omega_4^2\omega_8^2\omega_5 + 12\omega_9\omega_6^2\omega_7^2 cs^2\omega_4\omega_8^2\omega_5 + 3\omega_9\omega_6^2\omega_7^2 cs^2\omega_4^3\omega_8^2\omega_5^2 - 18\omega_9\omega_6^2 v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 12\omega_9\omega_6 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5^2 - 72\omega_9\omega_6\omega_7^2 cs^2\omega_4\omega_8^2\omega_5^2 - 24\omega_9\omega_6^2\omega_7^2 cs^2\omega_4^3\omega_5^2 + 24\omega_6^2\omega_7^2 cs^2\omega_4^2\omega_8\omega_5^2 - 4\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 24\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2 - 12\omega_6\omega_7^2 cs^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_9\omega_6\omega_7^2 cs^2\omega_4^3\omega_5^2 - 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 18\omega_9\omega_6^2\omega_7^2 cs^2\omega_4^3\omega_8^2 + 12\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5 - 24\omega_9\omega_6^2 v_1^2\omega_4^2\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2 cs^2\omega_4^3\omega_8^2\omega_5^2 - 24\omega_9\omega_6^2\omega_7 cs^2\omega_4^3\omega_8^2\omega_5^2 - 24\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 + 12\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5^2 + 48\omega_9\omega_6\omega_7^2 cs^2\omega_4^2\omega_8\omega_5^2 + 12\omega_9\omega_6 v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - 36\omega_9\omega_6^2\omega_7 cs^2\omega_4\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2\omega_4^2\omega_8^2\omega_5^2 - 12\omega_6^2 v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 66\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2 + 12\omega_6^2\omega_7^2 cs^2\omega_4^3\omega_8^2\omega_5^2 + 6\omega_9\omega_6^2\omega_7 cs^2\omega_4^3\omega_8^2\omega_5 - 12\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_9\omega_6^2\omega_7^2 cs^2\omega_4^2\omega_5^2 - 18\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5 - 132\omega_9\omega_6^2\omega_7^2 cs^2\omega_4^2\omega_8\omega_5^2 + 24\omega_6 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 96\omega_9\omega_6^2\omega_7^2 cs^2\omega_8^2\omega_5^2 + 12\omega_9\omega_6\omega_7 cs^2\omega_4^3\omega_8^2\omega_5^2 - 12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 24\omega_6^2\omega_7\omega_4^2\omega_8^2\omega_5^2 + 36\omega_9\omega_6^2\omega_7^2 cs^2\omega_4^2\omega_8^2 - 24\omega_6^2 v_1^2\omega_7^2\omega_4^2\omega_8^2\omega_5^2 - \omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2 + 12\omega_9\omega_6 v_1^2\omega_7\omega_4^3\omega_8^2\omega_5^2 - 36\omega_9\omega_6^2 v_1^2\omega_7\omega_4\omega_8^2\omega_5^2 + 156\omega_9\omega_6^2\omega_7^2 cs^2\omega_4\omega_8^2\omega_5^2 + 12\omega_9\omega_6^2 v_1^2\omega_7^2\omega_4^3\omega_8\omega_5^2 - 12\omega_6^2\omega_7 cs^2\omega_4^3\omega_8^2\omega_5^2 + 24\omega_9\omega_6\omega_7\omega_4^2\omega_8^2\omega_5^2 + 6\omega_9\omega_6^2 v_1^2\omega_7\omega_4^3\omega_8^2\omega_5 + 12\omega_9\omega_6^2\omega_7^2 cs^2\omega_4^3\omega_8^2\omega_5 + 12\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5^2)\frac{v_1\rho v_2}{12\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5^2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (v_1^2\omega_7 + 3\omega_7 cs^2 - 9cs^2\omega_5 - 3v_1^2\omega_5 - \omega_7 - \omega_7\omega_5 + 3\omega_7 cs^2\omega_5 + v_1^2\omega_7\omega_5 + 3\omega_5)\frac{v_1\rho v_2}{12\omega_7\omega_5}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (-9cs^2\omega_5 + v_1^2\omega_7 + 3cs^2\omega_7\omega_5 + 3cs^2\omega_7 - 3v_1^2\omega_5 - \omega_7 - \omega_7\omega_5 + v_1^2\omega_7\omega_5 + 3\omega_5)\frac{v_1\rho v_2}{12\omega_7\omega_5}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (-\omega_4\omega_1 - 9cs^2\omega_1 + 3cs^2\omega_4 - \omega_4 + v_1^2\omega_4\omega_1 + 3\omega_1 + v_1^2\omega_4 - 3v_1^2\omega_1 + 3cs^2\omega_4\omega_1)\frac{v_1\rho v_2}{12\omega_4\omega_1}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^3_x\mathrm{D}_y v_2} = (2\omega_3\omega_2 - 6v_1^2\omega_1\omega_2 - 2\omega_3\omega_1\omega_2 + 6\omega_3\omega_1 cs^2\omega_2 + 2\omega_3 v_1^2\omega_1\omega_2 + \omega_3 v_1^2\omega_1 - 18\omega_1 cs^2\omega_2 - 9\omega_3 v_2^2\omega_2 + 6\omega_1\omega_2 + \omega_3 v_1^2\omega_2 + 6\omega_3\omega_1 cs^2 - 4\omega_3\omega_1 + 9\omega_3\omega_1 v_2^2)\frac{v_1\rho v_2}{24\omega_3\omega_1\omega_2}$

coefficient $C^{(2)}_{\mathrm{D}^2_x\mathrm{D}^2_y\rho}$ **at** $\frac{\partial^4\rho}{\partial x_1^2\partial x_2^2}$**:**

$$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (24 - \omega^3 - 72cs^2 - 46\omega^2cs^2 + 14\omega^2 + 5\omega^3cs^2 + 36v_2^2\omega - 24v_2^2 - 36\omega + 108\omega cs^2 + v_2^2\omega^3 - 14v_2^2\omega^2)\,\tfrac{v_2cs^2}{12\omega^3}$$

$$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (-12\omega_9\omega_6^3cs^2\omega_7\omega_4^3 + 12\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 + 12\omega_9\omega_6^3cs^2\omega_7\omega_4\omega_8 - 12\omega_6^3cs^2\omega_4^2\omega_8^2 + 18\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4^3\omega_8^2 - 24\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_8^2 -$$
$$12\omega_9\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8 + 6\omega_6^3v_1^2\omega_4^3\omega_8^2 - 36\omega_9\omega_6cs^2v_1^2\omega_7\omega_4^3\omega_8 - 36\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4^2 - 36\omega_6^3cs^4\omega_7\omega_4^3\omega_8 + 12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8^2 + 2\omega_9\omega_6^2cs^2\omega_7\omega_4^3\omega_8^2 +$$
$$12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 - 12\omega_9\omega_6^3cs^2\omega_7\omega_4^2v_2^2\omega_8^2 - 12\omega_9v_1^2\omega_7\omega_4^3\omega_8^2 - 6\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 12\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8^2 - 2\omega_9\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8^2 - 18\omega_6^3cs^4\omega_4^3\omega_8^2 -$$
$$88\omega_9\omega_6^3cs^4\omega_7\omega_4^2\omega_8^2 - 84\omega_9\omega_6^2cs^4\omega_7\omega_4\omega_8^2 + 12\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_8^2 + 12\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8 + 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8 + 24\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8 +$$
$$12\omega_6^3cs^2\omega_7\omega_4^2v_2^2\omega_8 + 18\omega_9\omega_6^2cs^2v_1^2\omega_4^3\omega_8^2 + 12\omega_9\omega_6^2cs^4\omega_7\omega_4^3 + 12\omega_9\omega_6^3cs^2\omega_7\omega_4^2 - 6\omega_6^3v_1^2\omega_4^3v_2^2\omega_8^2 - 36\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4^2\omega_8 + 24\omega_9\omega_6^2v_1^2\omega_7\omega_4v_2^2\omega_8^2 -$$
$$18\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 + 12\omega_9\omega_6^3cs^2\omega_7\omega_4^3v_2^2 + 6\omega_6^2cs^2\omega_7\omega_4^3\omega_8^2 + 30\omega_9\omega_6^3cs^4\omega_7\omega_4^3\omega_8 + 36\omega_9cs^4\omega_7\omega_4^3\omega_8^2 + 36\omega_9\omega_6cs^2v_1^2\omega_7\omega_4^2\omega_8^2 - 36\omega_6^3cs^4\omega_7\omega_4^2\omega_8^2 +$$
$$36\omega_6^2cs^2v_1^2\omega_7\omega_4^3\omega_8 + 12\omega_6^3cs^2\omega_4^2v_2^2\omega_8^2 + 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 + 12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3 + 36\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4^3 + 36\omega_6^3cs^4\omega_4^2\omega_8^2 - 12\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8 -$$
$$36\omega_9\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 - 12\omega_6^2cs^2\omega_7\omega_4^3\omega_8 - 12\omega_9\omega_6^3cs^4\omega_7\omega_4^3 + 5\omega_9\omega_6^3cs^4\omega_7\omega_4^3\omega_8^2 - 18\omega_6^2cs^2v_1^2\omega_7\omega_4^3\omega_8^2 + 36\omega_6^3cs^4\omega_7\omega_4^2\omega_8 + 12\omega_9cs^2\omega_7\omega_4^3v_2^2\omega_8^2 -$$
$$12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2 - 6\omega_6^3v_1^2\omega_7\omega_4^3\omega_8^2 - 18\omega_9\omega_6^2cs^2\omega_7\omega_4^2\omega_8^2 + 36\omega_9cs^2v_1^2\omega_7\omega_4^3\omega_8^2 - 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3 - 12\omega_6^3cs^2\omega_7\omega_4^2v_2^2\omega_8^2 + 6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 -$$
$$6\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8^2 - 12\omega_6^3v_1^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_8 - 72\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4^2\omega_8^2 + 6\omega_6^3cs^2\omega_4^3\omega_8^2 + 18\omega_6^3cs^4\omega_7\omega_4^3\omega_8^2 - 12\omega_9\omega_6^2cs^2\omega_7\omega_4v_2^2\omega_8^2 -$$
$$54\omega_9\omega_6cs^2v_1^2\omega_7\omega_4^3\omega_8^2 - 12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8 - 18\omega_9\omega_6^2cs^2\omega_7\omega_4^3\omega_8 - 12\omega_9\omega_6^2v_1^2\omega_4^2v_2^2\omega_8^2 + 18\omega_9\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8 + 12\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8 +$$
$$12\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8 + 18\omega_9\omega_6^3cs^2\omega_7\omega_4^2v_2^2\omega_8 + 12\omega_9\omega_6^3cs^4\omega_7\omega_4^2 - 12\omega_9\omega_6^3cs^2\omega_7\omega_4^2v_2^2 + 12\omega_9\omega_6^2cs^2\omega_7\omega_4^3 - 42\omega_9\omega_6^3cs^4\omega_7\omega_4^2\omega_8 - 12\omega_9\omega_6^3cs^2\omega_7\omega_4\omega_8^2 -$$
$$36\omega_9\omega_6^2cs^2v_1^2\omega_4^2\omega_8^2 + 72\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4^3\omega_8 + 6\omega_9\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2 - 12\omega_9\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8^2 + 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^2 - 72\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4\omega_8 +$$
$$18\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2 + 12\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2 + 12\omega_9\omega_6^3cs^4\omega_7\omega_4\omega_8 - 6\omega_6^3cs^2\omega_4^3v_2^2\omega_8^2 - 36\omega_6^3cs^2v_1^2\omega_7\omega_4^3\omega_8 + 36\omega_6^3cs^2v_1^2\omega_4^2\omega_8^2 - 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3v_2^2\omega_8 -$$
$$12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8 - 12\omega_6^3cs^2\omega_7\omega_4^3v_2^2\omega_8 + 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3v_2^2 + 12\omega_9\omega_6^3cs^2\omega_7\omega_4^2\omega_8^2 + 108\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4^2\omega_8^2 + 108\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4^2\omega_8 + 12\omega_6^3cs^2\omega_7\omega_4^3\omega_8 +$$
$$12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8 + 12\omega_6^3v_1^2\omega_4^2v_2^2\omega_8^2 - 6\omega_9\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2 + 24\omega_9\omega_6^3v_1^2\omega_7\omega_4\omega_8 - 36\omega_6^3cs^2v_1^2\omega_7\omega_4^2\omega_8^2 - 12\omega_9\omega_6^3cs^2\omega_7\omega_4v_2^2\omega_8 +$$
$$12\omega_9\omega_6^2v_1^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6^2cs^2\omega_7\omega_4\omega_8^2 + \omega_9\omega_6^3cs^2\omega_7\omega_4^3v_2^2\omega_8^2 + 6\omega_6^3v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 + 18\omega_9\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_8^2 - 36\omega_9\omega_6cs^4\omega_7\omega_4^3\omega_8^2 + 12\omega_6^3cs^2\omega_7\omega_4^2\omega_8^2 -$$
$$6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2 - 18\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2 + 72\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4\omega_8^2 - 12\omega_9cs^2\omega_7\omega_4^3\omega_8^2 + 6\omega_9\omega_6^3cs^2\omega_7\omega_4^3\omega_8 - 36\omega_9\omega_6^2cs^4\omega_4^2\omega_8^2 - 12\omega_9\omega_6^2cs^2\omega_4^2v_2^2\omega_8^2 -$$
$$12\omega_6^3cs^2\omega_7\omega_4^2\omega_8 - 24\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8 - 36\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4^3\omega_8 + 150\omega_9\omega_6^2cs^4\omega_7\omega_4^2\omega_8^2 + 36\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2 - \omega_9\omega_6^3cs^2\omega_7\omega_4^3\omega_8^2 - 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^2v_2^2 +$$
$$6\omega_9\omega_6^2v_1^2\omega_4^3v_2^2\omega_8^2 - 18\omega_6^3cs^2v_1^2\omega_4^3\omega_8^2 + 12\omega_9\omega_6^3cs^2\omega_7\omega_4v_2^2\omega_8^2 + 36\omega_6^3cs^2v_1^2\omega_7\omega_4^2\omega_8^2 - 36\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4^3 + 18\omega_9\omega_6^2cs^4\omega_4^3\omega_8^2 +$$
$$12\omega_9\omega_6^3cs^2\omega_7\omega_4^3\omega_8 - 12\omega_9\omega_6^3cs^2\omega_7\omega_4^3\omega_8 - 96\omega_9\omega_6^3cs^4\omega_7\omega_4^2 + 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3 + 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 + 12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3 - 12\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8 - 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^2\omega_8 - 18\omega_6^2\omega_7cs^4\omega_4^3\omega_8^2 -$$
$$12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2 - 6\omega_6^3v_1^2\omega_7\omega_4^3\omega_8^2 + 108\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8 - 12\omega_9\omega_6^3\omega_7cs^2\omega_4\omega_8^2 + 12\omega_9\omega_6^2\omega_7cs^4\omega_4^3 - 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3 + 36\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^3 +$$
$$6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 12\omega_9\omega_6^3\omega_7cs^2\omega_4^2v_2^2 + 18\omega_9\omega_6^2v_1^2cs^2\omega_4^3\omega_8^2 - 12\omega_6^3v_1^2\omega_4^2\omega_8^2 + 12\omega_6^2\omega_7cs^2\omega_4^3v_2^2\omega_8 + 12\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8 - 18\omega_9\omega_6^2\omega_7cs^2\omega_4^3\omega_8 -$$
$$36\omega_6^3v_1^2\omega_7cs^2\omega_4^3\omega_8 - 36\omega_9\omega_6\omega_7cs^4\omega_4^3\omega_8^2 + 6\omega_9\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2 - 12\omega_9\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8^2 - 12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8 - 2\omega_9\omega_6^2\omega_7cs^2\omega_4^3v_2^2\omega_8^2 -$$
$$12\omega_9\omega_6^2v_1^2\omega_4^2v_2^2\omega_8^2 + 12\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8 + 12\omega_9\omega_6\omega_7cs^2\omega_4^3\omega_8 + 12\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8 + 72\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4\omega_8^2 + 18\omega_9\omega_6^2cs^4\omega_4^3\omega_8^2 -$$
$$6\omega_9\omega_6^2\omega_7cs^4\omega_4^3\omega_8^2 - 18\omega_9\omega_6^2\omega_7cs^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6^2cs^2\omega_4^2\omega_8^2 - 12\omega_9\omega_6\omega_7cs^2\omega_4^3v_2^2\omega_8 - 36\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6^3\omega_7cs^4\omega_4\omega_8 -$$
$$36\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^2 - 12\omega_6^2\omega_7cs^2\omega_4^3\omega_8 + 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^2 + 6\omega_9\omega_6^3\omega_7cs^2\omega_4^3\omega_8 - 12\omega_9\omega_7cs^2\omega_4^3\omega_8^2 + 18\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2 + 36\omega_9v_1^2\omega_7cs^2\omega_4^3\omega_8^2 +$$
$$12\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2 - 72\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^2\omega_8^2 - 12\omega_6^3cs^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^3 - 36\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8 - 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3v_2^2 -$$
$$12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8 - 24\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8 - 36\omega_9\omega_6^3cs^4\omega_4^3\omega_8 - 12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8 - 24\omega_9\omega_6^3v_1^2\omega_7\omega_4v_2^2\omega_8 +$$
$$24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2 - 88\omega_9\omega_6^3\omega_7cs^4\omega_4^2\omega_8^2 + 36\omega_6^2v_1^2\omega_7cs^2\omega_4^3\omega_8 - 12\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8 + 36\omega_9\omega_6v_1^2\omega_7cs^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8 +$$
$$36\omega_6^3v_1^2cs^2\omega_4^2\omega_8^2 - \omega_9\omega_6^3\omega_7cs^2\omega_4^3\omega_8^2 + 12\omega_9\omega_6^2\omega_7cs^2\omega_4^3 - 6\omega_9\omega_6^2v_1^2\omega_4^3\omega_8^2 - 36\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^2\omega_8 - 12\omega_6^3\omega_7cs^2\omega_4^2\omega_8)\,\tfrac{v_2}{12\omega_9\omega_6^3\omega_7\omega_4^3\omega_8^2}$$

$$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (-12\omega_9\omega_6\omega_7cs^2\omega_4^3v_2^2\omega_8^2 + 36\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8 + 12\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 48\omega_9\omega_6\omega_7cs^4\omega_4^2\omega_8^2 + 180\omega_9\omega_6^3\omega_7cs^4\omega_4\omega_8^2 -$$
$$24\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_8^2 + 6\omega_6^3v_1^2\omega_4^3\omega_8^2 + 12\omega_9\omega_6^3\omega_7cs^2\omega_4^3v_2^2 + 6\omega_6^2\omega_7cs^2\omega_4^3\omega_8^2 - 36\omega_9\omega_6^2v_1^2cs^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6^3\omega_7cs^4\omega_4^2 - 36\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^3\omega_8 +$$
$$12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8^2 + 18\omega_9\omega_6^2\omega_7cs^2\omega_4^3v_2^2\omega_8 + 18\omega_9\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8 + 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 - 12\omega_9v_1^2\omega_7\omega_4^3\omega_8^2 - 6\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 12\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8^2 +$$
$$12\omega_9\omega_6\omega_7cs^2\omega_4^3\omega_8^2 - 42\omega_9\omega_6^2\omega_7cs^4\omega_4^3\omega_8 - 12\omega_9\omega_6^2\omega_7cs^2\omega_4v_2^2\omega_8^2 + 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8 + 24\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8 + 18\omega_6^3v_1^2\omega_7cs^2\omega_4^3\omega_8^2 +$$
$$2\omega_9\omega_6^2\omega_7cs^2\omega_4^3\omega_8^2 - 6\omega_9\omega_6^2cs^2\omega_4^3\omega_8^2 - 12\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8^2 - 6\omega_6^2\omega_7cs^2\omega_4^3v_2^2\omega_8^2 - 6\omega_6^3v_1^2\omega_4^3v_2^2\omega_8^2 + 12\omega_9\omega_6\omega_7cs^4\omega_4^3\omega_8 + 12\omega_6^3cs^2\omega_4^2v_2^2\omega_8^2 +$$
$$24\omega_9\omega_6^2v_1^2\omega_7\omega_4v_2^2\omega_8^2 - 18\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 + 12\omega_9\omega_7cs^2\omega_4^3v_2^2\omega_8^2 - 36\omega_9\omega_6^2cs^2\omega_4^2\omega_8^2 + 150\omega_9\omega_6^2\omega_7cs^4\omega_4^2\omega_8^2 + 36\omega_6^2\omega_7cs^4\omega_4^3\omega_8 +$$
$$12\omega_9\omega_6^3\omega_7cs^2\omega_4\omega_8 - 12\omega_9\omega_6^3\omega_7cs^4\omega_4^3 + 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 + 12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3 - 12\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8 - 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^2\omega_8 - 18\omega_6^2\omega_7cs^4\omega_4^3\omega_8^2 -$$
$$12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2 - 6\omega_6^3v_1^2\omega_7\omega_4^3\omega_8^2 + 108\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8 - 12\omega_9\omega_6^3\omega_7cs^2\omega_4\omega_8^2 + 12\omega_9\omega_6^2\omega_7cs^4\omega_4^3 - 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3 + 36\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^3 +$$
$$6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 12\omega_9\omega_6^3\omega_7cs^2\omega_4^2v_2^2 + 18\omega_9\omega_6^2v_1^2cs^2\omega_4^3\omega_8^2 - 12\omega_6^3v_1^2\omega_4^2\omega_8^2 + 12\omega_6^2\omega_7cs^2\omega_4^3v_2^2\omega_8 + 12\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8 - 18\omega_9\omega_6^2\omega_7cs^2\omega_4^3\omega_8 -$$
$$36\omega_6^3v_1^2\omega_7cs^2\omega_4^3\omega_8 - 36\omega_9\omega_6\omega_7cs^4\omega_4^3\omega_8^2 + 6\omega_9\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2 - 12\omega_9\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8^2 - 12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8 - 2\omega_9\omega_6^2\omega_7cs^2\omega_4^3v_2^2\omega_8^2 -$$
$$12\omega_9\omega_6^2v_1^2\omega_4^2v_2^2\omega_8^2 + 12\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8 + 12\omega_9\omega_6\omega_7cs^2\omega_4^3\omega_8 + 12\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8 + 72\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4\omega_8^2 + 18\omega_9\omega_6^2cs^4\omega_4^3\omega_8^2 -$$
$$6\omega_9\omega_6^2\omega_7cs^4\omega_4^3\omega_8^2 - 18\omega_9\omega_6^2\omega_7cs^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6^2cs^2\omega_4^2\omega_8^2 - 12\omega_9\omega_6\omega_7cs^2\omega_4^3v_2^2\omega_8 - 36\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6^3\omega_7cs^4\omega_4\omega_8 -$$
$$36\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^2 - 12\omega_6^2\omega_7cs^2\omega_4^3\omega_8 + 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^2 + 6\omega_9\omega_6^3\omega_7cs^2\omega_4^3\omega_8 - 12\omega_9\omega_7cs^2\omega_4^3\omega_8^2 + 18\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2 + 36\omega_9v_1^2\omega_7cs^2\omega_4^3\omega_8^2 +$$
$$12\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2 - 72\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^2\omega_8^2 - 12\omega_6^3cs^2\omega_4^2\omega_8^2 + 18\omega_9\omega_6^2v_1^2cs^2\omega_4^3\omega_8^2 - 36\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8 - 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3v_2^2 -$$
$$12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8 - 24\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8 - 36\omega_9\omega_6^3cs^4\omega_4^3\omega_8 - 12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8 - 24\omega_9\omega_6^3v_1^2\omega_7\omega_4v_2^2\omega_8 +$$
$$24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2 - 88\omega_9\omega_6^3\omega_7cs^4\omega_4^2\omega_8^2 + 36\omega_6^2v_1^2\omega_7cs^2\omega_4^3\omega_8 - 12\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8 + 36\omega_9\omega_6v_1^2\omega_7cs^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8 +$$
$$36\omega_6^3v_1^2cs^2\omega_4^2\omega_8^2 - \omega_9\omega_6^3\omega_7cs^2\omega_4^3\omega_8^2 + 12\omega_9\omega_6^2\omega_7cs^2\omega_4^3 - 6\omega_9\omega_6^2v_1^2\omega_4^3\omega_8^2 - 36\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^2\omega_8 - 12\omega_6^3\omega_7cs^2\omega_4^2\omega_8)\,\tfrac{v_2}{12\omega_9\omega_6^3\omega_7\omega_4^3\omega_8^2}$$

$$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho} = (54\omega_9\omega_6^2\omega_7\omega_4^2\omega_8cs^2 + 6\omega_6^2\omega_7\omega_4^2\omega_8^2 + 12\omega_9\omega_6^3\omega_7\omega_4^2v_2^2 - 36\omega_9\omega_6^3\omega_7\omega_8cs^2 - 12\omega_9\omega_6^3\omega_7\omega_4v_2^2\omega_8^2 + 12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2 +$$
$$12\omega_9\omega_6^3\omega_7v_2^2\omega_8^2 + 54\omega_9\omega_6^3\omega_7\omega_4\omega_8cs^2 - 6\omega_9\omega_6^2\omega_4^2\omega_8^2 + 18\omega_6^3\omega_7\omega_4^2\omega_8^2cs^2 - 2\omega_9\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2 - 12\omega_9\omega_6^3\omega_7\omega_4^2 + 6\omega_9\omega_6^2\omega_4^2v_2^2\omega_8^2 - 18\omega_6^3\omega_4^2\omega_8^2cs^2 -$$
$$36\omega_9\omega_6^3\omega_7\omega_4cs^2 + 12\omega_6^3\omega_7\omega_4^2\omega_8 + 12\omega_9\omega_6^3\omega_7\omega_4\omega_8^2 + 36\omega_6^2\omega_7\omega_4^2\omega_8cs^2 + 12\omega_9\omega_6^2\omega_7\omega_8^2 + 12\omega_6^3\omega_4v_2^2\omega_8^2 - 12\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8^2 +$$
$$54\omega_9\omega_6^2\omega_7\omega_4\omega_8^2cs^2 - 36\omega_9\omega_6^2\omega_4\omega_8^2cs^2 - 12\omega_6^3\omega_7\omega_4v_2^2\omega_8^2 - 36\omega_9\omega_6\omega_7\omega_4^2\omega_8cs^2 + 36\omega_6^3\omega_7\omega_4\omega_8cs^2 - 6\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2 + 5\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2cs^2 -$$
$$12\omega_9\omega_7\omega_4^2\omega_8^2 + 12\omega_6^2\omega_7\omega_4^2v_2^2\omega_8 + 36\omega_9\omega_7\omega_4^2\omega_8^2cs^2 + 12\omega_6^3\omega_7\omega_4v_2^2\omega_8 - 12\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8 - 12\omega_9\omega_6^3\omega_7v_2^2\omega_8 - 6\omega_6^3\omega_7\omega_4^2\omega_8^2 +$$
$$18\omega_9\omega_6^2\omega_7\omega_4^2v_2^2\omega_8 + 6\omega_6^3\omega_4^2\omega_8^2 + 12\omega_9\omega_6^3\omega_7\omega_4 - 12\omega_9\omega_6^2\omega_7\omega_4^2v_2^2 - 18\omega_9\omega_6^3\omega_7\omega_4\omega_8 - 18\omega_9\omega_6^2\omega_7\omega_4\omega_8^2 - 12\omega_6^2\omega_7\omega_4^2\omega_8 + 12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2 -$$
$$12\omega_9\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2 + 18\omega_9\omega_6^3\omega_7\omega_4v_2^2\omega_8 - 36\omega_9\omega_6^2\omega_7\omega_8^2cs^2 + 6\omega_9\omega_6^3\omega_7\omega_4^2\omega_8 + 12\omega_6^3\omega_7\omega_4\omega_8^2 - 12\omega_6^3\omega_4\omega_8^2 - 36\omega_9\omega_6^2\omega_7\omega_4^2cs^2 - 12\omega_9\omega_6^3\omega_7\omega_8^2 -$$
$$12\omega_6^3\omega_7\omega_4^2v_2^2\omega_8 + 2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2 + 12\omega_9\omega_6^2\omega_7\omega_4^2 + 12\omega_9\omega_7\omega_4^2v_2^2\omega_8^2 - 6\omega_9\omega_6^3\omega_7\omega_4^2v_2^2\omega_8 + \omega_9\omega_6^3\omega_7\omega_4^2v_2^2\omega_8^2 - 18\omega_6^2\omega_7\omega_4^2\omega_8^2cs^2 -$$
$$36\omega_6^3\omega_7\omega_4\omega_8^2cs^2 - 12\omega_9\omega_6^2\omega_4v_2^2\omega_8^2 + 18\omega_9\omega_6^2\omega_7\omega_4v_2^2\omega_8^2 - 36\omega_9\omega_6\omega_7\omega_4^2\omega_8^2cs^2 + 36\omega_6^3\omega_4\omega_8^2cs^2 - 18\omega_9\omega_6^3\omega_7\omega_4^2\omega_8cs^2 + 12\omega_9\omega_6^3\omega_7\omega_8 -$$
$$12\omega_9\omega_6^3\omega_7\omega_4v_2^2 - 6\omega_6^3\omega_4^2v_2^2\omega_8^2 + 18\omega_9\omega_6^2\omega_4^2\omega_8^2cs^2 - 6\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2cs^2 - 18\omega_9\omega_6^2\omega_7\omega_4^2\omega_8 + 6\omega_6^3\omega_7\omega_4^2v_2^2\omega_8^2 + 36\omega_9\omega_6^3\omega_7\omega_8^2cs^2 + 12\omega_9\omega_6^2\omega_4\omega_8^2 -$$

$$40\omega_9\omega_6^3\omega_7\omega_4\omega_8^2cs^2-\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2+36\omega_9\omega_6^3\omega_7\omega_4^2cs^2-12\omega_6^3\omega_7\omega_4\omega_8-36\omega_6^3\omega_7\omega_4^2\omega_8cs^2)\frac{v_2cs^2}{12\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2}$$

$$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho}=(-18cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2+6\omega_6^2\omega_7\omega_4^2\omega_8^2+12\omega_9\omega_6^3\omega_7\omega_4^2v_2^2-12\omega_9\omega_6^3\omega_7\omega_4v_2^2\omega_8^2+36cs^2\omega_6^3\omega_4\omega_8^2+12\omega_9\omega_6\omega_7\omega_4^2\omega_8^2+$$
$$12\omega_9\omega_6^3\omega_7v_2^2\omega_8^2-6\omega_9\omega_6^2\omega_4^2\omega_8^2-2\omega_9\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2-12\omega_9\omega_6^3\omega_7\omega_4^2-36cs^2\omega_6^3\omega_7\omega_4^2\omega_8+6\omega_9\omega_6^2\omega_4^2v_2^2\omega_8^2+12\omega_6^3\omega_7\omega_4^2\omega_8+12\omega_9\omega_6^3\omega_7\omega_4\omega_8^2-$$
$$6\omega_9cs^2\omega_6^2\omega_7\omega_4^2\omega_8^2+12\omega_9\omega_6^2\omega_7\omega_8^2+12\omega_6^3\omega_4v_2^2\omega_8^2-12\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8^2-36\omega_9cs^2\omega_6^2\omega_4\omega_8^2-12\omega_6^3\omega_7\omega_4v_2^2\omega_8^2-36\omega_9cs^2\omega_6^3\omega_7\omega_8-$$
$$6\omega_6^2\omega_7\omega_4^2v_2^2\omega_8^2-18\omega_9cs^2\omega_6^3\omega_7\omega_4^2\omega_8-12\omega_9\omega_7\omega_4^2\omega_8^2+36\omega_9cs^2\omega_6^3\omega_7\omega_8^2+12\omega_6^2\omega_7\omega_4^2v_2^2\omega_8+5\omega_9cs^2\omega_6^3\omega_7\omega_4^2\omega_8^2+54\omega_9cs^2\omega_6^2\omega_7\omega_4^2\omega_8+$$
$$12\omega_6^3\omega_7\omega_4v_2^2\omega_8-12\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8-12\omega_9\omega_6^3\omega_7v_2^2\omega_8-6\omega_6^3\omega_7\omega_4^2\omega_8^2+18\omega_9\omega_6^2\omega_7\omega_4^2v_2^2\omega_8+18cs^2\omega_6^3\omega_7\omega_4^2\omega_8^2+6\omega_6^3\omega_4^2\omega_8^2+12\omega_9\omega_6^3\omega_7\omega_4-$$
$$12\omega_9\omega_6^2\omega_7\omega_4^2v_2^2-18\omega_9\omega_6^3\omega_7\omega_4\omega_8-18\omega_9\omega_6^2\omega_7\omega_4\omega_8^2-12\omega_6^2\omega_7\omega_4^2\omega_8-36\omega_9cs^2\omega_6^2\omega_7\omega_4^2+36cs^2\omega_6^2\omega_7\omega_4^2\omega_8+12\omega_9\omega_6\omega_7\omega_4^2\omega_8-$$
$$12\omega_9\omega_6^2\omega_7v_2^2\omega_8^2+18\omega_9\omega_6^3\omega_7\omega_4v_2^2\omega_8+6\omega_9\omega_6^3\omega_7\omega_4^2\omega_8+12\omega_6^3\omega_7\omega_4\omega_8^2-12\omega_6^3\omega_4\omega_8^2-36cs^2\omega_6^3\omega_7\omega_4\omega_8^2-12\omega_9\omega_6^3\omega_7\omega_8^2-12\omega_6^3\omega_7\omega_4^2v_2^2\omega_8+$$
$$2\omega_9\omega_6^2\omega_7\omega_4^2\omega_8^2+36\omega_9cs^2\omega_7\omega_4^2\omega_8^2-40\omega_9cs^2\omega_6^3\omega_7\omega_4\omega_8^2+12\omega_9\omega_6^2\omega_7\omega_4^2+12\omega_9\omega_7\omega_4^2v_2^2\omega_8^2-6\omega_9\omega_6^3\omega_7\omega_4^2v_2^2\omega_8-36\omega_9cs^2\omega_6^3\omega_7\omega_4-$$
$$36\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8^2+36\omega_9cs^2\omega_6^3\omega_7\omega_4^2+\omega_9\omega_6^3\omega_7\omega_4^2v_2^2\omega_8^2+54\omega_9cs^2\omega_6^2\omega_7\omega_4\omega_8^2-36\omega_9cs^2\omega_6\omega_7\omega_4^2\omega_8+18\omega_9cs^2\omega_6^2\omega_4^2\omega_8^2-12\omega_9\omega_6^2\omega_4v_2^2\omega_8^2+$$
$$18\omega_9\omega_6^2\omega_7\omega_4v_2^2\omega_8^2+54\omega_9cs^2\omega_6^3\omega_7\omega_4\omega_8+12\omega_9\omega_6^3\omega_7\omega_8-12\omega_9\omega_6^3\omega_7\omega_4v_2^2-6\omega_6^3\omega_4^2v_2^2\omega_8^2-18\omega_9\omega_6^2\omega_7\omega_4^2\omega_8+6\omega_6^3\omega_7\omega_4^2v_2^2\omega_8^2-18cs^2\omega_6^3\omega_4^2\omega_8^2+$$
$$12\omega_9\omega_6^2\omega_4\omega_8^2-\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2+36cs^2\omega_6^3\omega_7\omega_4\omega_8-12\omega_6^3\omega_7\omega_4\omega_8-36\omega_9cs^2\omega_6^2\omega_7\omega_8^2)\frac{cs^2v_2}{12\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2}$$

$$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho}=(12\omega_6\omega_2^3-36\omega_6^2cs^2\omega_2^2+5\omega_6^2\omega_3^2cs^2\omega_2^3+12\omega_6\omega_3v_2^2\omega_2^2+18\omega_6^2\omega_3^2\omega_2-12\omega_3v_2^2\omega_2^3+36\omega_6^2cs^2\omega_2^3+18\omega_6\omega_3v_2^2\omega_2^3+12\omega_6^2\omega_3^2cs^2\omega_2^2-$$
$$18\omega_6^2\omega_3^2v_2^2\omega_2-54\omega_6^2\omega_3^2cs^2\omega_2+4\omega_6^2\omega_3^2v_2^2\omega_2^2+54\omega_6\omega_3cs^2\omega_2^3-4\omega_6^2\omega_3^2\omega_2^2+12\omega_6^2v_2^2\omega_2^3-18\omega_6\omega_3\omega_2^3-36\omega_3cs^2\omega_2^3+36\omega_6^2\omega_3^2cs^2+12\omega_3\omega_2^3+$$
$$36\omega_6\omega_3cs^2\omega_2^2+\omega_6^2\omega_3^2v_2^2\omega_2^3-12\omega_6^2\omega_2^3-12\omega_6\omega_3\omega_2^2-\omega_6^2\omega_3^2\omega_2^3-12\omega_6^2v_2^2\omega_2^2-18\omega_6\omega_3^2cs^2\omega_2^3+6\omega_6^2\omega_3v_2^2\omega_2^2+36\omega_3^2cs^2\omega_2^3+12\omega_3^2\omega_2^2+$$
$$12\omega_6^2\omega_3\omega_2^3-6\omega_6\omega_3^2\omega_2^2-12\omega_6v_2^2\omega_2^3-12\omega_6^2\omega_3v_2^2\omega_2^2+18\omega_6\omega_3^2cs^2\omega_2^2+6\omega_6\omega_3^2\omega_2^3-6\omega_6^2\omega_3\omega_2^2-36\omega_3^2cs^2\omega_2^2-12\omega_3^2\omega_2^3-12\omega_3^2v_2^2\omega_2^2+12\omega_6^2\omega_2^2+$$
$$6\omega_6\omega_3^2v_2^2\omega_2^2-40\omega_6^2\omega_3cs^2\omega_2^3-36\omega_6cs^2\omega_2^3-12\omega_6^2\omega_2^3+12\omega_6^2\omega_3^2v_2^2+12\omega_3^2v_2^2\omega_2^3+18\omega_6^2\omega_3cs^2\omega_2^2-6\omega_6\omega_3^2v_2^2\omega_2^3)\frac{cs^2v_2}{12\omega_6^2\omega_3^2\omega_2^3}$$

$$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2\rho}=(-45\omega_3^2v_1^2\omega_1^2v_2^2\omega_2-12\omega_1^3v_2^2cs^2\omega_2^2-30\omega_3^2\omega_1v_2^2cs^2\omega_2^2+35\omega_3^2\omega_1^3cs^4\omega_2^2+144\omega_3\omega_1^2cs^4\omega_2^3-27\omega_3^2v_1^2\omega_1^3\omega_2^2-30\omega_3\omega_1v_2^2cs^2\omega_2^3-$$
$$6\omega_3^2\omega_1^2\omega_2-54\omega_3^2\omega_1^2cs^2\omega_2^2+12\omega_3\omega_1^3cs^2\omega_2^3-12\omega_3^2\omega_1^2v_2^2\omega_2^2+10\omega_3^2\omega_1^3cs^4\omega_2^3-54\omega_3^2v_1^4\omega_1^3\omega_2+108\omega_3\omega_1^2cs^4\omega_2^2+3\omega_3^2\omega_1v_2^2cs^2\omega_2^2+24\omega_1^3v_2^2cs^2\omega_2^3-$$
$$27\omega_3^2v_1^4\omega_1^2\omega_2^3+9\omega_3^2v_1^2\omega_2^3+41\omega_3^2\omega_1^2cs^2\omega_2^3-297\omega_3^2v_1^2\omega_1^2cs^2\omega_2+18\omega_3^2\omega_1^3v_2^2cs^2+99\omega_3^2v_1^2\omega_1^2\omega_2+90\omega_3^2\omega_1^3cs^4+6\omega_3\omega_1^3cs^2\omega_2-36\omega_1^2v_2^2cs^2\omega_2^2-$$
$$6\omega_3^2\omega_1^3\omega_2+270\omega_3^2v_1^2\omega_1^2cs^2\omega_2^2-90\omega_3^2v_1^2\omega_1^2\omega_2^2+27\omega_3^2v_1^4\omega_1^3\omega_2^2+6\omega_3^2\omega_1^2v_2^2\omega_2+12\omega_1^3cs^2\omega_2^2+63\omega_3^2\omega_1cs^4\omega_2^3+6\omega_3^2\omega_1^3+30\omega_3\omega_1cs^2\omega_2^3-$$
$$138\omega_3^2v_1^2\omega_1^2cs^2\omega_2^3+27\omega_3^2v_1^2\omega_1^2\omega_2^3+12\omega_3^2\omega_1^2\omega_2^2+99\omega_3^2v_1^2\omega_1^3\omega_2+54\omega_3^2v_1^4\omega_1^3+24\omega_3^2\omega_1^2cs^2\omega_2-108\omega_1^2cs^4\omega_2^3+18\omega_3^2cs^4\omega_2^3+18\omega_3^2v_2^2cs^2\omega_2^3-$$
$$90\omega_3^2\omega_1cs^4\omega_2^2+90\omega_3^2v_1^2\omega_1^2v_2^2\omega_2^2-24\omega_1^3cs^2\omega_2^3-54\omega_3^2v_1^4\omega_1^2\omega_2-117\omega_3^2\omega_1^3cs^4\omega_2-36\omega_3\omega_1^2cs^2\omega_2^2-6\omega_3^2\omega_1\omega_2^2+27\omega_3^2v_1^2\omega_1cs^2\omega_2^2-$$
$$2\omega_3^2\omega_1^3cs^2\omega_2^3-9\omega_3^2v_1^2\omega_1\omega_2^3-6\omega_3^2\omega_1^3v_2^2-459\omega_3^2v_1^2\omega_1^3cs^2\omega_2-54\omega_3^2v_1^4\omega_1^3-21\omega_3^2\omega_1^3v_2^2cs^2\omega_2+48\omega_3\omega_1^2v_2^2cs^2\omega_2^3+18\omega_3^2\omega_1^2v_2^2cs^2\omega_2^2-$$
$$72\omega_3^2\omega_1^3cs^2-45\omega_3^2v_1^2\omega_1v_2^2\omega_2^3-91\omega_3^2\omega_1^2cs^4\omega_2^3+36\omega_3\omega_1^2v_2^2cs^2\omega_2^2+45\omega_3^2v_1^2\omega_1^3v_2^2-9\omega_3^2v_1^2\omega_1\omega_2^2-48\omega_3\omega_1^2cs^2\omega_2^3-25\omega_3^2\omega_1^3cs^2\omega_2^2+$$
$$189\omega_3^2v_1^2\omega_1cs^2\omega_2^3-6\omega_3^2\omega_1\omega_2^3-45\omega_3^2v_1^2\omega_1^3v_2^2\omega_2-36\omega_3\omega_1^3cs^4\omega_2^3+54\omega_3^2\omega_1^2cs^4\omega_2^2+6\omega_3^2\omega_2^3-45\omega_3^2v_1^2\omega_1v_2^2\omega_2^2-6\omega_3\omega_1^3v_2^2cs^2\omega_2-$$
$$24\omega_3^2\omega_1^2v_2^2cs^2\omega_2^3+405\omega_3^2v_1^2\omega_1^3cs^2+6\omega_3^2\omega_1v_2^2\omega_2^3+54\omega_3^2v_1^4\omega_1\omega_2^2-90\omega_3\omega_1cs^4\omega_2^3+45\omega_3^2v_1^2v_2^2\omega_2^3-99\omega_3^2v_1^2\omega_1^3-18\omega_3^2\omega_1^2cs^4\omega_2+36\omega_1^2cs^2\omega_2^3+$$
$$2\omega_3^2\omega_1^3v_2^2cs^2\omega_2^3+48\omega_3^2\omega_1cs^2\omega_2^2+72\omega_1^3cs^4\omega_2^3+93\omega_3^2\omega_1^3cs^2\omega_2-12\omega_3\omega_1^3v_2^2cs^2\omega_2^3-6\omega_3^2\omega_1^3v_2^2cs^2\omega_2+6\omega_3^2\omega_1^3v_2^2\omega_2-18\omega_3\omega_1^3cs^4\omega_2-$$
$$6\omega_3^2v_2^2\omega_2^3+54\omega_3^2v_1^4\omega_1\omega_2^2+6\omega_3^2\omega_1v_2^2\omega_2^2-36\omega_1^3cs^4\omega_2^2+138\omega_3^2v_1^2\omega_1^3cs^2\omega_2^2-39\omega_3^2\omega_1cs^2\omega_2^3-135\omega_3^2v_1^2cs^2\omega_2^3+8\omega_3^2\omega_1^3v_2^2cs^2\omega_2^2)\frac{v_2}{24\omega_3^2\omega_1^3\omega_2^3}$$

coefficient $C^{(2)}_{\mathrm{D}_x^2\mathrm{D}_y^2v_1}$ **at** $\frac{\partial^4v_1}{\partial x_1^2\partial x_2^2}$**:**

$$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_1}=0$$

$$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_1}=(8\omega_9\omega_6^2cs^2\omega_7\omega_4^2\omega_8^2\omega_5+8\omega_9\omega_6^3cs^2\omega_7\omega_4^3\omega_8^2\omega_5-2\omega_9\omega_6^3cs^2\omega_4^3\omega_8^2\omega_5-6\omega_9\omega_6^3cs^2\omega_7^2\omega_4\omega_8\omega_5+2\omega_9\omega_6^2\omega_7^2\omega_4v_2^2\omega_8^2\omega_5+2\omega_6^3\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5-$$
$$4\omega_9\omega_6^3\omega_7^2\omega_4^2v_2^2\omega_5-8\omega_9\omega_6^3cs^2\omega_7^2\omega_4^2\omega_5-9\omega_9\omega_6^3\omega_7^2\omega_4^2\omega_8\omega_5+7\omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5-2\omega_9\omega_6^3\omega_7\omega_4^3v_2^2\omega_8^2\omega_5-2\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5-16\omega_9\omega_6^3cs^2\omega_7^2\omega_8^2\omega_5-$$
$$\omega_9\omega_6^3\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5+3\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5-8\omega_9\omega_6^3cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5+3\omega_9\omega_6^2cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5-4\omega_6^3cs^2\omega_7^2\omega_4^3\omega_8\omega_5-4\omega_9\omega_7^2\omega_4^3\omega_8^2\omega_5-4\omega_6^3\omega_7^2\omega_4^2\omega_8\omega_5-$$
$$4\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_5-2\omega_9\omega_6^3\omega_7^2\omega_4\omega_8^2\omega_5-2\omega_6^3\omega_7\omega_4^3v_2^2\omega_8^2\omega_5-15\omega_9\omega_6cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5-4\omega_6^3\omega_7\omega_4^2\omega_8^2\omega_5+4\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5-2\omega_6^3cs^2\omega_7\omega_4^3\omega_8^2\omega_5-$$
$$6\omega_9\omega_6^2\omega_7^2\omega_4v_2^2\omega_8\omega_5+4\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_5-6\omega_9\omega_6^2cs^2\omega_7^2\omega_4\omega_8^2\omega_5+8\omega_9\omega_6^3cs^2\omega_7^2\omega_4^3\omega_5+4\omega_6^3\omega_7\omega_4^2v_2^2\omega_8^2\omega_5-4\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5+4\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5+$$
$$2\omega_9\omega_6^3cs^2\omega_7^2\omega_4^2\omega_8^2-4\omega_6^3cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5-4\omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_5-2\omega_6^2cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5+4\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_5-2\omega_6^3\omega_7^2\omega_4^3\omega_8^2\omega_5-4\omega_6^3\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5+$$
$$2\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2\omega_5-4\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_8\omega_5+\omega_9\omega_6^3\omega_7\omega_4^3v_2^2\omega_8^2\omega_5+12\omega_9cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5-2\omega_9\omega_6^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5+12\omega_9\omega_6^3cs^2\omega_7\omega_4\omega_8^2\omega_5-$$
$$7\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5-5\omega_9\omega_6^3cs^2\omega_7^2\omega_4^3\omega_8\omega_5+2\omega_9\omega_6^2cs^2\omega_7^2\omega_4^2\omega_8\omega_5+4\omega_6^3\omega_7^2\omega_4^3\omega_8\omega_5+4\omega_6^3\omega_7^2\omega_4^2v_2^2\omega_8\omega_5+4\omega_6^3cs^2\omega_7^2\omega_4^2\omega_8\omega_5+4\omega_6^2cs^2\omega_7^2\omega_4^3\omega_8\omega_5-$$
$$8\omega_9\omega_6^2cs^2\omega_7^2\omega_4^3\omega_5-5\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5+4\omega_9\omega_6^3cs^2\omega_7\omega_4^2\omega_8^2-\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5-\omega_9\omega_6^2cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5-3\omega_9\omega_6^2\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5-$$
$$3\omega_9\omega_6^3\omega_7^2\omega_4^3v_2^2\omega_8\omega_5+3\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_8\omega_5+4\omega_9\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5+5\omega_9\omega_6\omega_7^2\omega_4^3\omega_8^2\omega_5-8\omega_9\omega_6cs^2\omega_7^2\omega_4^3\omega_8\omega_5+2\omega_9\omega_6^3\omega_7^2\omega_4v_2^2\omega_8^2\omega_5-$$
$$4\omega_9\omega_6^2cs^2\omega_7\omega_4^3\omega_8^2\omega_5+4\omega_9\omega_6^3cs^2\omega_4^2\omega_8^2\omega_5-24\omega_9\omega_6^3cs^2\omega_7\omega_4^2\omega_8^2\omega_5+4\omega_9\omega_6^3\omega_7^2\omega_4^3v_2^2\omega_5-4\omega_9\omega_6^3cs^2\omega_7^2\omega_4\omega_8^2+2\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5-$$
$$2\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5+11\omega_9\omega_6^3cs^2\omega_7^2\omega_4^2\omega_8\omega_5+2\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5+13\omega_9\omega_6^2cs^2\omega_7^2\omega_4^3\omega_8\omega_5-2\omega_9\omega_6^3cs^2\omega_7\omega_4^3\omega_8^2+9\omega_9\omega_6^3\omega_7^2\omega_4^2v_2^2\omega_8\omega_5+$$
$$4\omega_6^3\omega_7^2\omega_4^2\omega_8^2\omega_5+2\omega_6^3cs^2\omega_7^2\omega_4^3\omega_8^2\omega_5-\omega_9\omega_6^3\omega_7\omega_4^3\omega_8^2\omega_5+6\omega_9\omega_6^3\omega_7^2\omega_4\omega_8^2\omega_5-2\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5+26\omega_9\omega_6^3cs^2\omega_7^2\omega_4\omega_8^2\omega_5-4\omega_6^3\omega_7^2\omega_4^3v_2^2\omega_8\omega_5+$$
$$\omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5+\omega_9\omega_6^3\omega_7^2\omega_4^2\omega_8^2\omega_5+4\omega_6^3cs^2\omega_7\omega_4^2\omega_8^2\omega_5+2\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5+2\omega_9\omega_6cs^2\omega_7^2\omega_4^2\omega_8^2\omega_5+2\omega_6^3\omega_7\omega_4^3\omega_8^2\omega_5)\frac{v_1\rho v_2}{2\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_8^2\omega_5}$$

$$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_1}=(2\omega_6^3\omega_7^2cs^2\omega_4^3\omega_8^2\omega_5+12\omega_9\omega_6^3\omega_7cs^2\omega_4\omega_8^2\omega_5+2\omega_9\omega_6^2\omega_7^2\omega_4v_2^2\omega_8^2\omega_5+2\omega_6^3\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5-4\omega_9\omega_6^3\omega_7^2\omega_4^2v_2^2\omega_5-2\omega_9\omega_6^3cs^2\omega_4^3\omega_8^2\omega_5-$$
$$9\omega_9\omega_6^3\omega_7^2\omega_4^2\omega_8\omega_5+7\omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5-2\omega_9\omega_6^3\omega_7\omega_4^3v_2^2\omega_8^2\omega_5-2\omega_9\omega_6\omega_7^2\omega_4^2\omega_8^2\omega_5+13\omega_9\omega_6^2\omega_7^2cs^2\omega_4^3\omega_8\omega_5+11\omega_9\omega_6^3\omega_7^2cs^2\omega_4^2\omega_8\omega_5+$$
$$2\omega_9\omega_6\omega_7^2cs^2\omega_4^2\omega_8^2\omega_5-\omega_9\omega_6^3\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5+3\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8^2\omega_5+2\omega_9\omega_6^3\omega_7^2cs^2\omega_4^2\omega_8^2-2\omega_6^3\omega_7cs^2\omega_4^3\omega_8^2\omega_5-4\omega_9\omega_7^2\omega_4^3\omega_8^2\omega_5-4\omega_6^3\omega_7^2\omega_4^2\omega_8\omega_5+$$
$$26\omega_9\omega_6^3\omega_7^2cs^2\omega_4\omega_8^2\omega_5-4\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_5-2\omega_9\omega_6^3\omega_7^2\omega_4\omega_8^2\omega_5-2\omega_6^3\omega_7\omega_4^3v_2^2\omega_8^2\omega_5+8\omega_9\omega_6^3\omega_7^2cs^2\omega_4^3\omega_5-4\omega_6^3\omega_7\omega_4^2\omega_8^2\omega_5-\omega_9\omega_6^2\omega_7^2cs^2\omega_4^2\omega_8^2\omega_5+$$
$$4\omega_9\omega_6\omega_7^2\omega_4^3\omega_8\omega_5+4\omega_6^2\omega_7^2cs^2\omega_4^3\omega_8\omega_5+4\omega_6^3\omega_7^2cs^2\omega_4^2\omega_8\omega_5-6\omega_9\omega_6^3\omega_7^2\omega_4v_2^2\omega_8\omega_5+4\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_5+4\omega_6^3\omega_7\omega_4^2v_2^2\omega_8^2\omega_5-4\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5+$$

$4\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 - 4\omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_5 + 4\omega_9\omega_6^3\omega_7^2\omega_4^2\omega_5 - 2\omega_6^3\omega_7^2\omega_4^3\omega_8^2\omega_5 - 8\omega_9\omega_6^3\omega_7^2cs^2\omega_4^2\omega_5 - 4\omega_6^3\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5 + 2\omega_9\omega_6^3\omega_7\omega_4^2\omega_8^2\omega_5 - 4\omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 + \omega_9\omega_6^3\omega_7\omega_4^3v_2^2\omega_8^2\omega_5 - 16\omega_9\omega_6^3\omega_7^2cs^2\omega_8^2\omega_5 - 8\omega_9\omega_6\omega_7^2cs^2\omega_4^3\omega_8\omega_5 - 2\omega_9\omega_6^2\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 - 7\omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8\omega_5 + 8\omega_9\omega_6^2\omega_7cs^2\omega_4^2\omega_8^2\omega_5 + 8\omega_9\omega_6^3\omega_7cs^2\omega_4^3\omega_8^2\omega_5 - 6\omega_9\omega_6^2\omega_7^2cs^2\omega_4\omega_8^2\omega_5 + 4\omega_6^3\omega_7^2\omega_4^3\omega_8\omega_5 + 4\omega_6^3\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 + 4\omega_6^3\omega_7cs^2\omega_4^2\omega_8^2\omega_5 - 5\omega_9\omega_6\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5 - \omega_9\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 3\omega_9\omega_6^2\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5 - 15\omega_9\omega_6\omega_7^2cs^2\omega_4^3\omega_8^2\omega_5 - 3\omega_9\omega_6^3\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 + 4\omega_9\omega_6^3cs^2\omega_4^2\omega_8^2\omega_5 + 3\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_8\omega_5 + 4\omega_9\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5 + 4\omega_9\omega_6^3\omega_7cs^2\omega_4^2\omega_8^2\omega_5 + 2\omega_9\omega_6^3\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5 - 2\omega_6^2\omega_7^2cs^2\omega_4^3\omega_8^2\omega_5 - 4\omega_6^3\omega_7^2cs^2\omega_4^2\omega_8^2\omega_5 + 4\omega_9\omega_6^3\omega_7^2\omega_4^2v_2^2\omega_5 + 2\omega_6^2\omega_7^2\omega_4^3\omega_8^2\omega_5 - 2\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5 - 4\omega_9\omega_6^2\omega_7cs^2\omega_4^3\omega_8^2\omega_5 + 2\omega_9\omega_6^2\omega_7^2\omega_4^2\omega_8\omega_5 - 24\omega_9\omega_6^3\omega_7cs^2\omega_4^2\omega_8^2\omega_5 + 9\omega_9\omega_6^3\omega_7^2\omega_4^2v_2^2\omega_8\omega_5 - 6\omega_9\omega_6^3\omega_7^2cs^2\omega_4\omega_8\omega_5 + 4\omega_6^3\omega_7^2\omega_4^2\omega_8^2\omega_5 - 4\omega_9\omega_6^3\omega_7^2cs^2\omega_4\omega_8^2 - \omega_9\omega_6^3\omega_7\omega_4^3\omega_8^2\omega_5 + 6\omega_9\omega_6^3\omega_7^2\omega_4\omega_8\omega_5 - 2\omega_9\omega_6^2\omega_7^2\omega_4\omega_8^2\omega_5 - 8\omega_9\omega_6^2\omega_7^2cs^2\omega_4^3\omega_5 - 4\omega_6^3\omega_7^2cs^2\omega_4^3\omega_8\omega_5 - 4\omega_6^3\omega_7^2\omega_4^3v_2^2\omega_8\omega_5 + \omega_9\omega_6^2\omega_7^2\omega_4^3v_2^2\omega_8^2\omega_5 - 2\omega_9\omega_6^3\omega_7cs^2\omega_4^3\omega_8^2 + \omega_9\omega_6^3\omega_7^2\omega_4^2\omega_8^2\omega_5 + 2\omega_9\omega_6\omega_7^2\omega_4^2v_2^2\omega_8^2\omega_5 + 3\omega_9\omega_6^2\omega_7^2cs^2\omega_4^3\omega_8^2\omega_5 - 8\omega_9\omega_6^3\omega_7^2cs^2\omega_4^2\omega_8^2\omega_5 + 2\omega_6^3\omega_7\omega_4^3\omega_8^2\omega_5)\frac{v_1\rho v_2}{2\omega_9\omega_6^3\omega_7^2\omega_4^3\omega_8^2\omega_5}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_1} = 0$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_1} = 0$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_1} = 0$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_1} = (-54\omega_1cs^2\omega_2^3 + 198\omega_3v_1^2\omega_1^3 - 36\omega_1^2\omega_2^2 - 54\omega_3cs^2\omega_2^3 + 216\omega_3v_1^2\omega_1\omega_2^3 - 18\omega_1^3v_2^2\omega_2 + 36\omega_3v_2^2\omega_2^3 - 54\omega_1^3cs^2\omega_2 + 162\omega_3v_1^2\omega_1\omega_2^2 + 18\omega_1^3\omega_2 + 84\omega_3\omega_1^3cs^2\omega_2^2 - 18\omega_1v_2^2\omega_2^3 - 297\omega_3\omega_1^3cs^2\omega_2 + 36\omega_3\omega_1^3v_2^2 - 54\omega_3\omega_1cs^2\omega_2^2 - 18\omega_3\omega_1\omega_2^2 - 27\omega_3\omega_1v_2^2\omega_2^3 + 270\omega_3\omega_1^3cs^2 + 54\omega_3\omega_2^3 + 135\omega_3\omega_1cs^2\omega_2^3 - 81\omega_3\omega_1\omega_2^3 - 36\omega_3\omega_1v_2^2\omega_2^2 - 27\omega_3\omega_1^3v_2^2\omega_2 + 135\omega_3\omega_1^3\omega_2 + 162\omega_3\omega_1^2cs^2\omega_2^2 + 46\omega_3\omega_1^2\omega_2^3 + 100\omega_3v_1^2\omega_1^3\omega_2^2 - 162\omega_3v_1^2\omega_1^2\omega_2 - 54\omega_3\omega_1^2cs^2\omega_2^3 + 54\omega_3\omega_1^2v_2^2\omega_2^2 - 126\omega_3\omega_1^3 - 36\omega_3\omega_1^2v_2^2\omega_2 + 18\omega_1\omega_2^3 + 36\omega_1^2v_2^2\omega_2^2 + 90\omega_3\omega_1^2\omega_2 + 108\omega_1^2cs^2\omega_2^2 - 198\omega_3v_1^2\omega_2^3 - 162\omega_3\omega_1^2cs^2\omega_2 - 46\omega_3\omega_1^3\omega_2^2 - 100\omega_3v_1^2\omega_1^2\omega_2^3 - 216\omega_3v_1^2\omega_1^3\omega_2)\frac{v_1\rho v_2}{24\omega_3\omega_1^3\omega_2^3}$

coefficient $C^{(2)}_{\mathrm{D}_x^2\mathrm{D}_y^2v_2}$ **at** $\frac{\partial^4v_2}{\partial x_1^2\partial x_2^2}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_2} = (-24 + 12cs^2 + 8\omega^2cs^2 - 12\omega^2 - \omega^3cs^2 - 108v_2^2\omega + 72v_2^2 + 36\omega - 18\omega cs^2 + 36v_2^2\omega^2)\frac{\rho cs^2}{12\omega^3}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_2} = (36\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 12\omega_9\omega_6^3cs^2\omega_7\omega_4\omega_8 - 12\omega_6^3cs^2\omega_4^2\omega_8^2 + 6\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4^3\omega_8^2 - 24\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_8^2 + 72\omega_9\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8 + 6\omega_6^3v_1^2\omega_4^3\omega_8^2 - 12\omega_9\omega_6cs^2v_1^2\omega_7\omega_4^3\omega_8 - 12\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4^2 - 12\omega_6^3cs^4\omega_7\omega_4^3\omega_8 + 12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8^2 + 6\omega_9\omega_6^2cs^2\omega_7\omega_4^3\omega_8^2 + 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 - 42\omega_9\omega_6^3cs^2\omega_7\omega_4^2v_2^2\omega_8^2 - 12\omega_9v_1^2\omega_7\omega_4^3\omega_8^2 - 18\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 36\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8^2 - 18\omega_9\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8^2 - 6\omega_6^3cs^4\omega_4^3\omega_8^2 - 4\omega_9\omega_6^3cs^4\omega_7\omega_4^2\omega_8^2 - 12\omega_9\omega_6^2cs^4\omega_7\omega_4\omega_8^2 - 6\omega_9\omega_6cs^2\omega_7\omega_4^3\omega_8^2 + 36\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8 + 108\omega_9\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8 + 72\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8 + 36\omega_6^3cs^2\omega_7\omega_4^2v_2^2\omega_8 + 6\omega_9\omega_6^2cs^2v_1^2\omega_4^3\omega_8^2 - 18\omega_6^3v_1^2\omega_4^3v_2^2\omega_8^2 - 12\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4^2\omega_8 + 72\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_2^2\omega_8^2 - 54\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 24\omega_9\omega_6^3cs^2\omega_7\omega_4^3v_2^2 + 6\omega_6^2cs^2\omega_7\omega_4^3\omega_8^2 + 12\omega_9\omega_6^3cs^4\omega_7\omega_4^3\omega_8 + 12\omega_9\omega_6cs^2v_1^2\omega_7\omega_4^2\omega_8^2 - 12\omega_6^3cs^4\omega_7\omega_4^2\omega_8^2 + 12\omega_6^2cs^2v_1^2\omega_7\omega_4^3\omega_8 + 36\omega_6^3cs^2\omega_4^2v_2^2\omega_8^2 + 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 - 12\omega_9\omega_6^2cs^2\omega_7\omega_4^2\omega_8 + 12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3 + 12\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4^3 + 12\omega_6^3cs^4\omega_4^2\omega_8^2 - 36\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8 - 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^2\omega_8 - 12\omega_6^2cs^2\omega_7\omega_4^3\omega_8 - \omega_9\omega_6^3cs^4\omega_7\omega_4^3\omega_8^2 - 6\omega_6^2cs^2v_1^2\omega_7\omega_4^3\omega_8^2 + 12\omega_6^3cs^4\omega_7\omega_4^2\omega_8 - 36\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2 - 6\omega_6^3v_1^2\omega_7\omega_4^3\omega_8^2 - 24\omega_9\omega_6^2cs^2\omega_7\omega_4^2\omega_8^2 + 12\omega_9cs^2v_1^2\omega_7\omega_4^3\omega_8^2 - 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3 - 36\omega_6^3cs^2\omega_7\omega_4^2v_2^2\omega_8^2 + 18\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 18\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8^2 - 12\omega_6^3v_1^2\omega_4^2\omega_8^2 - 24\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4^2\omega_8^2 + 6\omega_6^3cs^2\omega_4^3\omega_8^2 + 6\omega_6^3cs^4\omega_7\omega_4^3\omega_8^2 - 84\omega_9\omega_6^2cs^2\omega_7\omega_4v_2^2\omega_8^2 - 18\omega_9\omega_6cs^2v_1^2\omega_7\omega_4^3\omega_8^2 - 12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8^2 + 12\omega_9\omega_6^2cs^2\omega_7\omega_4^3\omega_8 - 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^2\omega_8 - 12\omega_6^2cs^2\omega_7\omega_4^3\omega_8 - 144\omega_9\omega_6^2cs^2\omega_7\omega_4^3v_2^2\omega_8 + 36\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8 + 36\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8 - 132\omega_9\omega_6^3cs^2\omega_7\omega_4^2v_2^2\omega_8 + 24\omega_9\omega_6^3cs^2\omega_7\omega_4^2v_2^2 - 24\omega_9\omega_6^3cs^4\omega_7\omega_4^2\omega_8 - 12\omega_9\omega_6^2cs^2v_1^2\omega_4^2\omega_8^2 + 24\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4^3\omega_8 + 18\omega_9\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2 - 48\omega_9\omega_6^3cs^2\omega_7v_2^2\omega_8^2 + 18\omega_9\omega_6cs^2\omega_7\omega_4^3v_2^2\omega_8^2 + 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^2 + 12\omega_9\omega_6cs^2\omega_7\omega_4^2\omega_8^2 - 24\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4\omega_8 + 18\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2 + 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8^2 + 12\omega_9\omega_6^3cs^4\omega_7\omega_4\omega_8 - 18\omega_6^3cs^2\omega_4^3v_2^2\omega_8^2 - 12\omega_6^3cs^2v_1^2\omega_7\omega_4^3\omega_8 + 12\omega_6^3cs^2v_1^2\omega_4^2\omega_8^2 - 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^3v_2^2\omega_8 - 36\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8 - 36\omega_6^3cs^2\omega_7\omega_4^3v_2^2\omega_8 + 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^3v_2^2 + 6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2 + 36\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4^2\omega_8 + 12\omega_6^3cs^2\omega_7\omega_4^3\omega_8 + 12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8 + 36\omega_6^3v_1^2\omega_4^2v_2^2\omega_8^2 - 6\omega_9\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2 - 6\omega_9\omega_6^2cs^2\omega_4^3\omega_8^2 + 24\omega_9\omega_6^3v_1^2\omega_7\omega_4\omega_8 - 12\omega_6^3cs^2v_1^2\omega_7\omega_4^2\omega_8^2 + 60\omega_9\omega_6^3cs^2\omega_7\omega_4v_2^2\omega_8 + 12\omega_9\omega_6^2v_1^2\omega_4^2\omega_8^2 + 12\omega_9\omega_6^2cs^2\omega_7\omega_4\omega_8^2 + 18\omega_6^3v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 + 180\omega_9\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_8^2 + 6\omega_9\omega_6cs^4\omega_7\omega_4^3\omega_8^2 + 12\omega_6^3cs^2\omega_7\omega_4^2\omega_8^2 - 6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2 + 12\omega_9\omega_6^2cs^4\omega_7\omega_4^2\omega_8 - 6\omega_6^2cs^4\omega_7\omega_4^3\omega_8^2 + 24\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4\omega_8^2 - 12\omega_9\omega_6^3cs^2\omega_7\omega_4^3\omega_8 - 12\omega_9\omega_6^2cs^4\omega_4^2\omega_8^2 - 36\omega_9\omega_6^2cs^2\omega_4^2v_2^2\omega_8^2 - 12\omega_6^2cs^2\omega_7\omega_4^2\omega_8 - 24\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8 - 12\omega_9\omega_6^3cs^2v_1^2\omega_7\omega_4^3\omega_8 + 24\omega_9\omega_6^2cs^4\omega_7\omega_4^2\omega_8^2 - 108\omega_9\omega_6cs^2\omega_7\omega_4^2v_2^2\omega_8^2 + 12\omega_6^2cs^4\omega_7\omega_4^3\omega_8 - 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^2v_2^2 + 18\omega_9\omega_6^2v_1^2\omega_4^3v_2^2\omega_8^2 - 6\omega_6^3cs^2v_1^2\omega_4^3\omega_8^2 + 84\omega_9\omega_6^3cs^2\omega_7\omega_4v_2^2\omega_8^2 + 12\omega_6^3cs^2v_1^2\omega_7\omega_4^2\omega_8 - 12\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2 + 60\omega_9\omega_6^2cs^2\omega_7\omega_4^2v_2^2\omega_8 - 36\omega_6^3v_1^2\omega_7\omega_4^3v_2^2\omega_8 + 78\omega_9\omega_6^3cs^2\omega_7\omega_4^3v_2^2\omega_8 - 12\omega_9\omega_6^3cs^4\omega_7\omega_4^2 + 18\omega_6^3cs^2\omega_7\omega_4^3v_2^2\omega_8^2 - 72\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8^2 - 12\omega_9\omega_6^2cs^2v_1^2\omega_7\omega_4^3 + 6\omega_9\omega_6^2cs^4\omega_4^3\omega_8^2 + 24\omega_9\omega_6^3cs^2\omega_7\omega_4^2\omega_8 - 12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8 + 24\omega_9\omega_6^2cs^2\omega_7\omega_4^3v_2^2 - 72\omega_9\omega_6^3v_1^2\omega_7\omega_4v_2^2\omega_8 - 6\omega_6^3cs^2\omega_7\omega_4^3\omega_8^2 + 24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2 - 12\omega_9\omega_6^2cs^4\omega_7\omega_4^3\omega_8 + 12\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8 - 6\omega_9\omega_6^2v_1^2\omega_4^3\omega_8^2 - 12\omega_9\omega_6cs^4\omega_7\omega_4^2\omega_8^2 + 12\omega_9\omega_6^2cs^2\omega_4^2\omega_8^2 + 18\omega_9\omega_6^3cs^4\omega_7\omega_4\omega_8^2 + 6\omega_6^3cs^2v_1^2\omega_7\omega_4^3\omega_8^2)\frac{\rho}{12\omega_9\omega_6^3\omega_7\omega_4^3\omega_8^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_2} = (18\omega_9\omega_6\omega_7cs^2\omega_4^3v_2^2\omega_8^2 + 12\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8 - 12\omega_9\omega_6^2\omega_7cs^2\omega_4^2\omega_8 + 36\omega_9v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 12\omega_9\omega_6\omega_7cs^4\omega_4^2\omega_8^2 + 18\omega_9\omega_6^3\omega_7cs^4\omega_4\omega_8^2 - 24\omega_9\omega_6^2v_1^2\omega_7\omega_4\omega_8^2 + 6\omega_6^3v_1^2\omega_4^3\omega_8^2 - 24\omega_9\omega_6^3\omega_7cs^2\omega_4^3v_2^2 + 6\omega_6^2\omega_7cs^2\omega_4^3\omega_8^2 - 12\omega_9\omega_6^2v_1^2cs^2\omega_4^2\omega_8^2 - 12\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^3\omega_8 + 12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8^2 - 144\omega_9\omega_6^2\omega_7cs^2\omega_4^3v_2^2\omega_8 - 132\omega_9\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8 + 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 - 12\omega_9v_1^2\omega_7\omega_4^3\omega_8^2 - 18\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 36\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8^2 - 6\omega_9\omega_6\omega_7cs^2\omega_4^3\omega_8^2 - 12\omega_9\omega_6^2\omega_7cs^4\omega_4^3\omega_8 - 84\omega_9\omega_6^2\omega_7cs^2\omega_4v_2^2\omega_8^2 + 108\omega_9\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8 + 72\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8 + 6\omega_6^3v_1^2\omega_7cs^2\omega_4^3\omega_8^2 + 6\omega_9\omega_6^2\omega_7cs^2\omega_4^3\omega_8^2 - 6\omega_9\omega_6^2cs^2\omega_4^3\omega_8^2 - 36\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8^2 - 18\omega_6^2\omega_7cs^2\omega_4^3v_2^2\omega_8^2 - 18\omega_6^3v_1^2\omega_4^3v_2^2\omega_8^2 + 36\omega_6^3cs^2\omega_4^2v_2^2\omega_8^2 + 72\omega_9\omega_6^2v_1^2\omega_7\omega_4v_2^2\omega_8^2 - 54\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 - 12\omega_9\omega_6^2cs^4\omega_4^2\omega_8^2 + 24\omega_9\omega_6^2\omega_7cs^4\omega_4^2\omega_8^2 + 12\omega_6^2\omega_7cs^4\omega_4^3\omega_8 - 12\omega_9\omega_6^3\omega_7cs^2\omega_4\omega_8 + 12\omega_6^3v_1^2\omega_7\omega_4^3\omega_8 + 12\omega_9\omega_6^2v_1^2\omega_7\omega_4^3 + 12\omega_9\omega_6cs^2\omega_4^2\omega_8^2 - 36\omega_9\omega_6v_1^2\omega_7\omega_4^3v_2^2\omega_8 - 48\omega_9\omega_6^3\omega_7cs^2v_2^2\omega_8^2 - 36\omega_9\omega_6^3v_1^2\omega_7\omega_4^2\omega_8 + 12\omega_9\omega_6^2\omega_7cs^4\omega_4^2\omega_8 - 6\omega_6^2\omega_7cs^4\omega_4^3\omega_8^2 - 36\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2 - 6\omega_6^3v_1^2\omega_7\omega_4^3\omega_8^2 + 36\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8 - 12\omega_9\omega_6^3v_1^2\omega_7\omega_4^3 + 12\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^3 + 18\omega_9\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8^2 +$

$$24\omega_9\omega_6^3\omega_7 cs^2\omega_4^2v_2^2+6\omega_9\omega_6^2v_1^2cs^2\omega_4^3\omega_8^2-12\omega_6^3v_1^2\omega_4^2\omega_8^2+36\omega_6^2\omega_7cs^2\omega_4^3v_2^2\omega_8+36\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8+12\omega_9\omega_6^2\omega_7cs^2\omega_4^3\omega_8-12\omega_6^3v_1^2\omega_7cs^2\omega_4^3\omega_8+6\omega_9\omega_6\omega_7cs^4\omega_4^3\omega_8^2+18\omega_9\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2-42\omega_9\omega_6^3\omega_7cs^2\omega_4^2v_2^2\omega_8^2-12\omega_6^3v_1^2\omega_7\omega_4^2\omega_8-18\omega_9\omega_6^2\omega_7cs^2\omega_4^3v_2^2\omega_8^2-36\omega_9\omega_6^2v_1^2\omega_4^2v_2^2\omega_8^2+36\omega_6^3v_1^2\omega_7\omega_4^2v_2^2\omega_8+36\omega_6^2v_1^2\omega_7\omega_4^3v_2^2\omega_8+24\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4\omega_8^2+6\omega_9\omega_6^2cs^4\omega_4^3\omega_8^2-6\omega_9\omega_6^2\omega_7cs^4\omega_4^3\omega_8^2-24\omega_9\omega_6^2\omega_7cs^2\omega_4^3\omega_8^2+12\omega_9\omega_6^2cs^2\omega_4^2\omega_8^2+72\omega_9\omega_6\omega_7cs^2\omega_4^3v_2^2\omega_8-12\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8^2+12\omega_9\omega_6^3\omega_7cs^4\omega_4\omega_8-12\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^2-12\omega_6^2\omega_7cs^2\omega_4^3\omega_8+12\omega_9\omega_6^3v_1^2\omega_7\omega_4^2-12\omega_9\omega_6^3\omega_7cs^2\omega_4^3\omega_8+18\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8^2+12\omega_9v_1^2\omega_7cs^2\omega_4^3\omega_8^2+36\omega_9\omega_6v_1^2\omega_7\omega_4^2v_2^2\omega_8^2-24\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^2\omega_8^2-12\omega_6^3cs^2\omega_4^2\omega_8^2+12\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4^2\omega_8^2-12\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^3-6\omega_6^3\omega_7cs^4\omega_4^3\omega_8^2-36\omega_9\omega_6^3v_1^2\omega_7\omega_4^3v_2^2\omega_8-36\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8-6\omega_6^3cs^4\omega_4^3\omega_8^2+12\omega_9\omega_6^2\omega_7cs^2\omega_4\omega_8^2+36\omega_9\omega_6^3v_1^2\omega_7\omega_4^3v_2^2+6\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2-12\omega_9\omega_6^3\omega_7cs^4\omega_8^2-18\omega_6^3cs^2\omega_4^3v_2^2\omega_8^2+12\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8+36\omega_6^3v_1^2\omega_4^2v_2^2\omega_8^2+18\omega_6^3\omega_7cs^2\omega_4^3v_2^2\omega_8^2-24\omega_9\omega_6^3\omega_7cs^4\omega_4^2\omega_8-6\omega_6^2v_1^2\omega_7cs^2\omega_4^3\omega_8^2+60\omega_9\omega_6^2\omega_7cs^2\omega_4^2v_2^2\omega_8+78\omega_9\omega_6^3\omega_7cs^2\omega_4^3v_2^2\omega_8+24\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^3\omega_8+24\omega_9\omega_6^3v_1^2\omega_7\omega_4\omega_8+12\omega_6^3\omega_7cs^2\omega_4^3\omega_8-24\omega_9\omega_6^3v_1^2\omega_7cs^2\omega_4\omega_8+12\omega_9\omega_6^2v_1^2\omega_4^2\omega_8^2+84\omega_9\omega_6^3\omega_7cs^2\omega_4v_2^2\omega_8^2-6\omega_6^3v_1^2cs^2\omega_4^3\omega_8^2+18\omega_6^3v_1^2\omega_7\omega_4^3v_2^2\omega_8^2-6\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8^2-18\omega_9\omega_6v_1^2\omega_7cs^2\omega_4^3\omega_8^2-108\omega_9\omega_6\omega_7cs^2\omega_4^2v_2^2\omega_8^2-\omega_9\omega_6^3\omega_7cs^4\omega_4^3\omega_8^2+12\omega_6^3\omega_7cs^4\omega_4^2\omega_8-24\omega_9\omega_6^2v_1^2\omega_7\omega_4^3\omega_8+12\omega_9\omega_6^3\omega_7cs^4\omega_4^3\omega_8-12\omega_9\omega_6v_1^2\omega_7cs^2\omega_4^3\omega_8+12\omega_6^3cs^4\omega_4^2\omega_8^2-12\omega_6^3\omega_7cs^4\omega_4^2\omega_8^2-36\omega_9\omega_6^3v_1^2\omega_7\omega_4^2v_2^2+18\omega_9\omega_6^2v_1^2\omega_4^3v_2^2\omega_8^2+6\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^3\omega_8^2-12\omega_9\omega_6^2\omega_7cs^4\omega_4v_2^2\omega_8^2-36\omega_9\omega_6^2cs^2\omega_4^2v_2^2\omega_8^2+180\omega_9\omega_6^2\omega_7cs^2\omega_4^2v_2^2\omega_8^2+24\omega_9\omega_6^2\omega_7cs^2\omega_4^3v_2^2-6\omega_6^3\omega_7cs^2\omega_4^3\omega_8^2+6\omega_6^3cs^2\omega_4^3\omega_8^2-12\omega_9\omega_6v_1^2\omega_7\omega_4^2\omega_8^2+24\omega_9\omega_6^3\omega_7cs^2\omega_4^2\omega_8+60\omega_9\omega_6^3\omega_7cs^2\omega_4v_2^2\omega_8-36\omega_6^3v_1^2\omega_7\omega_4^3v_2^2\omega_8-72\omega_9\omega_6^2v_1^2\omega_7\omega_4^2v_2^2\omega_8^2-12\omega_6^3\omega_7cs^4\omega_4^3\omega_8-12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8-72\omega_9\omega_6^3v_1^2\omega_7\omega_4v_2^2\omega_8+24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2-4\omega_9\omega_6^3\omega_7cs^4\omega_4^2\omega_8^2+12\omega_6^2v_1^2\omega_7cs^2\omega_4^3\omega_8-36\omega_6^3\omega_7cs^2\omega_4^3v_2^2\omega_8+12\omega_9\omega_6v_1^2\omega_7cs^2\omega_4^2\omega_8^2+12\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8+12\omega_6^3v_1^2cs^2\omega_4^2\omega_8^2-6\omega_9\omega_6^2v_1^2\omega_4^3\omega_8^2-12\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^2\omega_8-12\omega_6^3\omega_7cs^2\omega_4^2\omega_8)\frac{\rho}{12\omega_9\omega_6^3\omega_7\omega_4^3\omega_8^2}$$

$$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_2}=(12\omega_6^2\omega_7\omega_4^2cs^2-4\omega_9\omega_6^2\omega_7\omega_4^2\omega_8cs^2+12\omega_9\omega_6\omega_7\omega_4^2cs^2+6\omega_9\omega_7\omega_4^3\omega_8cs^2-12\omega_6^2\omega_7\omega_4^2\omega_8cs^2-6\omega_6^2\omega_4^3\omega_8cs^2+6\omega_9\omega_6\omega_7\omega_4^3\omega_8+6\omega_9\omega_6\omega_4^3\omega_8cs^2-6\omega_6^2\omega_7\omega_4^3\omega_8+12\omega_9\omega_7\omega_4^2\omega_8+24\omega_9\omega_6\omega_7\omega_4^2\omega_8cs^2+36\omega_9\omega_6^2\omega_7\omega_4^3v_2^2+36\omega_6\omega_7\omega_4^3v_2^2+18\omega_9\omega_6\omega_4^3v_2^2\omega_8+12\omega_6^2\omega_7\omega_4^3-18\omega_6^2\omega_4^3v_2^2\omega_8+12\omega_9\omega_6\omega_7\omega_4^3-36\omega_6^2\omega_7\omega_4^2v_2^2\omega_8-12\omega_9\omega_6\omega_7\omega_4^3cs^2-12\omega_6^2\omega_7\omega_4^3cs^2+72\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8-12\omega_9\omega_6\omega_7\omega_4^2-12\omega_9\omega_6^2\omega_7\omega_8cs^2-12\omega_6^2\omega_7\omega_4^2-72\omega_9\omega_6^2\omega_7\omega_4^2v_2^2-6\omega_9\omega_7\omega_4^3\omega_8+18\omega_9\omega_7\omega_4^3v_2^2\omega_8+12\omega_6^2\omega_7\omega_4^2\omega_8+12\omega_9\omega_6^2\omega_7\omega_4cs^2-24\omega_9\omega_6\omega_7\omega_4^2\omega_8-12\omega_9\omega_6^2\omega_7\omega_4^3-12\omega_6\omega_7\omega_4^3-6\omega_9\omega_6\omega_7\omega_4^3\omega_8cs^2+36\omega_9\omega_6^2\omega_7\omega_4v_2^2+12\omega_6^2\omega_4^2\omega_8cs^2-24\omega_9\omega_6^2\omega_7\omega_4^2cs^2+6\omega_6^2\omega_7\omega_4^3\omega_8cs^2-36\omega_9\omega_6\omega_7\omega_4v_2^2\omega_8-12\omega_9\omega_6\omega_4^2\omega_8cs^2+12\omega_9\omega_6\omega_7\omega_4\omega_8-6\omega_6\omega_7\omega_4^3\omega_8cs^2-36\omega_6^2\omega_7\omega_4^3v_2^2-36\omega_9\omega_6\omega_7\omega_4^3v_2^2-12\omega_9\omega_7\omega_4^2\omega_8cs^2+12\omega_9\omega_6\omega_4^2\omega_8-12\omega_6^2\omega_4^2\omega_8+24\omega_9\omega_6^2\omega_7\omega_4^2+6\omega_6\omega_7\omega_4^3\omega_8-\omega_9\omega_6^2\omega_7\omega_4^3\omega_8cs^2+12\omega_6\omega_7\omega_4^3cs^2-36\omega_9\omega_7\omega_4^2v_2^2\omega_8-18\omega_6\omega_7\omega_4^3v_2^2\omega_8+12\omega_9\omega_6^2\omega_7\omega_4^3cs^2+18\omega_9\omega_6^2\omega_7\omega_4\omega_8cs^2-12\omega_9\omega_6^2\omega_7\omega_4-18\omega_9\omega_6\omega_7\omega_4^3v_2^2\omega_8-36\omega_9\omega_6\omega_4^2v_2^2\omega_8-6\omega_9\omega_6\omega_4^3\omega_8+36\omega_9\omega_6\omega_7\omega_4^2v_2^2+6\omega_6^2\omega_4^3\omega_8+18\omega_6^2\omega_7\omega_4^3v_2^2\omega_8+36\omega_6^2\omega_7\omega_4^2v_2^2+36\omega_6^2\omega_4^2v_2^2\omega_8-12\omega_9\omega_6\omega_7\omega_4\omega_8cs^2)\frac{\rho cs^2}{12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8}$$

$$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_2}=(12cs^2\omega_6\omega_7\omega_4^3+12\omega_9cs^2\omega_6^2\omega_7\omega_4-\omega_9cs^2\omega_6^2\omega_7\omega_4^3\omega_8+6\omega_9\omega_6\omega_7\omega_4^3\omega_8+6\omega_9cs^2\omega_6\omega_4^3\omega_8+6cs^2\omega_6^2\omega_7\omega_4^3\omega_8+12cs^2\omega_6^2\omega_4^2\omega_8-6\omega_6^2\omega_7\omega_4^3\omega_8-12\omega_9cs^2\omega_6\omega_7\omega_4\omega_8+12\omega_9\omega_7\omega_4^2\omega_8+36\omega_9\omega_6^2\omega_7\omega_4^3v_2^2+36\omega_6\omega_7\omega_4^3v_2^2+18\omega_9\omega_6\omega_4^3v_2^2\omega_8+12\omega_6^2\omega_7\omega_4^3-18\omega_6^2\omega_4^3v_2^2\omega_8+12\omega_9\omega_6\omega_7\omega_4^3-36\omega_6^2\omega_7\omega_4^2v_2^2\omega_8-4\omega_9cs^2\omega_6^2\omega_7\omega_4^2\omega_8+12\omega_9cs^2\omega_6^2\omega_7\omega_4^3+72\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8-12\omega_9\omega_6\omega_7\omega_4^2-12\omega_6^2\omega_7\omega_4^2-72\omega_9\omega_6^2\omega_7\omega_4^2v_2^2-6\omega_9\omega_7\omega_4^3\omega_8-12\omega_9cs^2\omega_6\omega_4^2\omega_8+18\omega_9\omega_7\omega_4^3v_2^2\omega_8+12\omega_6^2\omega_7\omega_4^2\omega_8-24\omega_9cs^2\omega_6^2\omega_7\omega_4^2-12cs^2\omega_6^2\omega_7\omega_4^2\omega_8-6cs^2\omega_6^2\omega_4^3\omega_8-24\omega_9\omega_6\omega_7\omega_4^2\omega_8-12\omega_9\omega_6^2\omega_7\omega_4^3-12\omega_6\omega_7\omega_4^3+36\omega_9\omega_6^2\omega_7\omega_4v_2^2-12\omega_9cs^2\omega_6^2\omega_7\omega_8-6\omega_9cs^2\omega_6\omega_7\omega_4^3\omega_8-36\omega_9\omega_6\omega_7\omega_4v_2^2\omega_8-12\omega_9cs^2\omega_6\omega_7\omega_4^3+12\omega_9\omega_6\omega_7\omega_4\omega_8-36\omega_6^2\omega_7\omega_4^3v_2^2-36\omega_9\omega_6\omega_7\omega_4^3v_2^2+12\omega_9\omega_6\omega_4^2\omega_8-12\omega_6^2\omega_4^2\omega_8+24\omega_9\omega_6^2\omega_7\omega_4^2+6\omega_9cs^2\omega_7\omega_4^3\omega_8+6\omega_6\omega_7\omega_4^3\omega_8-6cs^2\omega_6\omega_7\omega_4^3\omega_8+18\omega_9cs^2\omega_6^2\omega_7\omega_4\omega_8+12\omega_9cs^2\omega_6\omega_7\omega_4^2-36\omega_9\omega_7\omega_4^2v_2^2\omega_8-12cs^2\omega_6^2\omega_7\omega_4^2\omega_8+24\omega_9\omega_6^2\omega_7\omega_4^2-36\omega_9\omega_6\omega_7\omega_4^2v_2^2\omega_8-72\omega_9\omega_6^2\omega_7\omega_4^2v_2^2-12\omega_6^3\omega_7cs^4\omega_4^3\omega_8-12\omega_6^2v_1^2\omega_7\omega_4^3\omega_8-72\omega_9\omega_6^3v_1^2\omega_7\omega_4v_2^2\omega_8+24\omega_9\omega_6^2v_1^2\omega_7\omega_4^2\omega_8^2-4\omega_9\omega_6^3\omega_7cs^4\omega_4^2\omega_8^2+12\omega_6^2v_1^2\omega_7cs^2\omega_4^3\omega_8-36\omega_6^3\omega_7cs^2\omega_4^3v_2^2\omega_8+12\omega_9\omega_6v_1^2\omega_7cs^2\omega_4^2\omega_8^2+12\omega_9\omega_6v_1^2\omega_7\omega_4^3\omega_8+12\omega_6^3v_1^2cs^2\omega_4^2\omega_8^2-6\omega_9\omega_6^2v_1^2\omega_4^3\omega_8^2-12\omega_9\omega_6^2v_1^2\omega_7cs^2\omega_4^2\omega_8-12\omega_6^3\omega_7cs^2\omega_4^2\omega_8)\frac{cs^2\rho}{12\omega_9\omega_6^2\omega_7\omega_4^3\omega_8}$$

$$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_2}=(-72\omega_3^3v_2^2\omega_2+12\omega_6\omega_3\omega_2+36\omega_3v_2^2\omega_2^2+12\omega_3^3cs^2\omega_2^2-12\omega_6\omega_3cs^2\omega_2-\omega_6\omega_3^3cs^2\omega_2^2-36\omega_6\omega_3^2v_2^2+18\omega_6\omega_3cs^2\omega_2^2-36\omega_6\omega_3v_2^2\omega_2-12\omega_3\omega_2^2+36\omega_3^2v_2^2\omega_2^2+12\omega_3cs^2\omega_2^2+36\omega_3^2v_2^2-24\omega_3^3cs^2\omega_2+12\omega_6\omega_3^2-12\omega_6\omega_3^2cs^2+24\omega_3^2\omega_2^2+36\omega_6\omega_3^2v_2^2\omega_2-4\omega_6\omega_3^2cs^2\omega_2^2+72\omega_3^2v_2^2\omega_2-24\omega_3^2cs^2\omega_2^2+24\omega_3^3\omega_2-72\omega_3^2v_2^2\omega_2^2+12\omega_3^3cs^2+24\omega_3^2cs^2\omega_2-12\omega_3^3\omega_2^2-12\omega_6cs^2\omega_2^2+12\omega_6\omega_3^2cs^2\omega_2-24\omega_3^2\omega_2-12\omega_6\omega_3^2\omega_2-12\omega_3^3)\frac{\rho cs^2}{12\omega_6\omega_3^3\omega_2^2}$$

$$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x^2\mathrm{D}_y^2v_2}=(-135\omega_3^2v_1^2\omega_1^2v_2^2\omega_2-90\omega_3^2\omega_1v_2^2cs^2\omega_2^2+2\omega_3^2\omega_1^3cs^4\omega_2^2-108v_1^2\omega_1^3cs^2\omega_2^2+\omega_3^2\omega_1^2v_2^2\omega_2^3-60\omega_3\omega_1^2cs^4\omega_2^3-9\omega_3^2v_1^2\omega_1^3\omega_2^2+126\omega_3\omega_1v_2^2cs^2\omega_2^3-6\omega_3^2\omega_1^2\omega_2-42\omega_3^2\omega_1^2cs^2\omega_2^2-24\omega_3\omega_1^3cs^2\omega_2^3-18\omega_3v_1^2\omega_1\omega_2^3-36\omega_3^2\omega_1^2v_2^2\omega_2^2-2\omega_3^2\omega_1^3cs^4\omega_2^2-45\omega_3^2v_1^4\omega_1^3\omega_2+60\omega_3\omega_1^2cs^4\omega_2^2+9\omega_3^2\omega_1v_2^2cs^2\omega_2^3-9\omega_3^2v_1^4\omega_1^2\omega_2^3-9\omega_3^2v_1^2\omega_2^3+\omega_3^2\omega_1^3v_2^4\omega_2^2+2\omega_3^2\omega_1^2cs^2\omega_2^3+36\omega_3\omega_1^3cs^2\omega_2^2-81\omega_3^2v_1^2\omega_1^2cs^2\omega_2+18\omega_3^2\omega_1^3v_2^2cs^2+45\omega_3^2v_1^2\omega_1^2\omega_2+18\omega_3^2\omega_1^3cs^4-6\omega_3\omega_1^3cs^2\omega_2-6\omega_3^2\omega_1^3\omega_2+108\omega_3^2v_1^2\omega_1^2cs^2\omega_2^2-90\omega_3^2v_1^2\omega_1^2\omega_2^2-144\omega_3v_1^2\omega_1^2cs^2\omega_2^3+9\omega_3^2v_1^4\omega_1^3\omega_2^2+18\omega_3^2\omega_1^2v_2^2\omega_2+18\omega_3v_1^4\omega_1\omega_2^3+45\omega_3^2\omega_1cs^4\omega_2^3+6\omega_3^2\omega_1^3-30\omega_3\omega_1cs^2\omega_2^3-30\omega_3^2v_1^2\omega_1^2cs^2\omega_2^3+9\omega_3^2v_1^2\omega_1^3\omega_2^3+12\omega_3^2\omega_1^2\omega_2^2+90\omega_3^2v_1^2\omega_1^3\omega_2+36\omega_3^2v_1^4\omega_1^3+36\omega_3^2\omega_1^2cs^2\omega_2-30\omega_3^2cs^4\omega_2^3-18\omega_3^2v_2^2cs^2\omega_2^3-30\omega_3^2\omega_1cs^4\omega_2^2+270\omega_3^2v_1^2\omega_1^2v_2^2\omega_2^2+36\omega_3v_1^2\omega_1^2cs^2\omega_2^2-15\omega_3^2\omega_1^3cs^4\omega_2-60\omega_3\omega_1^2cs^2\omega_2^2-6\omega_3^2\omega_1\omega_2^2-45\omega_3^2v_1^2\omega_1cs^2\omega_2^2-18\omega_3^2\omega_1^3v_2^2-216\omega_3^2v_1^2\omega_1^3cs^2\omega_2-36\omega_3^2v_1^4\omega_2^3-54\omega_3v_1^2\omega_1^3\omega_2^2-9\omega_3^2\omega_1^3v_2^2cs^2\omega_2-198\omega_3\omega_1^2v_2^2cs^2\omega_2^2+72\omega_3^2\omega_1^2v_2^2cs^2\omega_2^2-24\omega_3^2\omega_1^3cs^2-36\omega_3\omega_1^3cs^4\omega_2^2-135\omega_3^2v_1^2\omega_1v_2^2\omega_2^3-\omega_3^2\omega_1^3v_2^2\omega_2^2+108v_1^2\omega_1^2cs^2\omega_2^3-10\omega_3^2\omega_1^2cs^4\omega_2^3-36v_1^2\omega_1^2\omega_2^3+18\omega_3v_1^2\omega_1cs^2\omega_2^2+144\omega_3\omega_1^2v_2^2cs^2\omega_2^2+135\omega_3^2v_1^2\omega_1^3v_2^2+45\omega_3^2v_1^2\omega_1\omega_2^2-36v_1^4\omega_1^3\omega_2^2+60\omega_3\omega_1^2cs^2\omega_2^3-2\omega_3^2\omega_1^3cs^2\omega_2^2+108\omega_3^2v_1^2\omega_1cs^2\omega_2^3-\omega_3^2\omega_1^2v_2^4\omega_2^2-6\omega_3^2\omega_1\omega_2^2-135\omega_3^2v_1^2\omega_1^3v_2^2\omega_2+24\omega_3\omega_1^3cs^4\omega_2^2-54\omega_3v_1^2\omega_1^3cs^2\omega_2+30\omega_3^2\omega_1^2cs^4\omega_2^2-18\omega_3v_1^4\omega_1^3\omega_2+6\omega_3^2\omega_2^2-135\omega_3^2v_1^2\omega_1v_2^2\omega_2^2+18\omega_3\omega_1^3v_2^2cs^2\omega_2-6\omega_3^2\omega_1^2v_2^2cs^2\omega_2^2-54\omega_3v_1^4\omega_1^2\omega_2^2+189\omega_3^2v_1^2\omega_1^3cs^2+18\omega_3^2\omega_1v_2^2\omega_2^2+45\omega_3^2v_1^4\omega_1\omega_2^2+30\omega_3\omega_1cs^4\omega_2^2+135\omega_3^2v_1^2v_2^2\omega_2^2-81\omega_3^2v_1^2\omega_1^3+54\omega_3v_1^4\omega_1^3\omega_2^2-30\omega_3^2\omega_1^2cs^4\omega_2+144\omega_3v_1^2\omega_1^3cs^2\omega_2^2-90\omega_3\omega_1^3v_2^2cs^2\omega_2^2+36\omega_3^2\omega_1cs^2\omega_2^2+36v_1^4\omega_1^2\omega_2^3+21\omega_3^2\omega_1^3cs^2\omega_2+72\omega_3\omega_1^3v_2^2cs^2\omega_2^2-54\omega_3^2\omega_1^2v_2^2cs^2\omega_2+18\omega_3^2\omega_1^3v_2^2\omega_2+6\omega_3\omega_1^3cs^4\omega_2-18\omega_3^2v_2^2\omega_2^2+18\omega_3^2\omega_1v_2^2\omega_2^2+36v_1^2\omega_1^3\omega_2^2+30\omega_3^2v_1^2\omega_1^3cs^2\omega_2^2-3\omega_3^2\omega_1cs^2\omega_2^3-63\omega_3^2v_1^2cs^2\omega_2^3+54\omega_3v_1^2\omega_1^2\omega_2^3+6\omega_3^2\omega_1^3v_2^2cs^2\omega_2^2+18\omega_3v_1^2\omega_1^3\omega_2)\frac{\rho}{24\omega_3^2\omega_1^3\omega_2^2}$$

coefficient $C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^3\rho}$ **at** $\frac{\partial^4\rho}{\partial x_1\partial x_2^3}$**:**

$$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^3\rho}=0$$

$$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^3\rho}=(-24\omega_4^2v_2^2\omega_8^2+36\omega_6\omega_4^2v_2^2\omega_8^2+4\omega_6^3cs^2\omega_4+4\omega_6cs^2\omega_4\omega_8^2+72\omega_6cs^2\omega_4v_2^2\omega_8^2-8\omega_6^2cs^2\omega_4^2\omega_8-24\omega_6^3cs^2\omega_4v_2^2+4\omega_6^2\omega_4^2v_2^2-$$

$$84\omega_6^2cs^2\omega_4v_2^2\omega_8^2+13\omega_6^2\omega_4^2v_2^4\omega_8^2+4\omega_6^2cs^4\omega_4^2\omega_8^2-4\omega_6^3cs^4\omega_4^2\omega_8-8\omega_6^2v_2^2\omega_8^2-13\omega_6^3\omega_4^2v_2^4\omega_8+16\omega_6^2\omega_4v_2^2\omega_8-4\omega_6^3cs^4\omega_8+4\omega_6^3\omega_4^2v_2^4+20\omega_6^2\omega_4v_2^2\omega_8^2-51\omega_6^3cs^2\omega_4^2v_2^2\omega_8+4\omega_6cs^4\omega_4\omega_8^2-8\omega_6^3v_2^4\omega_8+32\omega_6^2\omega_4^2v_2^4\omega_8-48\omega_6^2cs^2\omega_4v_2^2\omega_8-4\omega_6^2cs^2\omega_8^2-20\omega_6^3\omega_4v_2^2\omega_8+8\omega_6^2cs^4\omega_4^2\omega_8+20\omega_6\omega_4^2v_2^2\omega_8-4\omega_6^3cs^2\omega_4^2-4\omega_6^2cs^2\omega_4^2\omega_8^2-4\omega_6^2cs^4\omega_4^2+4\omega_6^3\omega_4v_2^2+4\omega_6^3cs^2\omega_4^2\omega_8+20\omega_6\omega_4v_2^4\omega_8^2+84\omega_6^3cs^2\omega_4v_2^2\omega_8+4\omega_6cs^2\omega_4^2\omega_8+36\omega_6^2cs^2v_2^2\omega_8^2-13\omega_6^2\omega_4^2v_2^2\omega_8^2+8\omega_6^2cs^2\omega_4\omega_8^2-8\omega_6^3cs^2\omega_4\omega_8-24\omega_6^2cs^2\omega_4^2v_2^2-16\omega_6^2\omega_4v_2^4\omega_8+120\omega_6^2cs^2\omega_4^2v_2^2\omega_8-4\omega_6^3\omega_4^2v_2^2+8\omega_6^2v_2^4\omega_8^2+13\omega_6^3\omega_4^2v_2^2\omega_8-36\omega_6^3cs^2v_2^2\omega_8+4\omega_6^3cs^2\omega_8-4\omega_6^3\omega_4v_2^4+8cs^4\omega_4^2\omega_8^2+24\omega_4^2v_2^4\omega_8^2-72\omega_6cs^2\omega_4^2v_2^2\omega_8-36\omega_6\omega_4^2v_2^4\omega_8^2-12\omega_6cs^4\omega_4^2\omega_8^2-4\omega_6^3cs^4\omega_4-20\omega_6\omega_4^2v_2^4\omega_8-4\omega_6cs^4\omega_4^2\omega_8+4\omega_6^3cs^4\omega_4^2-8\omega_6^2cs^4\omega_4\omega_8^2+4\omega_6^2cs^2\omega_4^2-144\omega_6cs^2\omega_4^2v_2^2\omega_8^2+8\omega_6^3cs^4\omega_4\omega_8-20\omega_6\omega_4v_2^2\omega_8^2+51\omega_6^2cs^2\omega_4^2v_2^2\omega_8^2-20\omega_6^2\omega_4v_2^4\omega_8^2-8cs^2\omega_4^2\omega_8^2+8\omega_6^3v_2^2\omega_8+12\omega_6cs^2\omega_4^2\omega_8^2-4\omega_6^2\omega_4^2v_2^4+4\omega_6^2cs^4\omega_8^2+96cs^2\omega_4^2v_2^2\omega_8^2+24\omega_6^3cs^2\omega_4^2v_2^2+20\omega_6^3\omega_4v_2^4\omega_8-32\omega_6^2\omega_4^2v_2^2\omega_8)\frac{v_1}{4\omega_6^3\omega_4^2\omega_8^2}$$

$$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^3\rho}=(-24\omega_4^2v_2^2\omega_8^2+8\omega_6^2cs^2\omega_4\omega_8^2+36\omega_6^2cs^2v_2^2\omega_8^2+4\omega_6cs^2\omega_4^2\omega_8+72\omega_6cs^2\omega_4v_2^2\omega_8^2+36\omega_6\omega_4^2v_2^2\omega_8^2-36\omega_6^3cs^2v_2^2\omega_8-8\omega_6^3cs^2\omega_4\omega_8-24\omega_6^2cs^2\omega_4^2v_2^2-4\omega_6^2cs^2\omega_8^2-4\omega_6^3cs^2\omega_4^2+4\omega_6^2\omega_4^2v_2^2+8cs^4\omega_4^2\omega_8^2+13\omega_6^2\omega_4^2v_2^4\omega_8^2-8\omega_6^2v_2^2\omega_8^2-4\omega_6^2cs^4\omega_4^2-13\omega_6^3\omega_4^2v_2^4\omega_8+16\omega_6^2\omega_4v_2^2\omega_8-84\omega_6^2cs^2\omega_4v_2^2\omega_8^2-12\omega_6cs^4\omega_4^2\omega_8^2-8\omega_6^2cs^4\omega_4\omega_8^2+4\omega_6^3\omega_4^2v_2^4+20\omega_6^2\omega_4v_2^2\omega_8^2-48\omega_6^2cs^2\omega_4v_2^2\omega_8-4\omega_6cs^4\omega_4^2\omega_8+4\omega_6^3cs^2\omega_4-8\omega_6^3v_2^4\omega_8+32\omega_6^2\omega_4^2v_2^4\omega_8-20\omega_6^3\omega_4v_2^2\omega_8+8\omega_6^3cs^4\omega_4\omega_8-51\omega_6^3cs^2\omega_4^2v_2^2\omega_8+20\omega_6\omega_4^2v_2^2\omega_8-8cs^2\omega_4^2\omega_8^2+24\omega_6^3cs^2\omega_4^2v_2^2+4\omega_6^3\omega_4v_2^2+12\omega_6cs^2\omega_4^2\omega_8^2-4\omega_6^3cs^4\omega_8+20\omega_6\omega_4v_2^4\omega_8^2+4\omega_6^3cs^4\omega_4^2+120\omega_6^2cs^2\omega_4^2v_2^2\omega_8-13\omega_6^2\omega_4^2v_2^2\omega_8^2+84\omega_6^3cs^2\omega_4v_2^2\omega_8-8\omega_6^2cs^2\omega_4^2\omega_8-16\omega_6^2\omega_4v_2^4\omega_8-4\omega_6^3\omega_4^2v_2^2-24\omega_6^3cs^2\omega_4v_2^2+8\omega_6^2v_2^4\omega_8^2+13\omega_6^3\omega_4^2v_2^2\omega_8+4\omega_6^2cs^2\omega_4^2-4\omega_6cs^2\omega_4\omega_8^2-4\omega_6^3\omega_4v_2^4+24\omega_4^2v_2^4\omega_8^2+4\omega_6^2cs^4\omega_4^2\omega_8^2-36\omega_6\omega_4^2v_2^4\omega_8^2-72\omega_6cs^2\omega_4^2v_2^2\omega_8-4\omega_6^3cs^4\omega_4^2\omega_8+4\omega_6^2cs^4\omega_8^2-20\omega_6\omega_4^2v_2^2\omega_8-144\omega_6cs^2\omega_4^2v_2^2\omega_8^2+8\omega_6^2cs^4\omega_4^2\omega_8+4\omega_6^3cs^2\omega_8+4\omega_6cs^4\omega_4\omega_8^2-20\omega_6\omega_4v_2^2\omega_8^2-4\omega_6^2cs^2\omega_4^2\omega_8^2-20\omega_6^2\omega_4v_2^4\omega_8^2+96cs^2\omega_4^2v_2^2\omega_8^2-4\omega_6^3cs^4\omega_4+8\omega_6^3v_2^2\omega_8-4\omega_6^2\omega_4^2v_2^4+51\omega_6^2cs^2\omega_4^2v_2^2\omega_8^2+20\omega_6^3\omega_4v_2^4\omega_8-32\omega_6^2\omega_4^2v_2^2\omega_8+4\omega_6^3cs^2\omega_4^2\omega_8)\frac{v_1}{4\omega_6^3\omega_4^2\omega_8^2}$$

$$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3\rho}=0$$

$$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3\rho}=0$$

$$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3\rho}=0$$

$$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3\rho}=(9\omega_3^2v_1^2\omega_1^2v_2^2\omega_2-297\omega_3^2\omega_1v_2^2cs^2\omega_2^2+6\omega_3^2\omega_1^3cs^4\omega_2^2-12v_1^2\omega_1^3cs^2\omega_2^2+24\omega_3^2\omega_1^2v_2^2\omega_3^2-54\omega_3\omega_1^2cs^4\omega_3^2-\omega_3^2v_1^2\omega_1^3\omega_2^2-6\omega_3^2\omega_1^2\omega_2-72\omega_3^2\omega_1^2cs^2\omega_2^2-108\omega_3^2\omega_1^2v_2^2\omega_2^2-54\omega_3^2\omega_1v_2^2cs^2\omega_2^3+6\omega_3^2v_1^2\omega_2^3+5\omega_3^2\omega_1^2cs^2\omega_2^3-18\omega_3\omega_2^3cs^2\omega_2^2-6\omega_3^2v_1^2\omega_1^2cs^2\omega_2+405\omega_3^2\omega_1^3v_2^2cs^2+6\omega_3^2v_1^2\omega_1^2\omega_2+\omega_3^2\omega_1^3\omega_2^2+90\omega_3^2\omega_1^3cs^4+6\omega_3\omega_1^3cs^2\omega_2-54\omega_3^2\omega_1^3v_2^4\omega_2-\omega_3^2\omega_1^2\omega_2^3+54\omega_3^2v_2^4\omega_3^2-6\omega_3^2\omega_1^3\omega_2-54\omega_3^2\omega_1v_2^4\omega_2^2-18\omega_3v_1^2\omega_1^2cs^2\omega_2^3+45\omega_3^2\omega_1^2v_2^2\omega_2+12\omega_1^2cs^2\omega_2^2+54\omega_3^2\omega_1^3v_2^4-24\omega_3^2v_1^2\omega_1^2v_2^2\omega_2^3+27\omega_3^2\omega_1cs^4\omega_2^3+6\omega_3^2\omega_1^3-6\omega_3\omega_1cs^2\omega_2^3-2\omega_3^2v_1^2\omega_1^2cs^2\omega_2^3+\omega_3^2v_1^2\omega_1^2\omega_2^3-54\omega_3^2\omega_1v_2^4\omega_2^3+6\omega_3^2v_1^2\omega_1^3\omega_2+60\omega_3^2\omega_1^2cs^2\omega_2+36\omega_1^2cs^4\omega_2^3-18\omega_3^2cs^4\omega_2^3+135\omega_3^2v_2^2cs^2\omega_2^3-18\omega_3^2\omega_1cs^4\omega_2^2-99\omega_3^2\omega_1^3cs^4\omega_2+6\omega_3^2\omega_1\omega_2^2+108\omega_3^2\omega_1^2v_2^4\omega_2^2+6\omega_3^2v_1^2\omega_1cs^2\omega_2^2-6\omega_3^2v_1^2\omega_1\omega_2^3-99\omega_3^2\omega_1^3v_2^2-21\omega_3^2v_1^2\omega_1^3cs^2\omega_2-486\omega_3^2\omega_1^3v_2^2cs^2\omega_2+540\omega_3^2\omega_1^2v_2^2cs^2\omega_2^2-72\omega_3^2\omega_1^3cs^2+54\omega_3\omega_1^3cs^4\omega_2^2+72\omega_3^2v_1^2\omega_1v_2^2\omega_2^3-24\omega_3^2\omega_1^3v_2^2\omega_2^2+12v_1^2\omega_1^2cs^2\omega_2^3-6\omega_3^2\omega_1^2cs^4\omega_2^3+6\omega_3v_1^2\omega_1cs^2\omega_2^3+45\omega_3^2v_1^2\omega_1^3v_2^2-6\omega_3^2v_1^2\omega_1\omega_2^2+18\omega_3\omega_1^2cs^2\omega_2^3-5\omega_3^2\omega_1^3cs^2\omega_2^2+21\omega_3^2v_1^2\omega_1cs^2\omega_2^3+6\omega_3^2\omega_1\omega_2^3-72\omega_3^2v_1^2\omega_1^3v_2^2\omega_2-6\omega_3v_1^2\omega_1^3cs^2\omega_2+72\omega_3^2\omega_1^2cs^4\omega_2^2-6\omega_3^2\omega_2^3-9\omega_3^2v_1^2\omega_1v_2^2\omega_2^2-72\omega_3^2\omega_1^2v_2^2cs^2\omega_2^3+18\omega_3^2v_1^2\omega_1^3cs^2-18\omega_3^2\omega_1v_2^2\omega_2^3+24\omega_3^2v_1^2\omega_1^3v_2^2\omega_2^2+18\omega_3\omega_1cs^4\omega_2^3-45\omega_3^2v_1^2v_2^2\omega_2^3-6\omega_3^2v_1^2\omega_1^3-54\omega_3^2\omega_1^2cs^4\omega_2+18\omega_3v_1^2\omega_1^3cs^2\omega_2^2-12\omega_1^2cs^2\omega_2^3+12\omega_3^2\omega_1cs^2\omega_2^2+75\omega_3^2\omega_1^3cs^2\omega_2-243\omega_3^2\omega_1^2v_2^2cs^2\omega_2+126\omega_3^2\omega_1^3v_2^2\omega_2-18\omega_3\omega_1^3cs^4\omega_2-9\omega_3^2v_2^2\omega_2^3+63\omega_3^2\omega_1v_2^2\omega_2^2-54\omega_3^2\omega_1^2v_2^4\omega_2-36\omega_1^3cs^4\omega_2^2+2\omega_3^2v_1^2\omega_1^3cs^2\omega_2^2-3\omega_3^2\omega_1cs^2\omega_2^3-18\omega_3^2v_1^2cs^2\omega_2^3+72\omega_3^2\omega_1^3v_2^2cs^2\omega_2^2)\frac{v_1}{24\omega_3^2\omega_1^3\omega_2^2}$$

coefficient $C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^3v_1}$ **at** $\frac{\partial^4v_1}{\partial x_1\partial x_2^3}$**:**

$$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^3v_1}=(-54\omega cs^4-42v_2^2\omega^2cs^2-36v_2^4-24cs^2+54v_2^4\omega-12\omega^2cs^2+12v_2^2\omega^3cs^2-26v_2^4\omega^2+4v_2^4\omega^3-54v_2^2\omega-\omega^3cs^4+36v_2^2+36cs^4+36\omega cs^2-4v_2^2\omega^3-36v_2^2cs^2+20\omega^2cs^4+54v_2^2\omega cs^2+26v_2^2\omega^2)\frac{\rho}{12\omega^3}$$

$$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^3v_1}=(-90\omega_6\omega_4^3v_2^4\omega_8^2-6\omega_6^2cs^4\omega_4^3\omega_8-5\omega_6^3cs^2\omega_4^2\omega_8^2-36\omega_6cs^2\omega_4^3v_2^2\omega_8+72\omega_4^3v_2^4\omega_8^2-12\omega_6^2cs^2\omega_4^2\omega_8-\omega_6^3cs^4\omega_4^3\omega_8^2+12\omega_6^3\omega_4^3v_2^4+27\omega_6^3\omega_4^3v_2^2\omega_8+54\omega_6^2cs^2\omega_4^3v_2^2\omega_8-12\omega_6^3\omega_4v_2^2\omega_8^2-48\omega_6^2cs^2\omega_4v_2^2\omega_8^2+12\omega_6^2\omega_4^2v_2^4\omega_8^2-6\omega_6^3cs^2\omega_4^3\omega_8+6\omega_6^2cs^4\omega_4^2\omega_8^2-18\omega_6^3cs^4\omega_4^2\omega_8-\omega_6^2cs^2\omega_4^3\omega_8^2+48\omega_6^3\omega_4^2v_2^4\omega_8-81\omega_6^3cs^2\omega_4^2v_2^2\omega_8^2-19\omega_6^2\omega_4^3v_2^2\omega_8^2+6\omega_6^2cs^2\omega_4^3\omega_8+13\omega_6^3cs^4\omega_4^2\omega_8^2-12\omega_6^3\omega_4^2v_2^4-18\omega_6^3\omega_4^2v_2^2\omega_8^2-60\omega_6^2\omega_4^3v_2^2\omega_8+12\omega_6^3cs^4\omega_8^2+30\omega_6^3cs^2\omega_4^2v_2^2\omega_8+252cs^2\omega_4^3v_2^2\omega_8^2+60\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2-4\omega_6^3\omega_4^3v_2^2\omega_8^2-24\omega_6^2\omega_4^2v_2^4\omega_8+24\omega_6^3\omega_4v_2^2\omega_8+12\omega_6^2cs^4\omega_4^2\omega_8-306\omega_6cs^2\omega_4^3v_2^2\omega_8^2+6\omega_6^3cs^4\omega_4^3\omega_8-6\omega_6^2cs^2\omega_4^2\omega_8^2+18\omega_6^3cs^2\omega_4^2\omega_8+\omega_6^2cs^4\omega_4^3\omega_8^2-36\omega_6\omega_4^3v_2^4\omega_8+12\omega_6^2\omega_4^3v_2^2-12\omega_6^3cs^2\omega_4v_2^2\omega_8-27\omega_6^3\omega_4^3v_2^4\omega_8-12\omega_6^2\omega_4^2v_2^2\omega_8^2+12\omega_6^3\omega_4v_2^4\omega_8^2+12\omega_6^3cs^2\omega_4^3v_2^2\omega_8^2-12\omega_6^3cs^2\omega_4\omega_8-12\omega_6^2cs^2\omega_4^2v_2^2\omega_8+12\omega_6^3\omega_4^2v_2^2-48\omega_6^3\omega_4^2v_2^2\omega_8+19\omega_6^2\omega_4^3v_2^4\omega_8^2+12\omega_6^3cs^2\omega_4^3v_2^2-24\omega_6^3cs^4\omega_4\omega_8^2+90\omega_6\omega_4^3v_2^2\omega_8^2-12\omega_6^2\omega_4^3v_2^4+12\omega_6cs^2\omega_4^3v_2^2\omega_8^2-72\omega_4^3v_2^2\omega_8^2-12\omega_6cs^4\omega_4^2\omega_8^2-12cs^2\omega_4^3\omega_8^2-12\omega_6^3\omega_4^3v_2^2-12\omega_6^2cs^2\omega_4^3v_2^2-108\omega_6cs^2\omega_4^2v_2^2\omega_8^2+36\omega_6\omega_4^3v_2^2\omega_8+12\omega_6^3cs^4\omega_4\omega_8+6\omega_6^3cs^2\omega_4\omega_8^2+18\omega_6^3\omega_4^2v_2^2\omega_8^2+162\omega_6^2cs^2\omega_4^2v_2^2\omega_8^2+60\omega_6^2\omega_4^3v_2^2\omega_8-48\omega_6^3cs^2v_2^2\omega_8^2-12\omega_6cs^4\omega_4^3\omega_8^2+4\omega_6^3\omega_4^3v_2^4\omega_8^2+102\omega_6^3cs^2\omega_4v_2^2\omega_8^2+12\omega_6cs^2\omega_4^2\omega_8^2-21\omega_6^3cs^2\omega_4^3v_2^2\omega_8+12cs^4\omega_4^3\omega_8^2-12\omega_6^3cs^2\omega_4^2v_2^2-24\omega_6^3\omega_4v_2^4\omega_8+24\omega_6^2\omega_4^2v_2^2\omega_8)\frac{\rho}{12\omega_6^3\omega_4^3\omega_8^2}$$

$$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^3v_1}=(-36\omega_6cs^2\omega_4^3v_2^2\omega_8-90\omega_6\omega_4^3v_2^4\omega_8^2+12\omega_6^3cs^4\omega_8^2+72\omega_4^3v_2^4\omega_8^2-12\omega_6^3cs^2\omega_4\omega_8+12\omega_6^3\omega_4^3v_2^4+27\omega_6^3\omega_4^3v_2^2\omega_8+12\omega_6cs^2\omega_4^3\omega_8^2-12\omega_6^3\omega_4v_2^2\omega_8^2+12\omega_6^3cs^2\omega_4^3v_2^2+12\omega_6^2\omega_4^2v_2^4\omega_8^2-81\omega_6^3cs^2\omega_4^2v_2^2\omega_8^2-24\omega_6^3cs^4\omega_4\omega_8^2+54\omega_6^2cs^2\omega_4^3v_2^2\omega_8+48\omega_6^3\omega_4^2v_2^4\omega_8-12cs^2\omega_4^3\omega_8^2-48\omega_6^2cs^2\omega_4v_2^2\omega_8^2-12\omega_6cs^4\omega_4^2\omega_8^2-19\omega_6^2\omega_4^3v_2^2\omega_8^2+60\omega_6^2cs^2\omega_4^3v_2^2\omega_8^2-12\omega_6^3\omega_4^2v_2^4-18\omega_6^3\omega_4^2v_2^2\omega_8^2-12\omega_6^2cs^2\omega_4^3v_2^2-60\omega_6^2\omega_4^3v_2^2\omega_8-4\omega_6^3\omega_4^3v_2^2\omega_8^2-24\omega_6^2\omega_4^2v_2^4\omega_8+24\omega_6^3\omega_4v_2^2\omega_8+12\omega_6^3cs^4\omega_4\omega_8+252cs^2\omega_4^3v_2^2\omega_8^2+30\omega_6^3cs^2\omega_4^2v_2^2\omega_8-12\omega_6cs^4\omega_4^3\omega_8^2-48\omega_6^3cs^2v_2^2\omega_8^2+6\omega_6^3cs^2\omega_4\omega_8^2-12\omega_6^3cs^2\omega_4^2v_2^2+12cs^4\omega_4^3\omega_8^2-306\omega_6cs^2\omega_4^3v_2^2\omega_8^2-36\omega_6\omega_4^3v_2^4\omega_8+12\omega_6cs^2\omega_4^2\omega_8^2+12\omega_6^2\omega_4^3v_2^2-27\omega_6^3\omega_4^3v_2^4\omega_8-12\omega_6^2cs^2\omega_4^2v_2^2\omega_8-12\omega_6^2\omega_4^2v_2^2\omega_8^2+12\omega_6^3\omega_4v_2^4\omega_8^2-6\omega_6^2cs^4\omega_4^3\omega_8-5\omega_6^3cs^2\omega_4^2\omega_8^2-12\omega_6^3cs^2\omega_4v_2^2\omega_8-12\omega_6^2cs^2\omega_4^2\omega_8-\omega_6^3cs^4\omega_4^3\omega_8^2+12\omega_6^3\omega_4^2v_2^2-48\omega_6^3\omega_4^2v_2^2\omega_8+12\omega_6^3cs^2\omega_4^3v_2^2\omega_8^2+19\omega_6^2\omega_4^3v_2^2\omega_8^2-6\omega_6^3cs^2\omega_4^3\omega_8+6\omega_6^2cs^4\omega_4^2\omega_8^2+90\omega_6\omega_4^3v_2^2\omega_8^2-12\omega_6^2\omega_4^3v_2^4-72\omega_4^3v_2^2\omega_8^2-18\omega_6^3cs^4\omega_4^2\omega_8-\omega_6^2cs^2\omega_4^3\omega_8^2-108\omega_6cs^2\omega_4^2v_2^2\omega_8^2+$$

$6\omega_6^2cs^2\omega_4^3\omega_8 + 13\omega_6^3cs^4\omega_4^2\omega_8^2 - 12\omega_6^3\omega_4^3v_2^2 + 36\omega_6\omega_4^3v_2^2\omega_8 + 12\omega_6^2cs^4\omega_4^2\omega_8 + 6\omega_6^3cs^4\omega_4^3\omega_8 - 6\omega_6^2cs^2\omega_4^2\omega_8^2 + 102\omega_6^3cs^2\omega_4v_2^2\omega_8^2 + 18\omega_6^3\omega_4^2v_2^2\omega_8^2 - 21\omega_6^3cs^2\omega_4^3v_2^2\omega_8 + 60\omega_6^2\omega_4^3v_2^4\omega_8 + 4\omega_6^3\omega_4^3v_2^4\omega_8^2 + 162\omega_6^2cs^2\omega_4^2v_2^2\omega_8^2 - 24\omega_6^3\omega_4v_2^4\omega_8 + 24\omega_6^2\omega_4^2v_2^2\omega_8 + 18\omega_6^3cs^2\omega_4^2\omega_8 + \omega_6^2cs^4\omega_4^3\omega_8^2)\frac{\rho}{12\omega_6^3\omega_4^3\omega_8^2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3v_1} = (-3\omega_6^3\omega_4^2v_2^2\omega_8^2cs^2 - 90\omega_6\omega_4^3v_2^4\omega_8^2 - 24\omega_6^3\omega_4\omega_8^2cs^4 + \omega_6^2\omega_4^3\omega_8^2cs^4 + 72\omega_4^3v_2^4\omega_8^2 - 5\omega_6^3\omega_4^2\omega_8^2cs^2 + 36\omega_6^3\omega_4^3v_2^4 + 39\omega_6^3\omega_4^3v_2^2\omega_8 + 6\omega_6^2\omega_4^3\omega_8cs^2 - 18\omega_6^3\omega_4^2\omega_8cs^4 - 12\omega_6^3\omega_4\omega_8cs^2 + 36\omega_6^3\omega_4^2v_2^4\omega_8 - 108\omega_6^2\omega_4^3v_2^2cs^2 + 36\omega_6^2\omega_4^2v_2^2\omega_8cs^2 - 12\omega_6\omega_4^2\omega_8^2cs^4 - 19\omega_6^2\omega_4^3v_2^2\omega_8^2 + 12\omega_6^2\omega_4^2\omega_8cs^4 - 36\omega_6^3\omega_4^2v_2^4 - 6\omega_6^3\omega_4^2v_2^4\omega_8^2 - 6\omega_6^3\omega_4^3\omega_8cs^2 - 72\omega_6^2\omega_4^3v_2^2\omega_8 - 12\omega_4^3\omega_8^2cs^2 + 198\omega_6^2\omega_4^3v_2^2\omega_8cs^2 - 4\omega_6^3\omega_4^3v_2^2\omega_8^2 + 108\omega_6^3\omega_4^3v_2^2cs^2 + 12\omega_6\omega_4^3\omega_8^2cs^2 - 108\omega_6\omega_4^3v_2^2\omega_8cs^2 + 12\omega_6^3\omega_4^3v_2^2\omega_8^2cs^2 - 6\omega_6^2\omega_4^2\omega_8^2cs^2 - 36\omega_6\omega_4^3v_2^4\omega_8 + 36\omega_6^2\omega_4^3v_2^2 - \omega_6^3\omega_4^3\omega_8^2cs^4 + 36\omega_6^3\omega_4\omega_8^2cs^2 - 39\omega_6^3\omega_4^3v_2^4\omega_8 - 306\omega_6\omega_4^3v_2^2\omega_8^2cs^2 - 12\omega_6\omega_4^3\omega_8^2cs^4 - 99\omega_6^3\omega_4^3v_2^2\omega_8cs^2 - 12\omega_6^2\omega_4^2\omega_8cs^2 + 36\omega_6^3\omega_4^2v_2^2 - 36\omega_6^3\omega_4^2v_2^2\omega_8 - 18\omega_6^3\omega_4v_2^2\omega_8^2cs^2 + 6\omega_6^3\omega_4^3\omega_8cs^4 + 19\omega_6^2\omega_4^3v_2^4\omega_8^2 + 12\omega_4^3\omega_8^2cs^4 + 90\omega_6\omega_4^3v_2^2\omega_8^2 + 6\omega_6^2\omega_4^2\omega_8^2cs^4 + 252\omega_4^3v_2^2\omega_8^2cs^2 - 36\omega_6^2\omega_4^3v_2^4 + 12\omega_6^3\omega_8^2cs^4 - 72\omega_4^3v_2^2\omega_8^2 + 60\omega_6^2\omega_4^3v_2^2\omega_8^2cs^2 - \omega_6^2\omega_4^3\omega_8^2cs^2 + 13\omega_6^3\omega_4^2\omega_8^2cs^4 - 36\omega_6^3\omega_4^3v_2^2 + 36\omega_6\omega_4^3v_2^2\omega_8 + 6\omega_6^3\omega_4\omega_8^2cs^2 + 18\omega_6^2\omega_4^2v_2^2\omega_8^2cs^2 + 12\omega_6^3\omega_4\omega_8cs^4 - 108\omega_6^3\omega_4^2v_2^2cs^2 + 6\omega_6^3\omega_4^2v_2^2\omega_8^2 + 54\omega_6^3\omega_4^2v_2^2\omega_8cs^2 - 36\omega_6\omega_4^2v_2^2\omega_8^2cs^2 + 72\omega_6^2\omega_4^3v_2^4\omega_8 + 12\omega_6\omega_4^2\omega_8^2cs^2 + 4\omega_6^3\omega_4^3v_2^4\omega_8^2 - 6\omega_6^2\omega_4^3\omega_8cs^4 + 18\omega_6^3\omega_4^2\omega_8cs^2)\frac{\rho}{12\omega_6^3\omega_4^3\omega_8^2}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3v_1} = (-12cs^2\omega_4^3\omega_8^2 - 90\omega_6\omega_4^3v_2^4\omega_8^2 - cs^2\omega_6^2\omega_4^3\omega_8^2 + 6cs^2\omega_6^3\omega_4\omega_8^2 - 18cs^4\omega_6^3\omega_4^2\omega_8 - 36cs^2\omega_6\omega_4^2v_2^2\omega_8^2 + 72\omega_4^3v_2^4\omega_8^2 - 108cs^2\omega_6^3\omega_4^2v_2^2 - 12cs^4\omega_6\omega_4^2\omega_8^2 + 36\omega_6^3\omega_4^3v_2^4 - 99cs^2\omega_6^3\omega_4^3v_2^2\omega_8 + 39\omega_6^3\omega_4^3v_2^2\omega_8 - 18cs^2\omega_6^3\omega_4v_2^2\omega_8^2 - 12cs^2\omega_6^2\omega_4^2\omega_8 + 252cs^2\omega_4^3v_2^2\omega_8^2 + 36\omega_6^3\omega_4^2v_2^4\omega_8 - cs^4\omega_6^3\omega_4^3\omega_8^2 + 60cs^2\omega_6^2\omega_4^3v_2^2\omega_8^2 - 19\omega_6^2\omega_4^3v_2^2\omega_8^2 - 12cs^4\omega_6\omega_4^3\omega_8^2 - 36\omega_6^3\omega_4^2v_2^4 + 12cs^4\omega_4^3\omega_8^2 - 6\omega_6^3\omega_4^2v_2^4\omega_8^2 + 6cs^4\omega_6^3\omega_4^3\omega_8 - 72\omega_6^2\omega_4^3v_2^2\omega_8 + 198cs^2\omega_6^2\omega_4^3v_2^2\omega_8 + 108cs^2\omega_6^3\omega_4^3v_2^2 - 4\omega_6^3\omega_4^3v_2^2\omega_8^2 + 12cs^2\omega_6^3\omega_4^3v_2^2\omega_8^2 + 36cs^2\omega_6^3\omega_4v_2^2\omega_8 - 6cs^2\omega_6^2\omega_4^2\omega_8^2 + 13cs^4\omega_6^3\omega_4^2\omega_8^2 - 36\omega_6\omega_4^3v_2^4\omega_8 + 6cs^2\omega_6^2\omega_4^3\omega_8 + 36\omega_6^2\omega_4^3v_2^2 - 12cs^2\omega_6^3\omega_4\omega_8 - 39\omega_6^3\omega_4^3v_2^4\omega_8 - 24cs^4\omega_6^3\omega_4\omega_8^2 + 18cs^2\omega_6^2\omega_4^2v_2^2\omega_8^2 + cs^4\omega_6^2\omega_4^3\omega_8^2 + 12cs^2\omega_6\omega_4^2\omega_8^2 + 36\omega_6^3\omega_4^2v_2^2 + 54cs^2\omega_6^3\omega_4^2v_2^2\omega_8 - 36\omega_6^3\omega_4^2v_2^2\omega_8 + 18cs^2\omega_6^3\omega_4^2\omega_8 + 19\omega_6^2\omega_4^3v_2^4\omega_8^2 + 90\omega_6\omega_4^3v_2^2\omega_8^2 - 306cs^2\omega_6\omega_4^3v_2^2\omega_8^2 + 12cs^4\omega_6^2\omega_4^2\omega_8 - 36\omega_6^2\omega_4^3v_2^4 - 72\omega_4^3v_2^2\omega_8^2 - 6cs^2\omega_6^3\omega_4^3\omega_8 + 12cs^2\omega_6\omega_4^3\omega_8^2 - 36\omega_6^3\omega_4^3v_2^2 + 6cs^4\omega_6^2\omega_4^2\omega_8^2 - 108cs^2\omega_6\omega_4^3v_2^2\omega_8 + 36\omega_6\omega_4^3v_2^2\omega_8 + 12cs^4\omega_6^3\omega_8^2 + 6\omega_6^3\omega_4^2v_2^2\omega_8^2 - 3cs^2\omega_6^2\omega_4^2v_2^2\omega_8^2 - 5cs^2\omega_6^3\omega_4^2\omega_8^2 + 72\omega_6^2\omega_4^3v_2^4\omega_8 + 4\omega_6^3\omega_4^3v_2^4\omega_8^2 + 12cs^4\omega_6^3\omega_4\omega_8 - 108cs^2\omega_6^2\omega_4^3v_2^2 + 36cs^2\omega_6^2\omega_4^2v_2^2\omega_8 - 6cs^4\omega_6^2\omega_4^3\omega_8)\frac{\rho}{12\omega_6^3\omega_4^3\omega_8^2}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3v_1} = (36\omega_6\omega_3cs^2v_2^2\omega_3^2 - 12\omega_6^2\omega_3^3cs^2 + 12\omega_6\omega_3^2cs^4\omega_2^2 - \omega_6^2\omega_3^3cs^4\omega_3^2 + 36\omega_6\omega_3^3v_2^2\omega_2 + 6\omega_6\omega_3^3cs^2\omega_2^2 - 5\omega_6^2\omega_3^2cs^2\omega_3^2 - 18\omega_6\omega_3^2cs^4\omega_3^2 + \omega_6^2\omega_3^2cs^4\omega_2^2 - 90\omega_6^2\omega_3^3v_2^4\omega_2 - 18\omega_6^2\omega_3cs^2v_2^2\omega_3^2 - 6\omega_6\omega_3^3cs^2\omega_3^2 + 252\omega_6^2\omega_3^3cs^2v_2^2 - 6\omega_6^2\omega_3^2cs^2\omega_2^2 + 12\omega_6^2\omega_3^2cs^2\omega_2 + 39\omega_6\omega_3^3v_2^2\omega_3^2 - 36\omega_3^2v_2^4\omega_3^2 - 12\omega_6\omega_3cs^2\omega_3^2 - 12\omega_6^2\omega_3^3cs^4\omega_2 + 36\omega_6\omega_3^2v_2^4\omega_3^2 + 19\omega_6^2\omega_3^3v_2^4\omega_2^2 - 36\omega_3^3v_2^2\omega_3^2 - 72\omega_6\omega_3^3v_2^2\omega_2^2 + 6\omega_6^2\omega_3^2v_2^2\omega_3^2 + 72\omega_6^2\omega_3^3v_2^4 + 36\omega_3^3v_2^2\omega_2^2 + 4\omega_6^2\omega_3^3v_2^4\omega_2^2 - 24\omega_6^2\omega_3cs^4\omega_3^2 - \omega_6^2\omega_3^3cs^2\omega_2^2 + 18\omega_6\omega_3^2cs^2\omega_3^2 + 18\omega_6^2\omega_3^2cs^2v_2^2\omega_2^2 + 12\omega_6^2cs^4\omega_3^2 + 90\omega_6^2\omega_3^3v_2^2\omega_2 + 6\omega_6^2\omega_3^2cs^4\omega_2^2 + 6\omega_6\omega_3^3cs^4\omega_2^2 + 54\omega_6\omega_3^2cs^2v_2^2\omega_3^2 - 306\omega_6^2\omega_3^3cs^2v_2^2\omega_2 - 3\omega_6^2\omega_3^2cs^2v_2^2\omega_3^2 - 108\omega_6\omega_3^3cs^2v_2^2\omega_2 - 12\omega_6\omega_3^2cs^2\omega_2^2 - 36\omega_6\omega_3^3v_2^4\omega_2 - 108\omega_3^2cs^2v_2^2\omega_2^2 + 36\omega_6\omega_3^2cs^2v_2^2\omega_2^2 + 13\omega_6^2\omega_3^2cs^4\omega_2^2 - 6\omega_6\omega_3^2cs^4\omega_2^2 - 72\omega_6^2\omega_3^3v_2^2 - 6\omega_6^2\omega_3^2v_2^4\omega_2^2 + 72\omega_6\omega_3^3v_2^4\omega_2^2 + 12\omega_6^2\omega_3^3cs^2v_2^2\omega_2^2 - 4\omega_6^2\omega_3^3v_2^2\omega_2^2 - 36\omega_3^3v_2^4\omega_2^2 + 12\omega_6^2\omega_3^3cs^4 + 6\omega_6^2\omega_3cs^2\omega_2^2 + 198\omega_6\omega_3^3cs^2v_2^2\omega_2^2 + 108\omega_3^3cs^2v_2^2\omega_2^2 - 12\omega_6^2\omega_3^2cs^4\omega_2 + 36\omega_3^2v_2^2\omega_2^2 + 60\omega_6^2\omega_3^2cs^2v_2^2\omega_2^2 - 39\omega_6\omega_3^3v_2^4\omega_2^2 + 12\omega_6\omega_3cs^4\omega_2^2 + 12\omega_6^2\omega_3^3cs^2\omega_2 - 36\omega_6^2\omega_3^2cs^2v_2^2\omega_2 - 99\omega_6\omega_3^3cs^2v_2^2\omega_2^2 - 108\omega_3^3cs^2v_2^2\omega_2^2 + 36\omega_3^3v_2^4\omega_2^2 - 19\omega_6^2\omega_3^3v_2^2\omega_2^2 - 36\omega_6\omega_3^2v_2^2\omega_2^2)\frac{\rho}{12\omega_6^2\omega_3^3\omega_2^2}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3v_1} = (27\omega_3^2v_1^2\omega_1^2v_2^2\omega_2 - 108\omega_1^2v_2^2cs^2\omega_2^2 + 99\omega_3^2\omega_1v_2^2cs^2\omega_2^2 - \omega_3^2\omega_1^3cs^4\omega_2^2 + 17\omega_3^2\omega_1^2v_2^2\omega_2^3 - 30\omega_3\omega_1^2cs^4\omega_2^3 - 72\omega_3\omega_1^3v_2^2\omega_2^2 - 3\omega_3^2v_1^2\omega_1^3\omega_2^2 + 54\omega_3\omega_1v_2^2cs^2\omega_2^3 - 6\omega_3^2\omega_1^2\omega_2 - 12\omega_3^2\omega_1^2cs^2\omega_2^2 + 8\omega_3^2\omega_1^3v_2^4\omega_2^3 - 12\omega_3\omega_1^3cs^2\omega_2^3 - 36\omega_3\omega_1^2v_2^4\omega_2^2 + 54\omega_3^2\omega_1^2v_2^2\omega_2^2 - 2\omega_3^2\omega_1^3cs^4\omega_2^3 + 78\omega_3\omega_1^3v_2^2\omega_2^3 + 24\omega_3\omega_1^2cs^4\omega_2^2 - 171\omega_3^2\omega_1v_2^2cs^2\omega_2^3 + 216\omega_1^3v_2^2cs^2\omega_2^3 + 18\omega_3^2v_1^2\omega_1^3 + 19\omega_3^2\omega_1^3v_2^4\omega_2^2 - 12\omega_3^2\omega_1^2cs^2\omega_2^3 + 144\omega_3\omega_1^2v_2^4\omega_2^3 + 18\omega_3\omega_1^3cs^2\omega_2^2 - 54\omega_3^2v_1^2\omega_1^2cs^2\omega_2 + 189\omega_3^2\omega_1^3v_2^2cs^2 + 18\omega_3^2v_1^2\omega_1^2\omega_2 + \omega_3^2\omega_1^3\omega_2^2 - 72\omega_1^3v_2^2\omega_2^3 + 18\omega_3^2\omega_1^3cs^4 - 6\omega_3\omega_1^3cs^2\omega_2 - 63\omega_3^2\omega_1^3v_2^4\omega_2 - 324\omega_1^2v_2^2cs^2\omega_2^3 - \omega_3^2\omega_1^2\omega_2^3 + 36\omega_3^2v_2^4\omega_2^3 - 6\omega_3^2\omega_1^3\omega_2 + 36\omega_3^2\omega_1v_2^4\omega_2^2 + 18\omega_3^2v_1^2\omega_1^2cs^2\omega_2^2 + 36\omega_3v_1^2\omega_1^2cs^2\omega_2^3 - 45\omega_3^2\omega_1^2v_2^2\omega_2 - 108\omega_1^2v_2^4\omega_2^3 + 18\omega_3\omega_1v_2^2\omega_2^3 + 36\omega_3^2\omega_1^3v_2^4 - 72\omega_3^2v_1^2\omega_1^2v_2^2\omega_2^3 - 57\omega_3^2\omega_1cs^4\omega_2^3 + 6\omega_3^2\omega_1^3 - 18\omega_3\omega_1cs^2\omega_2^3 + 6\omega_3^2v_1^2\omega_1^2cs^2\omega_2^3 + 3\omega_3^2v_1^2\omega_1^2\omega_2^3 - 63\omega_3^2\omega_1v_2^4\omega_2^3 + 18\omega_3^2v_1^2\omega_1^3\omega_2 + 36\omega_3^2\omega_1^2cs^2\omega_2 + 36\omega_1^3v_2^2\omega_2^2 + 30\omega_3^2cs^4\omega_2^3 + 63\omega_3^2v_2^2cs^2\omega_2^3 + 6\omega_3^2\omega_1cs^4\omega_2^2 + 18\omega_3\omega_1^3v_2^2\omega_2 + 36\omega_3v_1^2\omega_1^2cs^2\omega_2^2 - 15\omega_3^2\omega_1^3cs^4\omega_2 - 78\omega_3\omega_1^3v_2^4\omega_2^3 - 24\omega_3\omega_1^2cs^2\omega_2^2 + 6\omega_3^2\omega_1\omega_2^2 - 54\omega_3^2\omega_1^2v_2^4\omega_2^2 + 18\omega_3^2v_1^2\omega_1cs^2\omega_2^2 - 18\omega_3^2v_1^2\omega_1\omega_2^3 - 81\omega_3^2\omega_1^3v_2^2 - 9\omega_3^2v_1^2\omega_1^3cs^2\omega_2 - 297\omega_3^2\omega_1^3v_2^2cs^2\omega_2 + 306\omega_3\omega_1^2v_2^2cs^2\omega_2^3 - 144\omega_3^2\omega_1^2v_2^2cs^2\omega_2^2 - 144\omega_3\omega_1^2v_2^2\omega_2^3 - 24\omega_3^2\omega_1^3cs^2 - 18\omega_3\omega_1^3cs^4\omega_2^2 + 216\omega_3^2v_1^2\omega_1v_2^2\omega_2^3 - 43\omega_3^2\omega_1^3v_2^2\omega_2^2 + 29\omega_3^2\omega_1^2cs^4\omega_2^3 - 54\omega_3v_1^2\omega_1cs^2\omega_2^3 - 72\omega_3\omega_1^2v_2^2cs^2\omega_2^2 + 135\omega_3^2v_1^2\omega_1^3v_2^2 - 18\omega_3^2v_1^2\omega_1\omega_2^2 + 30\omega_3\omega_1^2cs^2\omega_2^3 + 72\omega_3\omega_1^3v_2^4\omega_2^2 - 9\omega_3^2v_1^2\omega_1cs^2\omega_2^3 + 7\omega_3^2\omega_1^2v_2^4\omega_2^3 + 6\omega_3^2\omega_1\omega_2^3 - 216\omega_3^2v_1^2\omega_1^3v_2^2\omega_2 + 12\omega_3\omega_1^3cs^4\omega_2^3 + 18\omega_3v_1^2\omega_1^3cs^2\omega_2 + 36\omega_3\omega_1^2v_2^2\omega_2^2 + 12\omega_3^2\omega_1^2cs^4\omega_2^2 - 8\omega_3^2\omega_1^3v_2^2\omega_2^2 - 6\omega_3^2\omega_2^3 - 27\omega_3^2v_1^2\omega_1v_2^2\omega_2^2 - 54\omega_3\omega_1^3v_2^2cs^2\omega_2 + 30\omega_3^2\omega_1^2v_2^2cs^2\omega_2^3 + 18\omega_3^2v_1^2\omega_1^3cs^2 - 9\omega_3^2\omega_1v_2^2\omega_2^3 + 72\omega_3^2v_1^2\omega_1^3v_2^2\omega_2^2 + 18\omega_3\omega_1cs^4\omega_2^3 - 135\omega_3^2v_1^2v_2^2\omega_2^3 - 18\omega_3^2v_1^2\omega_1^3 - 30\omega_3^2\omega_1^2cs^4\omega_2 - 36\omega_3v_1^2\omega_1^3cs^2\omega_2^2 - 36\omega_1^3v_2^4\omega_2^2 + 198\omega_3\omega_1^3v_2^2cs^2\omega_2^2 + 24\omega_3^2\omega_1^3v_2^2cs^2\omega_2^3 - 12\omega_3^2\omega_1cs^2\omega_2^2 + 21\omega_3^2\omega_1^3cs^2\omega_2 - 18\omega_3\omega_1^3v_2^4\omega_2 - 198\omega_3\omega_1^3v_2^2cs^2\omega_2^3 + 72\omega_1^3v_2^4\omega_2^3 + 81\omega_3^2\omega_1^2v_2^2cs^2\omega_2 + 135\omega_3^2\omega_1^3v_2^2\omega_2 + 6\omega_3\omega_1^3cs^4\omega_2 + 9\omega_3^2v_2^2\omega_2^3 - 27\omega_3^2\omega_1v_2^2\omega_2^2 + 36\omega_3^2\omega_1^2v_2^4\omega_2 + 108\omega_1^2v_2^2\omega_2^3 - 6\omega_3^2v_1^2\omega_1^3cs^2\omega_2^2 + 15\omega_3^2\omega_1cs^2\omega_2^3 + 18\omega_3^2v_1^2cs^2\omega_2^3 - 18\omega_3\omega_1v_2^4\omega_2^3 + 84\omega_3^2\omega_1^3v_2^2cs^2\omega_2^2)\frac{\rho}{24\omega_3^2\omega_1^3\omega_2^3}$

coefficient $C^{(2)}_{\mathrm{D}_x\mathrm{D}_y^3v_2}$ **at** $\frac{\partial^4v_2}{\partial x_1\partial x_2^3}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_x\mathrm{D}_y^3v_2} = 0$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_x\mathrm{D}_y^3v_2} = (80\omega_4^2v_2^2\omega_8^2 + 8\omega_6^2\omega_4^2 - 120\omega_6\omega_4^2v_2^2\omega_8^2 + 48\omega_6\omega_4^2\omega_8^2 - 16\omega_6^3cs^2\omega_4 + 32\omega_6cs^2\omega_4\omega_8^2 - 32\omega_4^2\omega_8^2 + 17\omega_6^3\omega_4^2\omega_8 + 56\omega_6^2cs^2\omega_4^2\omega_8 + 8\omega_6^3\omega_4 - 16\omega_6^2\omega_4^2v_2^2 + 28\omega_6^2v_2^2\omega_8^2 - 48\omega_6^2\omega_4v_2^2\omega_8 + 28\omega_6^2\omega_4\omega_8^2 - 68\omega_6^2\omega_4v_2^2\omega_8^2 + 16\omega_6^2\omega_4\omega_8 - 8\omega_6^3\omega_4^2 + 20\omega_6^2cs^2\omega_8^2 + 68\omega_6^3\omega_4v_2^2\omega_8 + 24\omega_6\omega_4^2\omega_8 - 64\omega_6\omega_4^2v_2^2\omega_8 + 16\omega_6^3cs^2\omega_4^2 + 25\omega_6^2cs^2\omega_4^2\omega_8^2 - 16\omega_6^3\omega_4v_2^2 - 25\omega_6^3cs^2\omega_4^2\omega_8 - 12\omega_6^2\omega_8^2 - 32\omega_6cs^2\omega_4^2\omega_8 + 43\omega_6^2\omega_4^2v_2^2\omega_8^2 - 44\omega_6^2cs^2\omega_4\omega_8^2 + 44\omega_6^3cs^2\omega_4\omega_8 + 16\omega_6^3\omega_4^2v_2^2 - 43\omega_6^3\omega_4^2v_2^2\omega_8 - 20\omega_6^3cs^2\omega_8 + 12\omega_6^3\omega_8 - 40\omega_6^2\omega_4^2\omega_8 - 16\omega_6^2cs^2\omega_4^2 + 64\omega_6\omega_4v_2^2\omega_8^2 - 17\omega_6^2\omega_4^2\omega_8^2 + 48cs^2\omega_4^2\omega_8^2 - 28\omega_6^3v_2^2\omega_8 - 72\omega_6cs^2\omega_4^2\omega_8^2 - 24\omega_6\omega_4\omega_8^2 + 104\omega_6^2\omega_4^2v_2^2\omega_8 - 28\omega_6^3\omega_4\omega_8 - 16\omega_6^2cs^2\omega_4\omega_8)\frac{v_1\rho v_2}{4\omega_6^3\omega_4^2\omega_8^2}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_x\mathrm{D}_y^3v_2} = (80\omega_4^2v_2^2\omega_8^2 - 44\omega_6^2cs^2\omega_4\omega_8^2 + 8\omega_6^2\omega_4^2 - 32\omega_6cs^2\omega_4^2\omega_8 - 120\omega_6\omega_4^2v_2^2\omega_8^2 + 48\omega_6\omega_4^2\omega_8^2 - 32\omega_4^2\omega_8^2 + 44\omega_6^3cs^2\omega_4\omega_8 + 17\omega_6^3\omega_4^2\omega_8 +$

$20\omega_6^2cs^2\omega_8^2+8\omega_6^3\omega_4+16\omega_6^3cs^2\omega_4^2-16\omega_6^2\omega_4^2v_2^2+28\omega_6^2v_2^2\omega_8^2-48\omega_6^2\omega_4v_2^2\omega_8+28\omega_6^2\omega_4\omega_8^2-68\omega_6^2\omega_4v_2^2\omega_8^2+16\omega_6^2\omega_4\omega_8-16\omega_6^3cs^2\omega_4-8\omega_6^3\omega_4^2+68\omega_6^3\omega_4v_2^2\omega_8+24\omega_6\omega_4^2\omega_8-64\omega_6\omega_4^2v_2^2\omega_8+48cs^2\omega_4^2\omega_8^2-16\omega_6^3\omega_4v_2^2-16\omega_6^2cs^2\omega_4\omega_8-72\omega_6cs^2\omega_4^2\omega_8^2-12\omega_6^2\omega_8^2+43\omega_6^2\omega_4^2v_2^2\omega_8^2+56\omega_6^2cs^2\omega_4^2\omega_8+16\omega_6^3\omega_4^2v_2^2-43\omega_6^3\omega_4^2v_2^2\omega_8-16\omega_6^2cs^2\omega_4^2+32\omega_6cs^2\omega_4\omega_8^2+12\omega_6^3\omega_8-40\omega_6^2\omega_4^2\omega_8-20\omega_6^3cs^2\omega_8+64\omega_6\omega_4v_2^2\omega_8^2-17\omega_6^2\omega_4^2\omega_8^2+25\omega_6^2cs^2\omega_4^2\omega_8^2-28\omega_6^3v_2^2\omega_8-24\omega_6\omega_4\omega_8^2+104\omega_6^2\omega_4^2v_2^2\omega_8-28\omega_6^3\omega_4\omega_8-25\omega_6^3cs^2\omega_4^2\omega_8)\frac{v_1\rho v_2}{4\omega_6^3\omega_4^2\omega_8^2}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3v_2}=0$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3v_2}=0$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_x\mathrm{D}_y^3v_2}=0$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_x\mathrm{D}_y^3v_2}=(54\omega_1cs^2\omega_2^3+36\omega_3v_1^2\omega_1^3+54\omega_3cs^2\omega_2^3+45\omega_3v_1^2\omega_1\omega_2^3+198\omega_3v_2^2\omega_2^3-54\omega_1^3cs^2\omega_2+18\omega_1^3\omega_2+18\omega_1^2\omega_2^3+30\omega_3\omega_1^3cs^2\omega_2^2-18\omega_1^3\omega_2^2-297\omega_3\omega_1^3cs^2\omega_2+198\omega_3\omega_1^3v_2^2-162\omega_3\omega_1cs^2\omega_2^2+90\omega_3\omega_1\omega_2^2+54\omega_1^3cs^2\omega_2^2-198\omega_3\omega_1v_2^2\omega_2^3+270\omega_3\omega_1^3cs^2-54\omega_3\omega_2^3-27\omega_3\omega_1cs^2\omega_2^3+45\omega_3\omega_1\omega_2^3-198\omega_3\omega_1v_2^2\omega_2^2-198\omega_3\omega_1^3v_2^2\omega_2+18v_1^2\omega_1\omega_2^3+135\omega_3\omega_1^3\omega_2+324\omega_3\omega_1^2cs^2\omega_2^2+10\omega_3\omega_1^2\omega_2^3+10\omega_3v_1^2\omega_1^3\omega_2^2-18v_1^2\omega_1^2\omega_2^3-18v_1^2\omega_1^3\omega_2-180\omega_3\omega_1^2\omega_2^2-30\omega_3\omega_1^2cs^2\omega_2^3+396\omega_3\omega_1^2v_2^2\omega_2^2-126\omega_3\omega_1^3-198\omega_3\omega_1^2v_2^2\omega_2-54\omega_1^2cs^2\omega_2^3-18\omega_1\omega_2^3+90\omega_3\omega_1^2\omega_2-36\omega_3v_1^2\omega_2^3+18v_1^2\omega_1^3\omega_2^2-162\omega_3\omega_1^2cs^2\omega_2-10\omega_3\omega_1^3\omega_2^2-10\omega_3v_1^2\omega_1^2\omega_2^3-45\omega_3v_1^2\omega_1^3\omega_2)\frac{v_1\rho v_2}{24\omega_3\omega_1^3\omega_2^3}$

coefficient $C^{(2)}_{\mathrm{D}_y^4\rho}$ **at** $\frac{\partial^4\rho}{\partial x_2^4}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_y^4\rho}=(12-216\omega cs^4+404v_2^2\omega^2cs^2-\omega^3+144v_2^4-132cs^2-216v_2^4\omega-78\omega^2cs^2+8\omega^2-34v_2^2\omega^3cs^2+90v_2^4\omega^2+6\omega^3cs^2-9v_2^4\omega^3+234v_2^2\omega-5\omega^3cs^4-156v_2^2+144cs^4-18\omega+198\omega cs^2+10v_2^2\omega^3+672v_2^2cs^2+82\omega^2cs^4-1008v_2^2\omega cs^2-98v_2^2\omega^2)\frac{v_2}{12\omega^3}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y^4\rho}=(12-34\omega_6^3cs^2v_2^2+6\omega_6^3cs^2+144v_2^4+10\omega_6^3v_2^2-18\omega_6+144cs^4-78\omega_6^2cs^2-216\omega_6v_2^4+672cs^2v_2^2-1008\omega_6cs^2v_2^2-216\omega_6cs^4-98\omega_6^2v_2^2+234\omega_6v_2^2+82\omega_6^2cs^4+404\omega_6^2cs^2v_2^2+90\omega_6^2v_2^4+198\omega_6cs^2-5\omega_6^3cs^4-156v_2^2-\omega_6^3+8\omega_6^2-9\omega_6^3v_2^4-132cs^2)\frac{v_2}{12\omega_6^3}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}_y^4\rho}=(12+198\omega_6cs^2+144v_2^4+672cs^2v_2^2+10\omega_6^3v_2^2-18\omega_6-1008\omega_6cs^2v_2^2+82\omega_6^2cs^4-216\omega_6v_2^4-34\omega_6^3cs^2v_2^2-132cs^2-5\omega_6^3cs^4-98\omega_6^2v_2^2+144cs^4+234\omega_6v_2^2+90\omega_6^2v_2^4+6\omega_6^3cs^2-156v_2^2-216\omega_6cs^4-\omega_6^3+404\omega_6^2cs^2v_2^2-78\omega_6^2cs^2+8\omega_6^2-9\omega_6^3v_2^4)\frac{v_2}{12\omega_6^3}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}_y^4\rho}=(12-5\omega_6^3cs^4+144v_2^4+10\omega_6^3v_2^2-18\omega_6-132cs^2+404\omega_6^2v_2^2cs^2-216\omega_6v_2^4+82\omega_6^2cs^4+198\omega_6cs^2-98\omega_6^2v_2^2-34\omega_6^3v_2^2cs^2-78\omega_6^2cs^2+234\omega_6v_2^2+90\omega_6^2v_2^4-216\omega_6cs^4-156v_2^2+6\omega_6^3cs^2-\omega_6^3+144cs^4+8\omega_6^2+672v_2^2cs^2-9\omega_6^3v_2^4-1008\omega_6v_2^2cs^2)\frac{v_2}{12\omega_6^3}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}_y^4\rho}=(12-5cs^4\omega_6^3+144v_2^4+82cs^4\omega_6^2+10\omega_6^3v_2^2-18\omega_6+404cs^2\omega_6^2v_2^2+144cs^4-216\omega_6v_2^4-216cs^4\omega_6-34cs^2\omega_6^3v_2^2-98\omega_6^2v_2^2-78cs^2\omega_6^2-132cs^2+234\omega_6v_2^2+6cs^2\omega_6^3+90\omega_6^2v_2^4+672cs^2v_2^2-156v_2^2-1008cs^2\omega_6v_2^2-\omega_6^3+8\omega_6^2+198cs^2\omega_6-9\omega_6^3v_2^4)\frac{v_2}{12\omega_6^3}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}_y^4\rho}=(12-1008cs^2v_2^2\omega_2-216cs^4\omega_2+144v_2^4+90v_2^4\omega_2^2-9v_2^4\omega_2^3-5cs^4\omega_2^3-34cs^2v_2^2\omega_2^3-\omega_2^3+404cs^2v_2^2\omega_2^2+82cs^4\omega_2^2-216v_2^4\omega_2+672cs^2v_2^2-132cs^2+8\omega_2^2+10v_2^2\omega_2^3+144cs^4+198cs^2\omega_2-98v_2^2\omega_2^2-78cs^2\omega_2^2+234v_2^2\omega_2-156v_2^2+6cs^2\omega_2^3-18\omega_2)\frac{v_2}{12\omega_2^3}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}_y^4\rho}=(-6\omega_1cs^2\omega_2^3+82\omega_3\omega_1^2cs^4\omega_2^3-98\omega_3\omega_1^3v_2^2\omega_2^2-600\omega_3\omega_1v_2^2cs^2\omega_2^3+12\omega_3\omega_1^3cs^2\omega_2^3-198\omega_3\omega_1^2v_2^4\omega_2^2-72\omega_3cs^2\omega_2^3+20\omega_3\omega_1^3v_2^2\omega_2^3-90\omega_3\omega_1^2cs^4\omega_2^2-51\omega_3v_2^2\omega_2^3-6\omega_1^3cs^2\omega_2+90\omega_3\omega_1^2v_2^4\omega_2^3-78\omega_3\omega_1^3cs^2\omega_2^2+411\omega_3\omega_1v_2^2cs^2\omega_2^2-36\omega_1^2cs^4\omega_2^2+141\omega_3\omega_1^3cs^2\omega_2-51\omega_3\omega_1^3v_2^2-60\omega_3\omega_1cs^2\omega_2^2+6\omega_3\omega_1\omega_2^2+54\omega_3\omega_1^2cs^4\omega_2+129\omega_3\omega_1v_2^2\omega_2^3-72\omega_3\omega_1^3cs^2+6\omega_3\omega_2^3+141\omega_3\omega_1cs^2\omega_2^3-12\omega_3\omega_1\omega_2^3-12\omega_1^2v_2^2cs^2\omega_2^2+99\omega_3\omega_1^2v_2^4\omega_2-105\omega_3\omega_1v_2^2\omega_2^2+6\omega_1^3v_2^2cs^2\omega_2+129\omega_3\omega_1^3v_2^2\omega_2-18\omega_3\omega_1^3v_2^4\omega_2^3-12\omega_3\omega_1^3\omega_2+114\omega_3\omega_1^2cs^2\omega_2^2+18\omega_1^3cs^4\omega_2+8\omega_3\omega_1^2\omega_2^3+45\omega_3v_2^2\omega_2^3+90\omega_3\omega_1^3cs^4+404\omega_3\omega_1^2v_2^2cs^2\omega_2^3-98\omega_3\omega_1^2v_2^2\omega_2^3+45\omega_3\omega_1^3v_2^4+82\omega_3\omega_1^3cs^4\omega_2^2+18\omega_1cs^4\omega_2^3-816\omega_3\omega_1^2v_2^2cs^2\omega_2^2+261\omega_3\omega_1^3v_2^2cs^2-12\omega_3\omega_1^2\omega_2^2-78\omega_3\omega_1^2cs^2\omega_2^3+90\omega_3\omega_1^3v_2^4\omega_2^2-10\omega_3\omega_1^3cs^4\omega_2^3+210\omega_3\omega_1^2v_2^2\omega_2^2+6\omega_3\omega_1^3-600\omega_3\omega_1^3v_2^2cs^2\omega_2+90\omega_3cs^4\omega_2^3-171\omega_3\omega_1cs^4\omega_2^3-105\omega_3\omega_1^2v_2^2\omega_2+404\omega_3\omega_1^3v_2^2cs^2\omega_2^2+411\omega_3\omega_1^2v_2^2cs^2\omega_2+6\omega_1v_2^2cs^2\omega_2^3+99\omega_3\omega_1v_2^4\omega_2^2+6\omega_3\omega_1^2\omega_2-117\omega_3\omega_1^3v_2^4\omega_2-2\omega_3\omega_1^3\omega_2^2-68\omega_3\omega_1^3v_2^2cs^2\omega_2^3+12\omega_1^2cs^2\omega_2^2-171\omega_3\omega_1^3cs^4\omega_2+261\omega_3v_2^2cs^2\omega_2^3+54\omega_3\omega_1cs^4\omega_2^2-60\omega_3\omega_1^2cs^2\omega_2+8\omega_3\omega_1^3\omega_2^2-117\omega_3\omega_1v_2^4\omega_2^3)\frac{v_2}{24\omega_3\omega_1^3\omega_2^3}$

coefficient $C^{(2)}_{\mathrm{D}_y^4v_2}$ **at** $\frac{\partial^4v_2}{\partial x_2^4}$**:**

$C^{(2),\mathrm{SRT}}_{\mathrm{D}_y^4v_2}=(12-36\omega cs^4+252v_2^2\omega^2cs^2-\omega^3+504v_2^4-36cs^2-756v_2^4\omega-22\omega^2cs^2+8\omega^2-18v_2^2\omega^3cs^2+310v_2^4\omega^2+2\omega^3cs^2-29v_2^4\omega^3+378v_2^2\omega-\omega^3cs^4-252v_2^2+24cs^4-18\omega+54\omega cs^2+14v_2^2\omega^3+432v_2^2cs^2+14\omega^2cs^4-648v_2^2\omega cs^2-154v_2^2\omega^2)\frac{\rho}{12\omega^3}$

$C^{(2),\mathrm{MRT1}}_{\mathrm{D}_y^4v_2}=(12-18\omega_6^3cs^2v_2^2+2\omega_6^3cs^2+504v_2^4+14\omega_6^3v_2^2-18\omega_6+24cs^4-22\omega_6^2cs^2-756\omega_6v_2^4+432cs^2v_2^2-648\omega_6cs^2v_2^2-36\omega_6cs^4-$

$154\omega_6^2 v_2^2 + 378\omega_6 v_2^2 + 14\omega_6^2 cs^4 + 252\omega_6^2 cs^2 v_2^2 + 310\omega_6^2 v_2^4 + 54\omega_6 cs^2 - \omega_6^3 cs^4 - 252v_2^2 - \omega_6^3 + 8\omega_6^2 - 29\omega_6^3 v_2^4 - 36cs^2) \frac{\rho}{12\omega_6^3}$

$C^{(2),\mathrm{MRT2}}_{\mathrm{D}^4_y v_2} = (12 + 54\omega_6 cs^2 + 504v_2^4 + 432cs^2 v_2^2 + 14\omega_6^3 v_2^2 - 18\omega_6 - 648\omega_6 cs^2 v_2^2 + 14\omega_6^2 cs^4 - 756\omega_6 v_2^4 - 18\omega_6^3 cs^2 v_2^2 - 36cs^2 - \omega_6^3 cs^4 - 154\omega_6^2 v_2^2 + 24cs^4 + 378\omega_6 v_2^2 + 310\omega_6^2 v_2^4 + 2\omega_6^3 cs^2 - 252v_2^2 - 36\omega_6 cs^4 - \omega_6^3 + 252\omega_6^2 cs^2 v_2^2 - 22\omega_6^2 cs^2 + 8\omega_6^2 - 29\omega_6^3 v_2^4) \frac{\rho}{12\omega_6^3}$

$C^{(2),\mathrm{CLBM1}}_{\mathrm{D}^4_y v_2} = (12 - \omega_6^3 cs^4 + 504v_2^4 + 14\omega_6^3 v_2^2 - 18\omega_6 - 36cs^2 + 252\omega_6^2 v_2^2 cs^2 - 756\omega_6 v_2^4 + 14\omega_6^2 cs^4 + 54\omega_6 cs^2 - 154\omega_6^2 v_2^2 - 18\omega_6^3 v_2^2 cs^2 - 22\omega_6^2 cs^2 + 378\omega_6 v_2^2 + 310\omega_6^2 v_2^4 - 36\omega_6 cs^4 - 252v_2^2 + 2\omega_6^3 cs^2 - \omega_6^3 + 24cs^4 + 8\omega_6^2 + 432v_2^2 cs^2 - 29\omega_6^3 v_2^4 - 648\omega_6 v_2^2 cs^2) \frac{\rho}{12\omega_6^3}$

$C^{(2),\mathrm{CLBM2}}_{\mathrm{D}^4_y v_2} = (12 - cs^4\omega_6^3 + 504v_2^4 + 14cs^4\omega_6^2 + 14\omega_6^3 v_2^2 - 18\omega_6 + 252cs^2\omega_6^2 v_2^2 + 24cs^4 - 756\omega_6 v_2^4 - 36cs^4\omega_6 - 18cs^2\omega_6^3 v_2^2 - 154\omega_6^2 v_2^2 - 22cs^2\omega_6^2 - 36cs^2 + 378\omega_6 v_2^2 + 2cs^2\omega_6^3 + 310\omega_6^2 v_2^4 + 432cs^2 v_2^2 - 252v_2^2 - 648cs^2\omega_6 v_2^2 - \omega_6^3 + 8\omega_6^2 + 54cs^2\omega_6 - 29\omega_6^3 v_2^4) \frac{\rho}{12\omega_6^3}$

$C^{(2),\mathrm{CuLBM1}}_{\mathrm{D}^4_y v_2} = (12 - 648cs^2 v_2^2\omega_2 - 36cs^4\omega_2 + 504v_2^4 + 310v_2^4\omega_2^2 - 29v_2^4\omega_2^3 - cs^4\omega_2^3 - 18cs^2 v_2^2\omega_2^3 - \omega_2^3 + 252cs^2 v_2^2\omega_2^2 + 14cs^4\omega_2^2 - 756v_2^4\omega_2 + 432cs^2 v_2^2 - 36cs^2 + 8\omega_2^2 + 14v_2^2\omega_2^3 + 24cs^4 + 54cs^2\omega_2 - 154v_2^2\omega_2^2 - 22cs^2\omega_2^2 + 378v_2^2\omega_2 - 252v_2^2 + 2cs^2\omega_2^3 - 18\omega_2) \frac{\rho}{12\omega_2^3}$

$C^{(2),\mathrm{CuLBM2}}_{\mathrm{D}^4_y v_2} = (-6\omega_1 cs^2\omega_2^3 + 14\omega_3\omega_1^2 cs^4\omega_2^3 - 154\omega_3\omega_1^3 v_2^2\omega_2^2 - 432\omega_3\omega_1 v_2^2 cs^2\omega_2^3 + 4\omega_3\omega_1^3 cs^2\omega_2^3 - 666\omega_3\omega_1^2 v_2^4\omega_2^2 - 24\omega_3 cs^2\omega_2^3 + 28\omega_3\omega_1^3 v_2^2\omega_2^3 - 6\omega_3\omega_1^2 cs^4\omega_2^2 - 99\omega_3 v_2^2\omega_2^3 - 6\omega_1^3 cs^2\omega_2 + 310\omega_3\omega_1^2 v_2^4\omega_2^3 - 22\omega_3\omega_1^3 cs^2\omega_2^2 + 225\omega_3\omega_1 v_2^2 cs^2\omega_2^2 - 12\omega_1^2 cs^4\omega_2^2 + 45\omega_3\omega_1^3 cs^2\omega_2 - 99\omega_3\omega_1^3 v_2^2 - 12\omega_3\omega_1 cs^2\omega_2^2 + 6\omega_3\omega_1\omega_2^2 + 6\omega_3\omega_1^2 cs^4\omega_2 + 225\omega_3\omega_1 v_2^2\omega_2^3 - 24\omega_3\omega_1^3 cs^2 + 6\omega_3\omega_2^3 + 45\omega_3\omega_1 cs^2\omega_2^3 - 12\omega_3\omega_1\omega_2^3 - 36\omega_1^2 v_2^2 cs^2\omega_2^2 + 333\omega_3\omega_1^2 v_2^2\omega_2 - 153\omega_3\omega_1 v_2^2\omega_2^2 + 18\omega_1^3 v_2^2 cs^2\omega_2 + 225\omega_3\omega_1^3 v_2^2\omega_2 - 58\omega_3\omega_1^3 v_2^4\omega_2^3 - 12\omega_3\omega_1^3\omega_2 + 18\omega_3\omega_1^2 cs^2\omega_2^2 + 6\omega_1^3 cs^4\omega_2 + 8\omega_3\omega_1^2\omega_2^3 + 171\omega_3 v_2^4\omega_2^3 + 18\omega_3\omega_1^3 cs^4 + 252\omega_3\omega_1^2 v_2^2 cs^2\omega_2^3 - 154\omega_3\omega_1^2 v_2^2\omega_2^3 + 171\omega_3\omega_1^3 v_2^4 + 14\omega_3\omega_1^3 cs^4\omega_2^2 + 6\omega_1 cs^4\omega_2^3 - 432\omega_3\omega_1^2 v_2^2 cs^2\omega_2^2 + 207\omega_3\omega_1^3 v_2^2 cs^2 - 12\omega_3\omega_1^2\omega_2^2 - 22\omega_3\omega_1^2 cs^2\omega_2^3 + 310\omega_3\omega_1^3 v_2^4\omega_2^2 - 2\omega_3\omega_1^3 cs^4\omega_2^3 + 306\omega_3\omega_1^2 v_2^2\omega_2^2 + 6\omega_3\omega_1^3 - 432\omega_3\omega_1^3 v_2^2 cs^2\omega_2 + 18\omega_3 cs^4\omega_2^3 - 33\omega_3\omega_1 cs^4\omega_2^3 - 153\omega_3\omega_1^2 v_2^2\omega_2 + 252\omega_3\omega_1^3 v_2^2 cs^2\omega_2^2 + 225\omega_3\omega_1^2 v_2^2 cs^2\omega_2 + 18\omega_1 v_2^2 cs^2\omega_2^3 + 333\omega_3\omega_1 v_2^4\omega_2^2 + 6\omega_3\omega_1^2\omega_2 - 423\omega_3\omega_1^3 v_2^4\omega_2 - 2\omega_3\omega_1^3\omega_2^2 - 36\omega_3\omega_1^3 v_2^2 cs^2\omega_2^3 + 12\omega_1^2 cs^2\omega_2^2 - 33\omega_3\omega_1^3 cs^4\omega_2 + 207\omega_3 v_2^2 cs^2\omega_2^3 + 6\omega_3\omega_1 cs^4\omega_2^2 - 12\omega_3\omega_1^2 cs^2\omega_2 + 8\omega_3\omega_1^3\omega_2^2 - 423\omega_3\omega_1 v_2^4\omega_2^3) \frac{\rho}{24\omega_3\omega_1^3\omega_2^3}$

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