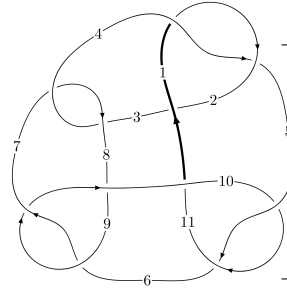
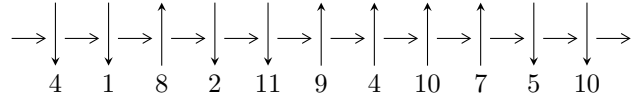


11n₇₃ (K11n₇₃)



A knot diagram¹

Linearized knot diagram



Solving Sequence

$$2,4 \xrightarrow{c_4} 5 \xrightarrow{c_1} 1,8 \xrightarrow{c_3} 3 \xrightarrow{c_7} 7,10 \xrightarrow{c_9} 9 \xrightarrow{c_{11}} 11 \xrightarrow{c_5} 6 \longrightarrow c_2, c_6, c_8, c_{10}$$

Ideals for irreducible components² of X_{par}

$$I_1^u = \langle -u^5 + 3u^4 - 6u^3 + 6u^2 + 4d - u - 1, -u^5 + 3u^4 - 6u^3 + 6u^2 + 4c - 5u - 1, u^4 - 2u^3 + 2u^2 + 2b - 1, u^6 - 3u^5 + 6u^4 - 5u^3 + 2u^2 + 2a + 6u + 3, u^7 - 3u^6 + 5u^5 - 3u^4 - u^3 + 7u^2 + 3u - 1 \rangle$$

$$I_2^u = \langle u^3 + 4d - u + 2, -u^3 + 2u^2 + 4c - 3u - 4, -u^3 + 4b + u + 2, -5u^3 + 4u^2 + 8a - 7u - 14, u^4 - 2u^3 + 3u^2 + 4u - 4 \rangle$$

$$I_3^u = \langle d, c + 1, b, a + 1, u + 1 \rangle$$

$$I_4^u = \langle d + 1, c + 1, b, a - 1, u + 1 \rangle$$

$$I_5^u = \langle d - c - 1, ca + a + 1, b, u + 1 \rangle$$

$$I_1^v = \langle c, d + 1, b, a - 1, v - 1 \rangle$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 14 representations.

* 1 irreducible components of $\dim_{\mathbb{C}} = 1$

¹The image of knot diagram is generated by the software “**Draw programme**” developed by Andrew Bartholomew (<http://www.layer8.co.uk/maths/draw/index.htm#Running-draw>), where we modified some parts for our purpose (<https://github.com/CATsTAILs/LinksPainter>).

²All coefficients of polynomials are rational numbers. But the coefficients are sometimes approximated in decimal forms when there is not enough margin.

$$\mathbf{I. } I_1^u = \langle -u^5 + 3u^4 + \cdots + 4d - 1, -u^5 + 3u^4 + \cdots + 4c - 1, u^4 - 2u^3 + 2u^2 + 2b - 1, u^6 - 3u^5 + \cdots + 2a + 3, u^7 - 3u^6 + \cdots + 3u - 1 \rangle$$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u \\ u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -\frac{1}{2}u^6 + \frac{3}{2}u^5 + \cdots - 3u - \frac{3}{2} \\ -\frac{1}{2}u^4 + u^3 - u^2 + \frac{1}{2} \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^3 \\ -u^3 + u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -\frac{1}{2}u^6 + \frac{3}{2}u^5 + \cdots - 3u - 2 \\ -\frac{1}{2}u^4 + u^3 - u^2 + \frac{1}{2} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{1}{4}u^5 - \frac{3}{4}u^4 + \cdots + \frac{5}{4}u + \frac{1}{4} \\ \frac{1}{4}u^5 - \frac{3}{4}u^4 + \cdots + \frac{1}{4}u + \frac{1}{4} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -\frac{1}{2}u^6 + \frac{3}{2}u^5 + \cdots - \frac{3}{2}u - \frac{3}{2} \\ \frac{1}{4}u^6 - \frac{1}{4}u^5 + \cdots + \frac{3}{4}u + \frac{1}{2} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{1}{4}u^5 - \frac{3}{4}u^4 + \cdots + \frac{1}{4}u + \frac{1}{4} \\ \frac{1}{4}u^5 - \frac{3}{4}u^4 + \cdots + \frac{1}{4}u + \frac{1}{4} \end{pmatrix}$$

$$a_6 = \begin{pmatrix} \frac{1}{4}u^6 - \frac{3}{4}u^5 + \cdots + \frac{1}{4}u + 1 \\ \frac{1}{4}u^6 - \frac{3}{4}u^5 + \cdots + \frac{5}{4}u^2 + \frac{1}{4}u \end{pmatrix}$$

$$a_6 = \begin{pmatrix} \frac{1}{4}u^6 - \frac{3}{4}u^5 + \cdots + \frac{1}{4}u + 1 \\ \frac{1}{4}u^6 - \frac{3}{4}u^5 + \cdots + \frac{5}{4}u^2 + \frac{1}{4}u \end{pmatrix}$$

(ii) Obstruction class = -1

$$\text{(iii) Cusp Shapes} = 3u^6 - \frac{19}{2}u^5 + \frac{35}{2}u^4 - 14u^3 + 3u^2 + \frac{39}{2}u + \frac{9}{2}$$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4, c_5 c_{10}	$u^7 - 3u^6 + 5u^5 - 3u^4 - u^3 + 7u^2 + 3u - 1$
c_2, c_{11}	$u^7 - u^6 + 5u^5 - 29u^4 + 67u^3 + 61u^2 + 23u + 1$
c_3, c_7	$u^7 - 6u^5 + 4u^4 + 32u^3 - 12u^2 + 16u - 8$
c_6, c_9	$u^7 + u^6 - 4u^5 + 15u^3 + 3u^2 - 8u - 4$
c_8	$u^7 - 9u^6 + 46u^5 - 142u^4 + 297u^3 - 249u^2 + 88u - 16$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_5 c_{10}	$y^7 + y^6 + 5y^5 + 29y^4 + 67y^3 - 61y^2 + 23y - 1$
c_2, c_{11}	$y^7 + 9y^6 + 101y^5 - 3y^4 + 8259y^3 - 581y^2 + 407y - 1$
c_3, c_7	$y^7 - 12y^6 + 100y^5 - 368y^4 + 928y^3 + 944y^2 + 64y - 64$
c_6, c_9	$y^7 - 9y^6 + 46y^5 - 142y^4 + 297y^3 - 249y^2 + 88y - 16$
c_8	$y^7 + 11y^6 + 154y^5 + 2854y^4 + 25301y^3 - 14273y^2 - 224y - 256$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.643564 + 0.238013I$ $a = -0.348787 + 1.223080I$ $b = -0.031685 + 0.698136I$ $c = -1.34441 + 1.38199I$ $d = -0.700849 + 1.143970I$	$-1.11796 + 1.29283I$	$-4.63450 - 5.74515I$
$u = -0.643564 - 0.238013I$ $a = -0.348787 - 1.223080I$ $b = -0.031685 - 0.698136I$ $c = -1.34441 - 1.38199I$ $d = -0.700849 - 1.143970I$	$-1.11796 - 1.29283I$	$-4.63450 + 5.74515I$
$u = 0.46828 + 1.59550I$ $a = -1.42404 - 0.69085I$ $b = -2.23667 - 1.02998I$ $c = -0.124307 + 0.903472I$ $d = -0.592592 - 0.692030I$	$5.28066 - 2.46552I$	$0.37200 + 1.61165I$
$u = 0.46828 - 1.59550I$ $a = -1.42404 + 0.69085I$ $b = -2.23667 + 1.02998I$ $c = -0.124307 - 0.903472I$ $d = -0.592592 + 0.692030I$	$5.28066 + 2.46552I$	$0.37200 - 1.61165I$
$u = 0.222829$ $a = -2.19711$ $b = 0.460179$ $c = 0.468941$ $d = 0.246113$	1.26042	8.87750
$u = 1.56387 + 1.00084I$ $a = 1.37138 - 2.22950I$ $b = 2.03826 - 1.30990I$ $c = -0.765750 + 0.890549I$ $d = -2.32961 - 0.11029I$	$14.9463 - 10.4045I$	$-1.17625 + 4.09895I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.56387 - 1.00084I$	$14.9463 + 10.4045I$	$-1.17625 - 4.09895I$
$a = 1.37138 + 2.22950I$		
$b = 2.03826 + 1.30990I$		
$c = -0.765750 - 0.890549I$		
$d = -2.32961 + 0.11029I$		

$$\text{II. } I_2^u = \langle u^3 + 4d - u + 2, -u^3 + 2u^2 + 4c - 3u - 4, -u^3 + 4b + u + 2, -5u^3 + 4u^2 + \dots + 8a - 14, u^4 - 2u^3 + 3u^2 + 4u - 4 \rangle$$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u \\ u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} \frac{5}{8}u^3 - \frac{1}{2}u^2 + \frac{7}{8}u + \frac{7}{4} \\ \frac{1}{4}u^3 - \frac{1}{4}u - \frac{1}{2} \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^3 \\ -u^3 + u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} \frac{3}{8}u^3 - \frac{1}{2}u^2 + \frac{9}{8}u + \frac{9}{4} \\ \frac{1}{4}u^3 - \frac{1}{4}u - \frac{1}{2} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{1}{4}u^3 - \frac{1}{2}u^2 + \frac{3}{4}u + 1 \\ -\frac{1}{4}u^3 + \frac{1}{4}u - \frac{1}{2} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} \frac{5}{8}u^3 - u^2 + \frac{7}{8}u + \frac{9}{4} \\ -u^3 + u - 1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{1}{2}u^3 - \frac{1}{2}u^2 + \frac{3}{2}u + \frac{3}{2} \\ \frac{3}{4}u^3 - 2u^2 - \frac{3}{4}u + \frac{3}{2} \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -\frac{5}{8}u^3 + u^2 + \frac{1}{8}u - \frac{9}{4} \\ 2u^3 - 2u + 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -\frac{5}{8}u^3 + u^2 + \frac{1}{8}u - \frac{9}{4} \\ 2u^3 - 2u + 1 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = 0

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4, c_5 c_{10}	$u^4 - 2u^3 + 3u^2 + 4u - 4$
c_2, c_{11}	$u^4 - 2u^3 + 17u^2 + 40u + 16$
c_3, c_7	$(u^2 + 4u + 2)^2$
c_6, c_9	$(u^2 + 2u - 1)^2$
c_8	$(u^2 - 6u + 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_5 c_{10}	$y^4 + 2y^3 + 17y^2 - 40y + 16$
c_2, c_{11}	$y^4 + 30y^3 + 481y^2 - 1056y + 256$
c_3, c_7	$(y^2 - 12y + 4)^2$
c_6, c_9	$(y^2 - 6y + 1)^2$
c_8	$(y^2 - 34y + 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.14055$ $a = -0.825724$ $b = -0.585786$ $c = -0.876768$ $d = -0.414214$	-2.46740	0
$u = 0.726339$ $a = 2.36126$ $b = -0.585786$ $c = 1.37677$ $d = -0.414214$	-2.46740	0
$u = 1.20711 + 1.83612I$ $a = -2.76777 + 0.53779I$ $b = -3.41421$ $c = 0.250000 - 0.380272I$ $d = 2.41421$	17.2718	0
$u = 1.20711 - 1.83612I$ $a = -2.76777 - 0.53779I$ $b = -3.41421$ $c = 0.250000 + 0.380272I$ $d = 2.41421$	17.2718	0

$$\text{III. } \Gamma_3^u = \langle d, c + 1, b, a + 1, u + 1 \rangle$$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -2 \\ -1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = -12

(iv) **u-Polynomials at the component**

Crossings	u-Polynomials at each crossing
c_1, c_5	$u - 1$
c_2, c_4, c_{10} c_{11}	$u + 1$
c_3, c_6, c_7 c_8, c_9	u

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_4 c_5, c_{10}, c_{11}	$y - 1$
c_3, c_6, c_7 c_8, c_9	y

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.00000$		
$a = -1.00000$		
$b = 0$	-3.28987	-12.0000
$c = -1.00000$		
$d = 0$		

$$\text{IV. } I_4^u = \langle d + 1, c + 1, b, a - 1, u + 1 \rangle$$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = 0

(iv) **u**-Polynomials at the component

Crossings	u -Polynomials at each crossing
c_1, c_9	$u - 1$
c_2, c_4, c_6 c_8	$u + 1$
c_3, c_5, c_7 c_{10}, c_{11}	u

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_4 c_6, c_8, c_9	$y - 1$
c_3, c_5, c_7 c_{10}, c_{11}	y

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.00000$		
$a = 1.00000$		
$b = 0$	0	0
$c = -1.00000$		
$d = -1.00000$		

$$\mathbf{V. } I_5^u = \langle d - c - 1, ca + a + 1, b, u + 1 \rangle$$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} a \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} a \\ 0 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} c \\ c + 1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} c + a \\ c + 1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} c - 1 \\ c \end{pmatrix}$$

$$a_6 = \begin{pmatrix} c \\ c + 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} c \\ c + 1 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = $-c^2 - a^2 - 2c - 5$

(iv) u-Polynomials at the component : It cannot be defined for a positive dimension component.

(v) Riley Polynomials at the component : It cannot be defined for a positive dimension component.

(iv) Complex Volumes and Cusp Shapes

Solution to I_5^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \dots$		
$a = \dots$		
$b = \dots$	-1.64493	-5.89563 + 0.16586I
$c = \dots$		
$d = \dots$		

$$\text{VI. } I_1^v = \langle c, d + 1, b, a - 1, v - 1 \rangle$$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = 0

(iv) **u**-Polynomials at the component

Crossings	u -Polynomials at each crossing
c_1, c_2, c_3 c_4, c_7	u
c_5, c_6, c_8 c_{11}	$u + 1$
c_9, c_{10}	$u - 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_4, c_7	y
c_5, c_6, c_8 c_9, c_{10}, c_{11}	$y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$v = 1.00000$		
$a = 1.00000$		
$b = 0$	0	0
$c = 0$		
$d = -1.00000$		

VII. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$u(u-1)^2(u^4 - 2u^3 + 3u^2 + 4u - 4)$ $\cdot (u^7 - 3u^6 + 5u^5 - 3u^4 - u^3 + 7u^2 + 3u - 1)$
c_2, c_{11}	$u(u+1)^2(u^4 - 2u^3 + 17u^2 + 40u + 16)$ $\cdot (u^7 - u^6 + 5u^5 - 29u^4 + 67u^3 + 61u^2 + 23u + 1)$
c_3, c_7	$u^3(u^2 + 4u + 2)^2(u^7 - 6u^5 + 4u^4 + 32u^3 - 12u^2 + 16u - 8)$
c_4	$u(u+1)^2(u^4 - 2u^3 + 3u^2 + 4u - 4)$ $\cdot (u^7 - 3u^6 + 5u^5 - 3u^4 - u^3 + 7u^2 + 3u - 1)$
c_5, c_{10}	$u(u-1)(u+1)(u^4 - 2u^3 + 3u^2 + 4u - 4)$ $\cdot (u^7 - 3u^6 + 5u^5 - 3u^4 - u^3 + 7u^2 + 3u - 1)$
c_6	$u(u+1)^2(u^2 + 2u - 1)^2(u^7 + u^6 - 4u^5 + 15u^3 + 3u^2 - 8u - 4)$
c_8	$u(u+1)^2(u^2 - 6u + 1)^2$ $\cdot (u^7 - 9u^6 + 46u^5 - 142u^4 + 297u^3 - 249u^2 + 88u - 16)$
c_9	$u(u-1)^2(u^2 + 2u - 1)^2(u^7 + u^6 - 4u^5 + 15u^3 + 3u^2 - 8u - 4)$

VIII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_5 c_{10}	$y(y-1)^2(y^4 + 2y^3 + 17y^2 - 40y + 16)$ $\cdot (y^7 + y^6 + 5y^5 + 29y^4 + 67y^3 - 61y^2 + 23y - 1)$
c_2, c_{11}	$y(y-1)^2(y^4 + 30y^3 + 481y^2 - 1056y + 256)$ $\cdot (y^7 + 9y^6 + 101y^5 - 3y^4 + 8259y^3 - 581y^2 + 407y - 1)$
c_3, c_7	$y^3(y^2 - 12y + 4)^2$ $\cdot (y^7 - 12y^6 + 100y^5 - 368y^4 + 928y^3 + 944y^2 + 64y - 64)$
c_6, c_9	$y(y-1)^2(y^2 - 6y + 1)^2$ $\cdot (y^7 - 9y^6 + 46y^5 - 142y^4 + 297y^3 - 249y^2 + 88y - 16)$
c_8	$y(y-1)^2(y^2 - 34y + 1)^2$ $\cdot (y^7 + 11y^6 + 154y^5 + 2854y^4 + 25301y^3 - 14273y^2 - 224y - 256)$