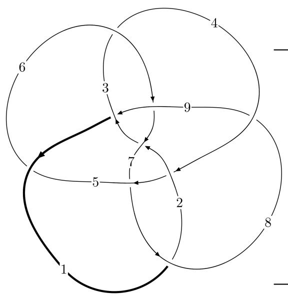
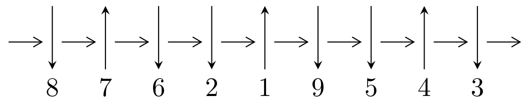
9_{40} $(K9a_{37})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

$$3,6 \xrightarrow[c_3]{} 4,9 \xrightarrow[c_6]{} 7 \xrightarrow[c_9]{} 1 \xrightarrow[c_2]{} 2 \xrightarrow[c_5]{} 5 \xrightarrow[c_8]{} 8 \twoheadrightarrow c_1, c_4, c_7$$

Ideals for irreducible components[2] of $X_{\mathbf{par}}$

$$I_1^u = \langle b-u,\ a+1,\ u^4+2u^3+2u^2+1\rangle$$
$$I_2^u = \langle b-u,\ 4u^3-6u^2+a+3u+6,\ u^4-u^3+2u+1\rangle$$
$$I_3^u = \langle u^3+3u^2+b+5u+2,\ 2u^3+3u^2+7a+3u-7,\ u^4+5u^3+12u^2+14u+7\rangle$$
$$I_4^u = \langle 2u^3-3u^2+b+2u+4,\ a+1,\ u^4-u^3+2u+1\rangle$$
$$I_5^u = \langle b-u,\ a+u-2,\ u^2-u+1\rangle$$
$$I_6^u = \langle b+u+1,\ a+1,\ u^2-u+1\rangle$$
$$I_7^u = \langle b+u+1,\ 3a+u,\ u^2+3u+3\rangle$$
$$I_8^u = \langle b+u,\ a+1,\ u^4-u^3+u+1\rangle$$
$$I_9^u = \langle b-1,\ u^3-2u^2+a+2u,\ u^4-u^3+2u+1\rangle$$
$$I_{10}^u = \langle u^3-2u^2+b+2u+1,\ -u^3+u^2+a-2,\ u^4-u^3+2u+1\rangle$$

[1] The 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`).

$$
\begin{aligned}
I^u_{11} &= \langle -a^3-2a^2+b-2a+1,\ a^4+a^3-2a+1,\ u-1\rangle\\
I^u_{12} &= \langle b,\ a+1,\ u^2-u+1\rangle\\
I^u_{13} &= \langle b-u,\ a,\ u^2-u+1\rangle\\
I^u_{14} &= \langle b-u,\ a+1,\ u^2+u+1\rangle\\
I^u_{15} &= \langle b+1,\ a+1,\ u-1\rangle
\end{aligned}
$$

$$
I^v_1 = \langle a,\ b^2-b+1,\ v-1\rangle
$$

* 16 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 47 representations.

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

I. $I_1^u = \langle b - u,\ a + 1,\ u^4 + 2u^3 + 2u^2 + 1\rangle$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -1 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u \\ u^2 + u \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -u - 1 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -u^3 - u^2 + 1 \\ -u^2 - 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u^3 - 2u^2 - u \\ u^3 + u^2 + u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -u^2 - u - 1 \\ u^3 + 2u^2 + u + 1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -u^2 - u - 1 \\ u^3 + 2u^2 + u + 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 6u^2 + 6u$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3, c_4 c_6, c_7, c_9	$u^4 - 2u^3 + 2u^2 + 1$
c_2, c_5, c_8	$u^4 - 2u^3 + 4u^2 - 2u + 2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_4 c_6, c_7, c_9	$y^4 + 6y^2 + 4y + 1$
c_2, c_5, c_8	$y^4 + 4y^3 + 12y^2 + 12y + 4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.189785 + 0.602803I$ $a = -1.00000$ $b = 0.189785 + 0.602803I$	$-0.10892 - 1.69225I$	$-0.82541 + 4.98965I$
$u = 0.189785 - 0.602803I$ $a = -1.00000$ $b = 0.189785 - 0.602803I$	$-0.10892 + 1.69225I$	$-0.82541 - 4.98965I$
$u = -1.18978 + 1.04318I$ $a = -1.00000$ $b = -1.18978 + 1.04318I$	$-4.0034 + 15.0183I$	$-5.17459 - 8.63488I$
$u = -1.18978 - 1.04318I$ $a = -1.00000$ $b = -1.18978 - 1.04318I$	$-4.0034 - 15.0183I$	$-5.17459 + 8.63488I$

II. $I_2^u = \langle b - u,\ 4u^3 - 6u^2 + a + 3u + 6,\ u^4 - u^3 + 2u + 1\rangle$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} 7u^3 - 12u^2 + 8u + 8 \\ u^3 - 2u^2 + u + 2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -4u^3 + 6u^2 - 4u - 6 \\ u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -u^2 + 3u - 3 \\ u^3 - 2u^2 + u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 4u^3 - 8u^2 + 8u + 4 \\ 2u^3 - 2u^2 + u + 2 \end{pmatrix}$$

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

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -12u^3 + 24u^2 - 12u - 30$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3, c_7 c_9	$u^4 + u^3 - 2u + 1$
c_2, c_8	$(u^2 + u + 1)^2$
c_4, c_6	$u^4 - 5u^3 + 12u^2 - 14u + 7$
c_5	$(u^2 - 2u + 4)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_7 c_9	$y^4 - y^3 + 6y^2 - 4y + 1$
c_2, c_8	$(y^2 + y + 1)^2$
c_4, c_6	$y^4 - y^3 + 18y^2 - 28y + 49$
c_5	$(y^2 + 4y + 16)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.621964 + 0.187730I$ $a = -1.32516 - 2.80932I$ $b = -0.621964 + 0.187730I$	$-3.28987 + 6.08965I$	$-12.0000 - 10.3923I$
$u = -0.621964 - 0.187730I$ $a = -1.32516 + 2.80932I$ $b = -0.621964 - 0.187730I$	$-3.28987 - 6.08965I$	$-12.0000 + 10.3923I$
$u = 1.12196 + 1.05376I$ $a = 0.825159 - 0.211249I$ $b = 1.12196 + 1.05376I$	$-3.28987 - 6.08965I$	$-12.0000 + 10.3923I$
$u = 1.12196 - 1.05376I$ $a = 0.825159 + 0.211249I$ $b = 1.12196 - 1.05376I$	$-3.28987 + 6.08965I$	$-12.0000 - 10.3923I$

III.

$\boldsymbol{I_3^u = \langle u^3+3u^2+b+5u+2,\ 2u^3+3u^2+7a+3u-7,\ u^4+5u^3+12u^2+14u+7\rangle}$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} -\frac{10}{7}u^3 - \frac{36}{7}u^2 - \frac{64}{7}u - 5 \\ -2u^3 - 8u^2 - 14u - 10 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} \frac{5}{7}u^3 + \frac{18}{7}u^2 + \frac{32}{7}u + 3 \\ -u^3 - 3u^2 - 5u - 2 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} \frac{2}{7}u^3 - \frac{4}{7}u^2 - \frac{18}{7}u - 5 \\ 4u^3 + 16u^2 + 28u + 16 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} \frac{4}{7}u^3 + \frac{13}{7}u^2 + \frac{20}{7}u + 1 \\ u^2 + 4u + 4 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -\frac{9}{7}u^3 - \frac{31}{7}u^2 - \frac{52}{7}u - 4 \\ -u^3 - 6u^2 - 12u - 9 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -\frac{9}{7}u^3 - \frac{31}{7}u^2 - \frac{52}{7}u - 4 \\ -u^3 - 6u^2 - 12u - 9 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -12u^3 - 48u^2 - 84u - 66$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3	$u^4 - 5u^3 + 12u^2 - 14u + 7$
c_2	$(u^2 - 2u + 4)^2$
c_4, c_6, c_7 c_9	$u^4 + u^3 - 2u + 1$
c_5, c_8	$(u^2 + u + 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3	$y^4 - y^3 + 18y^2 - 28y + 49$
c_2	$(y^2 + 4y + 16)^2$
c_4, c_6, c_7 c_9	$y^4 - y^3 + 6y^2 - 4y + 1$
c_5, c_8	$(y^2 + y + 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.148400 + 0.632502I$ $a = \ \ 1.137350 - 0.291171I$ $b = \ \ 1.12196 - 1.05376I$	$-3.28987 + 6.08965I$	$-12.0000 - 10.3923I$
$u = -1.148400 - 0.632502I$ $a = \ \ 1.137350 + 0.291171I$ $b = \ \ 1.12196 + 1.05376I$	$-3.28987 - 6.08965I$	$-12.0000 + 10.3923I$
$u = -1.35160 + 1.49853I$ $a = -0.137346 - 0.291171I$ $b = -0.621964 - 0.187730I$	$-3.28987 - 6.08965I$	$-12.0000 + 10.3923I$
$u = -1.35160 - 1.49853I$ $a = -0.137346 + 0.291171I$ $b = -0.621964 + 0.187730I$	$-3.28987 + 6.08965I$	$-12.0000 - 10.3923I$

IV. $I_4^u = \langle 2u^3 - 3u^2 + b + 2u + 4,\ a + 1,\ u^4 - u^3 + 2u + 1\rangle$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} -u \\ u^3 - 2u^2 + u + 2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 2u^3 - 3u^2 + 2u + 3 \\ -2u^3 + 3u^2 - 2u - 4 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} u^3 - u^2 + 2 \\ u^3 - 2u^2 + u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u^3 - 2u^2 + 2u + 1 \\ -2u^3 + 4u^2 - 2u - 3 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 2u^3 - 4u^2 + 2u + 3 \\ -2u^3 + 3u^2 - 2 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 2u^3 - 4u^2 + 2u + 3 \\ -2u^3 + 3u^2 - 2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -12u^3 + 24u^2 - 12u - 30$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3, c_4 c_6	$u^4 + u^3 - 2u + 1$
c_2, c_5	$(u^2 + u + 1)^2$
c_7, c_9	$u^4 - 5u^3 + 12u^2 - 14u + 7$
c_8	$(u^2 - 2u + 4)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_4 c_6	$y^4 - y^3 + 6y^2 - 4y + 1$
c_2, c_5	$(y^2 + y + 1)^2$
c_7, c_9	$y^4 - y^3 + 18y^2 - 28y + 49$
c_8	$(y^2 + 4y + 16)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.621964+0.187730I$ $a=-1.00000$ $b=-1.35160-1.49853I$	$-3.28987+6.08965I$	$-12.0000-10.3923I$
$u=-0.621964-0.187730I$ $a=-1.00000$ $b=-1.35160+1.49853I$	$-3.28987-6.08965I$	$-12.0000+10.3923I$
$u=\quad 1.12196+1.05376I$ $a=-1.00000$ $b=-1.148400-0.632502I$	$-3.28987-6.08965I$	$-12.0000+10.3923I$
$u=\quad 1.12196-1.05376I$ $a=-1.00000$ $b=-1.148400+0.632502I$	$-3.28987+6.08965I$	$-12.0000-10.3923I$

V. $I_5^u = \langle b - u,\ a + u - 2,\ u^2 - u + 1\rangle$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} 1 \\ u - 1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u + 2 \\ u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -3 \\ -u + 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -2u + 2 \\ u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 3u - 2 \\ -u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 4u - 4 \\ -u \end{pmatrix}$$

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

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 12u - 6$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_3 c_7, c_8, c_9	$u^2 + u + 1$
c_4, c_6	$u^2 - 3u + 3$
c_5	$(u-2)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_7, c_8, c_9	$y^2 + y + 1$
c_4, c_6	$y^2 - 3y + 9$
c_5	$(y-4)^2$

(vi) Complex Volumes and Cusp Shapes

	Solutions to I_5^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u =$	$0.500000 + 0.866025I$		
$a =$	$1.50000 - 0.86603I$	$-6.08965I$	$0. + 10.39230I$
$b =$	$0.500000 + 0.866025I$		
$u =$	$0.500000 - 0.866025I$		
$a =$	$1.50000 + 0.86603I$	$6.08965I$	$0. - 10.39230I$
$b =$	$0.500000 - 0.866025I$		

VI. $I^u_6 = \langle b+u+1,\ a+1,\ u^2-u+1\rangle$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ u-1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -1 \\ -u-1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u \\ -u+1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u \\ -u-1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 0 \\ -u \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 1 \\ 2u-2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ u-3 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ u-3 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 12u - 6$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_3 c_4, c_5, c_6	$u^2 + u + 1$
c_7, c_9	$u^2 - 3u + 3$
c_8	$(u - 2)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_4, c_5, c_6	$y^2 + y + 1$
c_7, c_9	$y^2 - 3y + 9$
c_8	$(y-4)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_6^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = \quad 0.500000 + 0.866025I$ $a = -1.00000$ $b = -1.50000 - 0.86603I$	$-\ 6.08965I$	$0. + 10.39230I$
$u = \quad 0.500000 - 0.866025I$ $a = -1.00000$ $b = -1.50000 + 0.86603I$	$6.08965I$	$0. - 10.39230I$

VII. $I_7^u = \langle b+u+1,\ 3a+u,\ u^2+3u+3\rangle$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} 1 \\ -3u-3 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -\frac{1}{3}u \\ -u-1 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -\frac{2}{3}u-1 \\ -2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} \frac{2}{3}u+1 \\ -u-1 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} \frac{4}{3}u+3 \\ 4 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} \frac{1}{3}u \\ u+1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -\frac{4}{3}u-2 \\ -u-4 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -\frac{4}{3}u-2 \\ -u-4 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -12u-18$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3	$u^2 - 3u + 3$
c_2	$(u-2)^2$
c_4, c_5, c_6 c_7, c_8, c_9	$u^2 + u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3	$y^2 - 3y + 9$
c_2	$(y-4)^2$
c_4, c_5, c_6 c_7, c_8, c_9	$y^2 + y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_7^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.50000 + 0.86603I$ $a = \quad 0.500000 - 0.288675I$ $b = \quad 0.500000 - 0.866025I$	$6.08965I$	$0. - 10.39230I$
$u = -1.50000 - 0.86603I$ $a = \quad 0.500000 + 0.288675I$ $b = \quad 0.500000 + 0.866025I$	$-6.08965I$	$0. + 10.39230I$

VIII. $I_8^u = \langle b+u,\ a+1,\ u^4-u^3+u+1\rangle$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} -u \\ -u^2+u \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} u^3-u^2+1 \\ -u^3+u^2-u-1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u^3+2u^2-u \\ u^3-u^2+u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u^2+u-1 \\ 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u^2+u-1 \\ 1 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 3u^3-3u^2+3u-3$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4, c_7	$u^4 + u^3 - u + 1$
c_2, c_5, c_8	$u^4 + u^2 + 2$
c_3, c_6, c_9	$u^4 - u^3 + u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_4 c_6, c_7, c_9	$y^4 - y^3 + 4y^2 - y + 1$
c_2, c_5, c_8	$(y^2 + y + 2)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_8^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.566121 + 0.458821I$ $a = -1.00000$ $b = 0.566121 - 0.458821I$	$-2.46740 - 5.33349I$	$-4.50000 + 3.96863I$
$u = -0.566121 - 0.458821I$ $a = -1.00000$ $b = 0.566121 + 0.458821I$	$-2.46740 + 5.33349I$	$-4.50000 - 3.96863I$
$u = 1.066120 + 0.864054I$ $a = -1.00000$ $b = -1.066120 - 0.864054I$	$-2.46740 - 5.33349I$	$-4.50000 + 3.96863I$
$u = 1.066120 - 0.864054I$ $a = -1.00000$ $b = -1.066120 + 0.864054I$	$-2.46740 + 5.33349I$	$-4.50000 - 3.96863I$

IX. $I^u_9 = \langle b - 1,\ u^3 - 2u^2 + a + 2u,\ u^4 - u^3 + 2u + 1\rangle$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u^3 + 2u^2 - 2u \\ 1 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -4u^3 + 7u^2 - 5u - 5 \\ -u^3 + 2u^2 - u - 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -u^3 + 2u^2 - 2u - 1 \\ 1 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -4u^3 + 6u^2 - 3u - 6 \\ -u^3 + 2u^2 - u - 2 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -2u^3 + 3u^2 - 2u - 3 \\ -u^3 + 2u^2 - 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -2u^3 + 4u^2 - 3u - 2 \\ -u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -2u^3 + 4u^2 - 3u - 2 \\ -u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^3 + 8u^2 - 4u - 18$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3, c_4 c_6	$u^4 + u^3 - 2u + 1$
c_2, c_5, c_8	$(u^2 + u + 1)^2$
c_7, c_9	$(u + 1)^4$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_4 c_6	$y^4 - y^3 + 6y^2 - 4y + 1$
c_2, c_5, c_8	$(y^2 + y + 1)^2$
c_7, c_9	$(y - 1)^4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_9^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.621964 + 0.187730I$ $a = \quad 2.12196 - 1.05376I$ $b = \quad 1.00000$	$-3.28987 + 2.02988I$	$-12.00000 - 3.46410I$
$u = -0.621964 - 0.187730I$ $a = \quad 2.12196 + 1.05376I$ $b = \quad 1.00000$	$-3.28987 - 2.02988I$	$-12.00000 + 3.46410I$
$u = \quad 1.12196 + 1.05376I$ $a = \quad 0.378036 - 0.187730I$ $b = \quad 1.00000$	$-3.28987 - 2.02988I$	$-12.00000 + 3.46410I$
$u = \quad 1.12196 - 1.05376I$ $a = \quad 0.378036 + 0.187730I$ $b = \quad 1.00000$	$-3.28987 + 2.02988I$	$-12.00000 - 3.46410I$

X. $\boldsymbol{I^u_{10} = \langle u^3 - 2u^2 + b + 2u + 1,\ -u^3 + u^2 + a - 2,\ u^4 - u^3 + 2u + 1\rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u^3 - u^2 + 2 \\ -u^3 + 2u^2 - 2u - 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} u^3 - u^2 + 2 \\ -u^3 + 2u^2 - u - 1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 2u^3 - 3u^2 + 2u + 3 \\ -u^3 + 2u^2 - 2u - 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -u^3 + 2u^2 - 2u \\ -u^3 + 2u^2 - u - 2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} u^3 - 2u^2 + 2u + 1 \\ u^3 - u^2 + u + 2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 2u^3 - 3u^2 + u + 3 \\ -u^3 + u^2 - u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 2u^3 - 3u^2 + u + 3 \\ -u^3 + u^2 - u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^3 + 8u^2 - 4u - 18$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3, c_7 c_9	$u^4 + u^3 - 2u + 1$
c_2, c_5, c_8	$(u^2 + u + 1)^2$
c_4, c_6	$(u + 1)^4$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_7 c_9	$y^4 - y^3 + 6y^2 - 4y + 1$
c_2, c_5, c_8	$(y^2 + y + 1)^2$
c_4, c_6	$(y - 1)^4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_{10}	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.621964 + 0.187730I$ $a = 1.47356 + 0.44477I$ $b = 1.12196 - 1.05376I$	$-3.28987 + 2.02988I$	$-12.00000 - 3.46410I$
$u = -0.621964 - 0.187730I$ $a = 1.47356 - 0.44477I$ $b = 1.12196 + 1.05376I$	$-3.28987 - 2.02988I$	$-12.00000 + 3.46410I$
$u = 1.12196 + 1.05376I$ $a = -0.473561 + 0.444772I$ $b = -0.621964 - 0.187730I$	$-3.28987 - 2.02988I$	$-12.00000 + 3.46410I$
$u = 1.12196 - 1.05376I$ $a = -0.473561 - 0.444772I$ $b = -0.621964 + 0.187730I$	$-3.28987 + 2.02988I$	$-12.00000 - 3.46410I$

XI. $I^u_{11} = \langle -a^3 - 2a^2 + b - 2a + 1,\ a^4 + a^3 - 2a + 1,\ u - 1\rangle$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} a \\ a^3 + 2a^2 + 2a - 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -a^2 \\ -a^3 - 2a^2 - a + 2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -a^3 - 2a^2 - a + 1 \\ a^3 + 2a^2 + 2a - 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} a \\ -a^3 - 2a^2 - a + 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -a^3 - 2a^2 - a + 2 \\ 2a^3 + 3a^2 + 2a - 2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -a^3 - 2a^2 + 1 \\ a \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -a^3 - 2a^2 + 1 \\ a \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4a^3 + 8a^2 + 4a - 18$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3	$(u+1)^4$
c_2, c_5, c_8	$(u^2+u+1)^2$
c_4, c_6, c_7 c_9	u^4+u^3-2u+1

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3	$(y-1)^4$
c_2, c_5, c_8	$(y^2+y+1)^2$
c_4, c_6, c_7 c_9	$y^4 - y^3 + 6y^2 - 4y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_{11}	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = 0.621964 + 0.187730I$ $b = 1.12196 + 1.05376I$	$-3.28987 - 2.02988I$	$-12.00000 + 3.46410I$
$u = 1.00000$ $a = 0.621964 - 0.187730I$ $b = 1.12196 - 1.05376I$	$-3.28987 + 2.02988I$	$-12.00000 - 3.46410I$
$u = 1.00000$ $a = -1.12196 + 1.05376I$ $b = -0.621964 + 0.187730I$	$-3.28987 + 2.02988I$	$-12.00000 - 3.46410I$
$u = 1.00000$ $a = -1.12196 - 1.05376I$ $b = -0.621964 - 0.187730I$	$-3.28987 - 2.02988I$	$-12.00000 + 3.46410I$

XII. $I^u_{12} = \langle b,\ a+1,\ u^2 - u + 1\rangle$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} 1 \\ u-1 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} -u \\ u \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} -u+2 \\ u-1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u \\ u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u \\ u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u \\ u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u - 2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_3 c_4, c_5, c_6	$u^2 + u + 1$
c_7, c_9	u^2
c_8	$u^2 - u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_4, c_5, c_6 c_8	$y^2 + y + 1$
c_7, c_9	y^2

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_{12}	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.500000 + 0.866025I$ $a = -1.00000$ $b = 0$	$-2.02988I$	$0. + 3.46410I$
$u = 0.500000 - 0.866025I$ $a = -1.00000$ $b = 0$	$2.02988I$	$0. - 3.46410I$

XIII. $I^u_{13} = \langle b - u,\ a,\ u^2 - u + 1 \rangle$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} 1 \\ u - 1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

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

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

$$a_8 = \begin{pmatrix} -u \\ u + 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u \\ u + 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u - 2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_3 c_7, c_8, c_9	$u^2 + u + 1$
c_4, c_6	u^2
c_5	$u^2 - u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_5, c_7, c_8 c_9	$y^2 + y + 1$
c_4, c_6	y^2

(vi) Complex Volumes and Cusp Shapes

	Solutions to I^u_{13}	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u =$	$0.500000 + 0.866025I$		
$a =$	0	$-2.02988I$	$0. + 3.46410I$
$b =$	$0.500000 + 0.866025I$		
$u =$	$0.500000 - 0.866025I$		
$a =$	0	$2.02988I$	$0. - 3.46410I$
$b =$	$0.500000 - 0.866025I$		

XIV. $I_{14}^u = \langle b-u,\ a+1,\ u^2+u+1\rangle$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ -u-1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -1 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u \\ -1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -u-1 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u+1 \\ 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} u+1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 3$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3, c_4 c_6, c_7, c_9	$u^2 - u + 1$
c_2, c_5, c_8	$(u-1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_4 c_6, c_7, c_9	$y^2 + y + 1$
c_2, c_5, c_8	$(y-1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_{14}	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = -1.00000$ $b = -0.500000 + 0.866025I$	3.28987	3.00000
$u = -0.500000 - 0.866025I$ $a = -1.00000$ $b = -0.500000 - 0.866025I$	3.28987	3.00000

XV. $I_{15}^{u} = \langle b+1,\ a+1,\ u-1 \rangle$

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_{15}	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -1.00000$ $b = -1.00000$	-3.28987	-12.0000

XVI. $\boldsymbol{I_1^v = \langle a,\ b^2 - b + 1,\ v - 1\rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 0 \\ b \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ b-1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -b \\ b \end{pmatrix}$$
$$a_2 = \begin{pmatrix} b \\ -b \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -b+2 \\ b-1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -b \\ b \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -b \\ b \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4b - 2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3	u^2
c_2	$u^2 - u + 1$
c_4, c_5, c_6 c_7, c_8, c_9	$u^2 + u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3	y^2
c_2, c_4, c_5 c_6, c_7, c_8 c_9	$y^2 + y + 1$

(vi) Complex Volumes and Cusp Shapes

	Solutions to I_1^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v =$	1.00000		
$a =$	0	$-2.02988I$	$0. + 3.46410I$
$b =$	$0.500000 + 0.866025I$		
$v =$	1.00000		
$a =$	0	$2.02988I$	$0. - 3.46410I$
$b =$	$0.500000 - 0.866025I$		

XVII. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_4, c_7	$u^2(u+1)^5(u^2-3u+3)(u^2-u+1)(u^2+u+1)^4$ $\cdot(u^4-5u^3+\cdots-14u+7)(u^4-2u^3+2u^2+1)(u^4+u^3-2u+1)^4$ $\cdot(u^4+u^3-u+1)$
c_2, c_5, c_8	$u(u-2)^2(u-1)^2(u^2-2u+4)^2(u^2-u+1)(u^2+u+1)^{14}(u^4+u^2+2)$ $\cdot(u^4-2u^3+4u^2-2u+2)$
c_3, c_6, c_9	$u^2(u-1)(u+1)^4(u^2-3u+3)(u^2-u+1)(u^2+u+1)^4$ $\cdot(u^4-5u^3+12u^2-14u+7)(u^4-2u^3+2u^2+1)(u^4-u^3+u+1)$ $\cdot(u^4+u^3-2u+1)^4$

XVIII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_4 c_6, c_7, c_9	$y^2(y-1)^5(y^2-3y+9)(y^2+y+1)^5(y^4+6y^2+4y+1)$ $\cdot(y^4-y^3+4y^2-y+1)(y^4-y^3+6y^2-4y+1)^4$ $\cdot(y^4-y^3+18y^2-28y+49)$
c_2, c_5, c_8	$y(y-4)^2(y-1)^2(y^2+y+1)^{15}(y^2+y+2)^2(y^2+4y+16)^2$ $\cdot(y^4+4y^3+12y^2+12y+4)$