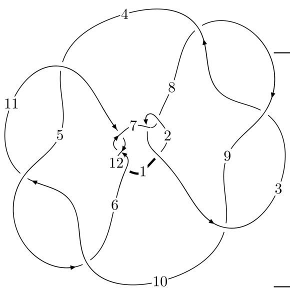
$12n_{0642}$ ($K12n_{0642}$)



A knot diagram[1]

Linearized knot diagam

$\rightarrow\downarrow\rightarrow\uparrow\rightarrow\uparrow\rightarrow\uparrow\rightarrow\uparrow\rightarrow\uparrow\rightarrow\uparrow\rightarrow\uparrow\rightarrow\uparrow\rightarrow\uparrow\rightarrow\uparrow\rightarrow\uparrow\rightarrow$

3 7 9 11 10 12 2 4 3 5 7 6

Solving Sequence

$$7{,}11 \xrightarrow[c_{11}]{} 3{,}12 \xrightarrow[c_2]{} 2 \xrightarrow[c_7]{} 8 \xrightarrow[c_1]{} 1{,}5 \xrightarrow[c_4]{} 4 \xrightarrow[c_6]{} 6 \xrightarrow[c_{10}]{} 10 \xrightarrow[c_9]{} 9 \twoheadrightarrow c_3, c_5, c_8, c_{12}$$

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

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

[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`).

$$
\begin{aligned}
I_{11}^u &= \langle d+u,\ c+u+1,\ b+u,\ a+1,\ u^2+1\rangle \\
I_{12}^u &= \langle d+u,\ cb+bu-u-1,\ a+1,\ u^2+1\rangle
\end{aligned}
$$

$$
I_1^v = \langle a,\ d-v,\ -av+c-v+1,\ b-1,\ v^2+1\rangle
$$

* 12 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 33 representations.
* 1 irreducible components of $\dim_{\mathbb{C}} = 1$

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

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

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1 \\ -\frac{1}{2}u^2 + u - \frac{1}{2} \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ \frac{1}{2}u^2 + u - \frac{1}{2} \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ \frac{1}{2}u^2 - u + \frac{1}{2} \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^2 + 1 \\ -4u + 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -\frac{1}{2}u^2 - \frac{1}{2} \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -\frac{1}{2}u^2 - u - \frac{1}{2} \\ u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u \\ -u^2 - 2u + 1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} \frac{1}{2}u^2 + u + \frac{1}{2} \\ u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} \frac{1}{2}u^2 + \frac{1}{2} \\ -\frac{1}{2}u^2 - u + \frac{1}{2} \end{pmatrix}$$

(ii) Obstruction class $= -1$

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

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^3 + 5u^2 + 11u - 1$
c_2, c_3, c_4 c_5, c_6, c_7 c_8, c_9, c_{10} c_{11}, c_{12}	$u^3 + u^2 + 3u - 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^3 - 3y^2 + 131y - 1$
c_2, c_3, c_4 c_5, c_6, c_7 c_8, c_9, c_{10} c_{11}, c_{12}	$y^3 + 5y^2 + 11y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.295598$ $a = 1.00000$ $b = -0.248091$ $c = -0.543689$ $d = 0.295598$	0.476945	20.7140
$u = -0.64780 + 1.72143I$ $a = 1.00000$ $b = 0.12405 + 2.83658I$ $c = 0.771845 + 1.115140I$ $d = -0.64780 + 1.72143I$	$12.0985 - 12.7092I$	$2.64285 + 4.85033I$
$u = -0.64780 - 1.72143I$ $a = 1.00000$ $b = 0.12405 - 2.83658I$ $c = 0.771845 - 1.115140I$ $d = -0.64780 - 1.72143I$	$12.0985 + 12.7092I$	$2.64285 - 4.85033I$

II.

$\boldsymbol{I_2^u = \langle d-u,\ u^3-u^2+2c+3u-1,\ -u^3+u^2+2b-3u-1,\ a-1,\ u^4+4u^2+2u+1\rangle}$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1 \\ \frac{1}{2}u^3 - \frac{1}{2}u^2 + \frac{3}{2}u + \frac{1}{2} \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ \frac{1}{2}u^3 + \frac{1}{2}u^2 + \frac{3}{2}u + \frac{1}{2} \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ \frac{1}{2}u^3 - \frac{1}{2}u^2 + \frac{1}{2}u - \frac{1}{2} \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^2 + 1 \\ 2u^2 + 2u + 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -\frac{1}{2}u^3 + \frac{1}{2}u^2 - \frac{3}{2}u + \frac{1}{2} \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -\frac{1}{2}u^3 + \frac{1}{2}u^2 - \frac{5}{2}u + \frac{1}{2} \\ u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} \frac{1}{2}u^3 + \frac{1}{2}u^2 + \frac{3}{2}u + \frac{3}{2} \\ u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u^3 + 4u + 2 \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u^3 + 14u + 12$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^4 + 8u^3 + 18u^2 + 4u + 1$
c_2, c_4, c_5 c_6, c_7, c_{10} c_{11}, c_{12}	$u^4 + 4u^2 + 2u + 1$
c_3, c_8, c_9	$u^4 + 3u^3 + 4u^2 + 4u + 4$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^4 - 28y^3 + 262y^2 + 20y + 1$
c_2, c_4, c_5 c_6, c_7, c_{10} c_{11}, c_{12}	$y^4 + 8y^3 + 18y^2 + 4y + 1$
c_3, c_8, c_9	$y^4 - y^3 + 16y + 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.264316 + 0.422125I$ $a = 1.00000$ $b = 0.219104 + 0.751390I$ $c = 0.780896 - 0.751390I$ $d = -0.264316 + 0.422125I$	$-2.86313 - 1.17563I$	$8.79089 + 5.96277I$
$u = -0.264316 - 0.422125I$ $a = 1.00000$ $b = 0.219104 - 0.751390I$ $c = 0.780896 + 0.751390I$ $d = -0.264316 - 0.422125I$	$-2.86313 + 1.17563I$	$8.79089 - 5.96277I$
$u = 0.26432 + 1.99036I$ $a = 1.00000$ $b = 1.28090 - 1.27441I$ $c = -0.280896 + 1.274410I$ $d = 0.26432 + 1.99036I$	$19.3125 + 4.7517I$	$3.20911 - 2.00586I$
$u = 0.26432 - 1.99036I$ $a = 1.00000$ $b = 1.28090 + 1.27441I$ $c = -0.280896 - 1.274410I$ $d = 0.26432 - 1.99036I$	$19.3125 - 4.7517I$	$3.20911 + 2.00586I$

III. $I_3^u = \langle d-u,\ u^3-u^2+2c+3u-1,\ u^3-u^2+2b+u-1,\ -u^3+u^2+2a-5u+3,\ u^4+4u^2+2u+1\rangle$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} \frac{1}{2}u^3-\frac{1}{2}u^2+\frac{5}{2}u-\frac{3}{2} \\ -\frac{1}{2}u^3+\frac{1}{2}u^2-\frac{1}{2}u+\frac{1}{2} \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} \frac{1}{2}u^3-\frac{1}{2}u^2+\frac{5}{2}u-\frac{3}{2} \\ 1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} \frac{3}{2}u^3-\frac{1}{2}u^2+\frac{11}{2}u+\frac{5}{2} \\ -\frac{1}{2}u^3+\frac{1}{2}u^2-\frac{3}{2}u-\frac{1}{2} \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^2+1 \\ 2u^2+2u+1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -\frac{1}{2}u^3+\frac{1}{2}u^2-\frac{3}{2}u+\frac{1}{2} \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -\frac{1}{2}u^3+\frac{1}{2}u^2-\frac{5}{2}u+\frac{1}{2} \\ u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u \\ u^3+u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} \frac{1}{2}u^3+\frac{1}{2}u^2+\frac{3}{2}u+\frac{3}{2} \\ u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u^3+4u+2 \\ -\frac{1}{2}u^3-\frac{1}{2}u^2-\frac{3}{2}u-\frac{1}{2} \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u^3+14u+12$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^4 - u^3 + 16u + 16$
c_2, c_7	$u^4 + 3u^3 + 4u^2 + 4u + 4$
c_3, c_4, c_5 c_6, c_8, c_9 c_{10}, c_{11}, c_{12}	$u^4 + 4u^2 + 2u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^4 - y^3 + 64y^2 - 256y + 256$
c_2, c_7	$y^4 - y^3 + 16y + 16$
c_3, c_4, c_5 c_6, c_8, c_9 c_{10}, c_{11}, c_{12}	$y^4 + 8y^3 + 18y^2 + 4y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.264316 + 0.422125I$ $a = -2.04521 + 1.17351I$ $b = 0.516580 - 0.329264I$ $c = 0.780896 - 0.751390I$ $d = -0.264316 + 0.422125I$	$-2.86313 - 1.17563I$	$8.79089 + 5.96277I$
$u = -0.264316 - 0.422125I$ $a = -2.04521 - 1.17351I$ $b = 0.516580 + 0.329264I$ $c = 0.780896 + 0.751390I$ $d = -0.264316 - 0.422125I$	$-2.86313 + 1.17563I$	$8.79089 - 5.96277I$
$u = 0.26432 + 1.99036I$ $a = -0.454787 + 0.715953I$ $b = -0.01658 + 3.26477I$ $c = -0.280896 + 1.274410I$ $d = 0.26432 + 1.99036I$	$19.3125 + 4.7517I$	$3.20911 - 2.00586I$
$u = 0.26432 - 1.99036I$ $a = -0.454787 - 0.715953I$ $b = -0.01658 - 3.26477I$ $c = -0.280896 - 1.274410I$ $d = 0.26432 - 1.99036I$	$19.3125 - 4.7517I$	$3.20911 + 2.00586I$

IV. $I_4^u = \langle u^3 - u^2 + 2d + 5u + 1,\ u^3 + c + 4u + 2,\ -u^3 + u^2 + 2b - 3u - 1,\ a - 1,\ u^4 + 4u^2 + 2u + 1\rangle$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ \frac{1}{2}u^3 - \frac{1}{2}u^2 + \frac{3}{2}u + \frac{1}{2} \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

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

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

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

$$a_5 = \begin{pmatrix} -u^3 - 4u - 2 \\ -\frac{1}{2}u^3 + \frac{1}{2}u^2 - \frac{5}{2}u - \frac{1}{2} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -\frac{1}{2}u^3 - \frac{1}{2}u^2 - \frac{3}{2}u - \frac{3}{2} \\ -\frac{1}{2}u^3 + \frac{1}{2}u^2 - \frac{5}{2}u - \frac{1}{2} \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{1}{2}u^3 - \frac{1}{2}u^2 + \frac{5}{2}u - \frac{1}{2} \\ -\frac{1}{2}u^3 - \frac{1}{2}u^2 - \frac{1}{2}u - \frac{3}{2} \end{pmatrix}$$

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u^3 + 14u + 12$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^4 + 8u^3 + 18u^2 + 4u + 1$
c_2, c_3, c_6 c_7, c_8, c_9 c_{11}, c_{12}	$u^4 + 4u^2 + 2u + 1$
c_4, c_5, c_{10}	$u^4 + 3u^3 + 4u^2 + 4u + 4$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^4 - 28y^3 + 262y^2 + 20y + 1$
c_2, c_3, c_6 c_7, c_8, c_9 c_{11}, c_{12}	$y^4 + 8y^3 + 18y^2 + 4y + 1$
c_4, c_5, c_{10}	$y^4 - y^3 + 16y + 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.264316 + 0.422125I$ $a = 1.00000$ $b = 0.219104 + 0.751390I$ $c = -1.06556 - 1.70176I$ $d = 0.045213 - 1.173520I$	$-2.86313 - 1.17563I$	$8.79089 + 5.96277I$
$u = -0.264316 - 0.422125I$ $a = 1.00000$ $b = 0.219104 - 0.751390I$ $c = -1.06556 + 1.70176I$ $d = 0.045213 + 1.173520I$	$-2.86313 + 1.17563I$	$8.79089 - 5.96277I$
$u = 0.26432 + 1.99036I$ $a = 1.00000$ $b = 1.28090 - 1.27441I$ $c = 0.065564 - 0.493715I$ $d = -1.54521 - 0.71595I$	$19.3125 + 4.7517I$	$3.20911 - 2.00586I$
$u = 0.26432 - 1.99036I$ $a = 1.00000$ $b = 1.28090 + 1.27441I$ $c = 0.065564 + 0.493715I$ $d = -1.54521 + 0.71595I$	$19.3125 - 4.7517I$	$3.20911 + 2.00586I$

V. $\boldsymbol{I_5^u = \langle u^3+u^2+2d+2u+2,\ u^3+3u^2+4c+4u+4,\ u^3+u^2+b+u+1,\ -u^3-u^2+4a-2u,\ u^4+3u^3+4u^2+4u+4\rangle}$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} \frac{1}{4}u^3 + \frac{1}{4}u^2 + \frac{1}{2}u \\ -u^3 - u^2 - u - 1 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} \frac{1}{4}u^3 + \frac{1}{4}u^2 + \frac{1}{2}u \\ 1 \end{pmatrix}$$

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

$$a_1 = \begin{pmatrix} u^2 + 1 \\ 3u^3 + 2u^2 + 4u + 4 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} \frac{1}{4}u^3 - \frac{1}{4}u^2 \\ -\frac{1}{2}u^3 - \frac{1}{2}u^2 - u - 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

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

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -u^3 - 5u^2 - 6u + 2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^4 + 8u^3 + 18u^2 + 4u + 1$
c_2, c_3, c_4 c_5, c_7, c_8 c_9, c_{10}	$u^4 + 4u^2 + 2u + 1$
c_6, c_{11}, c_{12}	$u^4 + 3u^3 + 4u^2 + 4u + 4$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^4 - 28y^3 + 262y^2 + 20y + 1$
c_2, c_3, c_4 c_5, c_7, c_8 c_9, c_{10}	$y^4 + 8y^3 + 18y^2 + 4y + 1$
c_6, c_{11}, c_{12}	$y^4 - y^3 + 16y + 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_5^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.045213 + 1.173520I$ $a = -0.367842 + 0.211063I$ $b = 0.516580 + 0.329264I$ $c = 0.032782 - 0.850878I$ $d = -0.264316 - 0.422125I$	$-2.86313 + 1.17563I$	$8.79089 - 5.96277I$
$u = 0.045213 - 1.173520I$ $a = -0.367842 - 0.211063I$ $b = 0.516580 - 0.329264I$ $c = 0.032782 + 0.850878I$ $d = -0.264316 + 0.422125I$	$-2.86313 - 1.17563I$	$8.79089 + 5.96277I$
$u = -1.54521 + 0.71595I$ $a = -0.632158 + 0.995180I$ $b = -0.01658 - 3.26477I$ $c = -0.532782 - 0.246857I$ $d = 0.26432 - 1.99036I$	$19.3125 - 4.7517I$	$3.20911 + 2.00586I$
$u = -1.54521 - 0.71595I$ $a = -0.632158 - 0.995180I$ $b = -0.01658 + 3.26477I$ $c = -0.532782 + 0.246857I$ $d = 0.26432 + 1.99036I$	$19.3125 + 4.7517I$	$3.20911 - 2.00586I$

VI. $I_6^u = \langle d-u,\ c-u+2,\ b+1,\ 2a+u+1,\ u^2-u+2\rangle$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -\frac{1}{2}u - \frac{1}{2} \\ -1 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ -u+2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -\frac{1}{2}u - \frac{1}{2} \\ 1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} \frac{1}{2}u - \frac{3}{2} \\ 1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u-1 \\ u+2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} u-2 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -2 \\ u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u \\ -2 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -u-1 \\ u-2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -\frac{3}{2}u + \frac{1}{2} \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^2 + 3u + 4$
c_2, c_3, c_4 c_5, c_6, c_7 c_8, c_9, c_{10} c_{11}, c_{12}	$u^2 - u + 2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^2 - y + 16$
c_2, c_3, c_4 c_5, c_6, c_7 c_8, c_9, c_{10} c_{11}, c_{12}	$y^2 + 3y + 4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_6^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = \quad 0.50000 + 1.32288I$ $a = -0.750000 - 0.661438I$ $b = -1.00000$ $c = -1.50000 + 1.32288I$ $d = \quad 0.50000 + 1.32288I$	-8.22467	2.00000
$u = \quad 0.50000 - 1.32288I$ $a = -0.750000 + 0.661438I$ $b = -1.00000$ $c = -1.50000 - 1.32288I$ $d = \quad 0.50000 - 1.32288I$	-8.22467	2.00000

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

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -\frac{1}{2}u - \frac{1}{2} \\ -1 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ -u+2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -\frac{1}{2}u - \frac{1}{2} \\ 1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} \frac{1}{2}u - \frac{3}{2} \\ 1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u-1 \\ u+2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -\frac{1}{2}u + \frac{1}{2} \\ -u+1 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} \frac{1}{2}u - \frac{1}{2} \\ -u+1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u \\ -2 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -\frac{1}{2}u + \frac{1}{2} \\ -u-1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} \frac{1}{2}u - \frac{1}{2} \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^2 + 3u + 4$
c_2, c_3, c_4 c_5, c_6, c_7 c_8, c_9, c_{10} c_{11}, c_{12}	$u^2 - u + 2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^2 - y + 16$
c_2, c_3, c_4 c_5, c_6, c_7 c_8, c_9, c_{10} c_{11}, c_{12}	$y^2 + 3y + 4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_7	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = \quad 0.50000 + 1.32288I$ $a = -0.750000 - 0.661438I$ $b = -1.00000$ $c = \quad 0.250000 - 0.661438I$ $d = \quad 0.50000 - 1.32288I$	-8.22467	2.00000
$u = \quad 0.50000 - 1.32288I$ $a = -0.750000 + 0.661438I$ $b = -1.00000$ $c = \quad 0.250000 + 0.661438I$ $d = \quad 0.50000 + 1.32288I$	-8.22467	2.00000

VIII. $I_8^u = \langle d+u-1,\ 2c+u-1,\ b+2u,\ a-1,\ u^2-u+2\rangle$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1 \\ -2u \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ -u+2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ -u-2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ -2u+2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u-1 \\ u+2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -\frac{1}{2}u+\frac{1}{2} \\ -u+1 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} \frac{1}{2}u-\frac{1}{2} \\ -u+1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u \\ -2 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -\frac{1}{2}u+\frac{1}{2} \\ -u-1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} \frac{1}{2}u-\frac{1}{2} \\ -u+3 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^2 + 3u + 4$
c_2, c_3, c_4 c_5, c_6, c_7 c_8, c_9, c_{10} c_{11}, c_{12}	$u^2 - u + 2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^2 - y + 16$
c_2, c_3, c_4 c_5, c_6, c_7 c_8, c_9, c_{10} c_{11}, c_{12}	$y^2 + 3y + 4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_8^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.50000 + 1.32288I$		
$a = 1.00000$		
$b = -1.00000 - 2.64575I$	-8.22467	2.00000
$c = 0.250000 - 0.661438I$		
$d = 0.50000 - 1.32288I$		
$u = 0.50000 - 1.32288I$		
$a = 1.00000$		
$b = -1.00000 + 2.64575I$	-8.22467	2.00000
$c = 0.250000 + 0.661438I$		
$d = 0.50000 + 1.32288I$		

IX. $I_9^u = \langle d,\ c+u,\ b+u,\ a+1,\ u^2+1\rangle$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -1 \\ -u \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -1 \\ -u+1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ -1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u \\ 0 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u+1 \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$(u-1)^2$
c_2, c_3, c_6 c_7, c_8, c_9 c_{11}, c_{12}	u^2+1
c_4, c_5, c_{10}	u^2

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$(y-1)^2$
c_2, c_3, c_6 c_7, c_8, c_9 c_{11}, c_{12}	$(y+1)^2$
c_4, c_5, c_{10}	y^2

(vi) Complex Volumes and Cusp Shapes

Solutions to I_9^u		$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u =$	$1.000000I$		
$a =$	-1.00000		
$b =$	$-1.000000I$	-4.93480	4.00000
$c =$	$-1.000000I$		
$d =$	0		
$u =$	$-1.000000I$		
$a =$	-1.00000		
$b =$	$1.000000I$	-4.93480	4.00000
$c =$	$1.000000I$		
$d =$	0		

X. $I_{10}^{u} = \langle d+u,\ c+u+1,\ b-1,\ a,\ u^2+1\rangle$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u-1 \\ -u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -1 \\ -u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} u \\ -1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u \\ u-1 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_7	u^2
c_3, c_4, c_5 c_6, c_8, c_9 c_{10}, c_{11}, c_{12}	$u^2 + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_7	y^2
c_3, c_4, c_5 c_6, c_8, c_9 c_{10}, c_{11}, c_{12}	$(y+1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_{10}^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.000000I$ $a = 0$ $b = 1.00000$ $c = -1.00000 - 1.00000I$ $d = -1.000000I$	-4.93480	4.00000
$u = -1.000000I$ $a = 0$ $b = 1.00000$ $c = -1.00000 + 1.00000I$ $d = 1.000000I$	-4.93480	4.00000

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

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -1 \\ -u \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -1 \\ -u+1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ -1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u-1 \\ -u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -1 \\ -u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} u \\ -1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$(u-1)^2$
c_2, c_4, c_5 c_6, c_7, c_{10} c_{11}, c_{12}	u^2+1
c_3, c_8, c_9	u^2

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$(y-1)^2$
c_2, c_4, c_5 c_6, c_7, c_{10} c_{11}, c_{12}	$(y+1)^2$
c_3, c_8, c_9	y^2

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_{11}	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.000000I$ $a = -1.00000$ $b = -1.000000I$ $c = -1.00000 - 1.00000I$ $d = -1.000000I$	-4.93480	4.00000
$u = -1.000000I$ $a = -1.00000$ $b = 1.000000I$ $c = -1.00000 + 1.00000I$ $d = 1.000000I$	-4.93480	4.00000

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

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -1 \\ b \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -1 \\ b + 1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ -bu \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} c \\ -u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} c + u \\ -u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -cu + 1 \\ -1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -cu + u + 1 \\ -bu - 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -2$

(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^u_{12}	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = \cdots$		
$a = \cdots$		
$b = \cdots$	-6.57974	-2.00000
$c = \cdots$		
$d = \cdots$		

XIII. $I_1^v = \langle a,\ d - v,\ -av + c - v + 1,\ b - 1,\ v^2 + 1\rangle$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_{12} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

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

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

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

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

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$(u-1)^2$
c_2, c_3, c_4 c_5, c_7, c_8 c_9, c_{10}	u^2+1
c_6, c_{11}, c_{12}	u^2

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$(y-1)^2$
c_2, c_3, c_4 c_5, c_7, c_8 c_9, c_{10}	$(y+1)^2$
c_6, c_{11}, c_{12}	y^2

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v = 1.000000I$ $a = 0$ $b = 1.00000$ $c = -1.00000 + 1.00000I$ $d = 1.000000I$	-4.93480	4.00000
$v = -1.000000I$ $a = 0$ $b = 1.00000$ $c = -1.00000 - 1.00000I$ $d = -1.000000I$	-4.93480	4.00000

XIV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$u^2(u-1)^6(u^2+3u+4)^3(u^3+5u^2+11u-1)(u^4-u^3+16u+16)$ $\cdot(u^4+8u^3+18u^2+4u+1)^3$
c_2, c_3, c_4 c_5, c_6, c_7 c_8, c_9, c_{10} c_{11}, c_{12}	$u^2(u^2+1)^3(u^2-u+2)^3(u^3+u^2+3u-1)(u^4+4u^2+2u+1)^3$ $\cdot(u^4+3u^3+4u^2+4u+4)$

XV. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$y^2(y-1)^6(y^2-y+16)^3(y^3-3y^2+131y-1)$ $\cdot (y^4-28y^3+262y^2+20y+1)^3(y^4-y^3+64y^2-256y+256)$
c_2, c_3, c_4 c_5, c_6, c_7 c_8, c_9, c_{10} c_{11}, c_{12}	$y^2(y+1)^6(y^2+3y+4)^3(y^3+5y^2+11y-1)(y^4-y^3+16y+16)$ $\cdot (y^4+8y^3+18y^2+4y+1)^3$