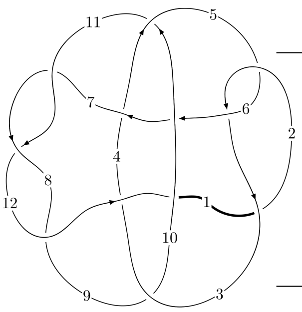
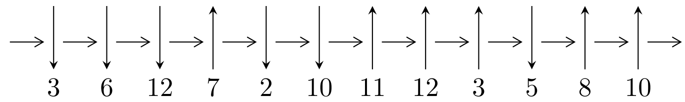
$12n_{0440}$ ($K12n_{0440}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I_1^u = \langle -238u^{25} - 929u^{24} + \cdots + 288b - 10325,\ -1220u^{25} - 4477u^{24} + \cdots + 2976a - 43144,$$
$$u^{26} + 4u^{25} + \cdots + 112u + 31\rangle$$
$$I_2^u = \langle -3u^7 + u^6 + 2u^5 - 2u^4 - 7u^3 + 3u^2 + 2b + 3u - 3,\ -3u^7 + 3u^6 + 2u^5 - 2u^4 - 7u^3 + 7u^2 + 2a + 3u - 3,$$
$$u^8 - u^6 + 3u^4 - 2u^2 + 1\rangle$$
$$I_3^u = \langle u^{11} + u^{10} - 3u^9 - u^8 + 3u^7 - u^6 + 4u^5 + 4u^4 - 5u^3 + u^2 + 4b - 4u,$$
$$u^{10} + u^9 - 3u^8 - 3u^7 + 5u^6 + 3u^5 - 2u^4 + 4u^3 - u^2 + 4a - 9u + 4,$$
$$u^{12} - 4u^{10} + u^9 + 6u^8 - 3u^7 + u^6 + 3u^5 - 9u^4 - 2u^3 + 5u^2 + u + 2\rangle$$
$$I_4^u = \langle -a^2 + b - 2a,\ a^3 + 2a^2 + a - 1,\ u - 1\rangle$$
$$I_5^u = \langle b^2a - 2a^2b + a^3 - b + 2a - 1,\ u - 1\rangle$$

$$I_1^v = \langle a,\ b^3 + b + 1,\ v - 1\rangle$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 52 representations.
* 1 irreducible components of $\dim_{\mathbb{C}} = 1$

[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`).

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

I. $\boldsymbol{I_1^u = \langle -238u^{25} - 929u^{24} + \cdots + 288b - 10325,\ -1220u^{25} - 4477u^{24} + \cdots + 2976a - 43144,\ u^{26} + 4u^{25} + \cdots + 112u + 31\rangle}$

(i) Arc colorings

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

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

$$a_3 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.409946u^{25} + 1.50437u^{24} + \cdots + 39.5783u + 14.4973 \\ 0.826389u^{25} + 3.22569u^{24} + \cdots + 93.5139u + 35.8507 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0.353831u^{25} + 1.25907u^{24} + \cdots + 37.8982u + 14.2540 \\ 0.291667u^{25} + 1.11458u^{24} + \cdots + 35.6354u + 14.5208 \end{pmatrix}$$

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

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

$$a_{11} = \begin{pmatrix} 1.13564u^{25} + 2.78909u^{24} + \cdots + 58.7102u + 16.2195 \\ 1.55208u^{25} + 4.51042u^{24} + \cdots + 112.646u + 37.5729 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0.663306u^{25} + 1.65323u^{24} + \cdots + 36.2944u + 11.7278 \\ 0.937500u^{25} + 2.37500u^{24} + \cdots + 54.1875u + 16.6875 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.833109u^{25} - 2.14841u^{24} + \cdots - 51.4773u - 17.1555 \\ -0.291667u^{25} - 0.739583u^{24} + \cdots - 15.7292u - 5.05208 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 0.0413306u^{25} + 0.290323u^{24} + \cdots + 12.3044u + 6.87903 \\ -0.270833u^{25} - 0.572917u^{24} + \cdots - 9.11458u - 0.979167 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.573029u^{25} - 1.26434u^{24} + \cdots - 24.9541u - 7.52643 \\ -\frac{1}{2}u^{25} - \frac{11}{8}u^{24} + \cdots - \frac{65}{2}u - \frac{87}{8} \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{323}{108}u^{25} - \frac{262}{27}u^{24} + \cdots - \frac{7238}{27}u - \frac{2566}{27}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{26} + 14u^{25} + \cdots + 1446u + 961$
c_2, c_5	$u^{26} - 4u^{25} + \cdots - 112u + 31$
c_3	$2(2u^{26} - 10u^{25} + \cdots + 864u + 183)$
c_4	$2(2u^{26} + 6u^{25} + \cdots + 6u + 93)$
c_6	$2(2u^{26} + 6u^{25} + \cdots + 828u + 216)$
c_7, c_8, c_{11}	$u^{26} + 4u^{25} + \cdots + 104u + 31$
c_9	$3(3u^{26} + 6u^{25} + \cdots + 28u + 8)$
c_{10}	$3(3u^{26} + 6u^{25} + \cdots - 28u + 8)$
c_{12}	$2(2u^{26} + 2u^{25} + \cdots + 552u + 264)$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{26} - 2y^{25} + \cdots - 2335010y + 923521$
c_2, c_5	$y^{26} - 14y^{25} + \cdots - 1446y + 961$
c_3	$4(4y^{26} - 152y^{25} + \cdots + 146544y + 33489)$
c_4	$4(4y^{26} + 56y^{25} + \cdots + 74364y + 8649)$
c_6	$4(4y^{26} - 88y^{25} + \cdots - 322704y + 46656)$
c_7, c_8, c_{11}	$y^{26} - 22y^{25} + \cdots + 282y + 961$
c_9	$9(9y^{26} + 276y^{25} + \cdots + 4752y + 64)$
c_{10}	$9(9y^{26} + 60y^{25} + \cdots + 400y + 64)$
c_{12}	$4(4y^{26} + 184y^{25} + \cdots + 708000y + 69696)$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.207245 + 0.967760I$ $a = -0.149721 + 1.284220I$ $b = -0.516236 + 0.281803I$	$-3.60172 - 2.61761I$	$-0.26262 + 1.62312I$
$u = 0.207245 - 0.967760I$ $a = -0.149721 - 1.284220I$ $b = -0.516236 - 0.281803I$	$-3.60172 + 2.61761I$	$-0.26262 - 1.62312I$
$u = 0.820953 + 0.396871I$ $a = -0.464795 + 0.712990I$ $b = -0.578506 + 0.981502I$	$-1.82983 - 1.27994I$	$-6.43006 + 3.42409I$
$u = 0.820953 - 0.396871I$ $a = -0.464795 - 0.712990I$ $b = -0.578506 - 0.981502I$	$-1.82983 + 1.27994I$	$-6.43006 - 3.42409I$
$u = 0.093519 + 1.101170I$ $a = 0.479969 + 1.064420I$ $b = -0.492737 + 0.320156I$	$-1.83826 + 8.69089I$	$1.85327 - 5.19152I$
$u = 0.093519 - 1.101170I$ $a = 0.479969 - 1.064420I$ $b = -0.492737 - 0.320156I$	$-1.83826 - 8.69089I$	$1.85327 + 5.19152I$
$u = -0.875136 + 0.787433I$ $a = 0.012821 + 0.379761I$ $b = 0.682772 - 0.320729I$	$8.20037 + 2.96512I$	$10.04842 - 2.30654I$
$u = -0.875136 - 0.787433I$ $a = 0.012821 - 0.379761I$ $b = 0.682772 + 0.320729I$	$8.20037 - 2.96512I$	$10.04842 + 2.30654I$
$u = -1.161750 + 0.364732I$ $a = 1.216800 - 0.327659I$ $b = 2.00120 - 0.76731I$	$-2.84479 + 4.92637I$	$-3.47765 - 6.11098I$
$u = -1.161750 - 0.364732I$ $a = 1.216800 + 0.327659I$ $b = 2.00120 + 0.76731I$	$-2.84479 - 4.92637I$	$-3.47765 + 6.11098I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.641989+0.388321I$ $a=-0.17877-1.49759I$ $b=-0.812488-0.481122I$	$1.35413+1.46610I$	$7.33690-4.93932I$
$u=-0.641989-0.388321I$ $a=-0.17877+1.49759I$ $b=-0.812488+0.481122I$	$1.35413-1.46610I$	$7.33690+4.93932I$
$u=-0.128992+0.733180I$ $a=\ 1.24585-1.03021I$ $b=-0.0120395-0.0178498I$	$4.13697-4.56838I$	$6.59727+4.70609I$
$u=-0.128992-0.733180I$ $a=\ 1.24585+1.03021I$ $b=-0.0120395+0.0178498I$	$4.13697+4.56838I$	$6.59727-4.70609I$
$u=-1.183540+0.424868I$ $a=-1.024870+0.400952I$ $b=-2.00747+0.99437I$	$0.97162+8.87300I$	$1.52140-7.94866I$
$u=-1.183540-0.424868I$ $a=-1.024870-0.400952I$ $b=-2.00747-0.99437I$	$0.97162-8.87300I$	$1.52140+7.94866I$
$u=\ 0.940665+0.925328I$ $a=\ 0.514581-0.495678I$ $b=\ 0.869814-0.281626I$	$5.50559-3.38335I$	$-3.13078+3.33250I$
$u=\ 0.940665-0.925328I$ $a=\ 0.514581+0.495678I$ $b=\ 0.869814+0.281626I$	$5.50559+3.38335I$	$-3.13078-3.33250I$
$u=-1.342860+0.390773I$ $a=\ 0.978142-0.178240I$ $b=\ 1.78351+0.39115I$	$-8.47827+7.26693I$	$-2.82019-4.69299I$
$u=-1.342860-0.390773I$ $a=\ 0.978142+0.178240I$ $b=\ 1.78351-0.39115I$	$-8.47827-7.26693I$	$-2.82019+4.69299I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.31172 + 0.58643I$ $a = 1.376260 - 0.051091I$ $b = 2.25303 + 0.42993I$	$-10.39120 - 9.04784I$	$-3.60025 + 5.37589I$
$u = 1.31172 - 0.58643I$ $a = 1.376260 + 0.051091I$ $b = 2.25303 - 0.42993I$	$-10.39120 + 9.04784I$	$-3.60025 - 5.37589I$
$u = -1.37849 + 0.40779I$ $a = -0.815957 + 0.087138I$ $b = -1.41656 - 0.61555I$	$-11.75740 + 1.91795I$	$-5.35471 - 0.48729I$
$u = -1.37849 - 0.40779I$ $a = -0.815957 - 0.087138I$ $b = -1.41656 + 0.61555I$	$-11.75740 - 1.91795I$	$-5.35471 + 0.48729I$
$u = 1.33866 + 0.56921I$ $a = -1.399980 - 0.153122I$ $b = -2.25429 - 0.76615I$	$-5.7462 - 14.6212I$	$-0.28099 + 7.59450I$
$u = 1.33866 - 0.56921I$ $a = -1.399980 + 0.153122I$ $b = -2.25429 + 0.76615I$	$-5.7462 + 14.6212I$	$-0.28099 - 7.59450I$

II.

$$\boldsymbol{I_2^u = \langle -3u^7+u^6+\cdots+2b-3,\ -3u^7+3u^6+\cdots+2a-3,\ u^8-u^6+3u^4-2u^2+1\rangle}$$

(i) Arc colorings

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

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

$$a_3 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{3}{2}u^7 - \frac{3}{2}u^6 + \cdots - \frac{3}{2}u + \frac{3}{2} \\ \frac{3}{2}u^7 - \frac{1}{2}u^6 + \cdots - \frac{3}{2}u + \frac{3}{2} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 2u^7 - \frac{5}{2}u^6 + u^4 + 5u^3 - \frac{13}{2}u^2 + u + \frac{3}{2} \\ \frac{5}{2}u^7 - 2u^6 + \cdots - \frac{1}{2}u + 2 \end{pmatrix}$$

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

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

$$a_{11} = \begin{pmatrix} \frac{3}{2}u^7 - \frac{5}{2}u^6 + \cdots - \frac{3}{2}u + \frac{5}{2} \\ \frac{3}{2}u^7 - \frac{3}{2}u^6 + \cdots - \frac{3}{2}u + \frac{5}{2} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -\frac{21}{4}u^7 + \frac{15}{4}u^6 + \cdots + \frac{27}{4}u - \frac{25}{4} \\ -\frac{17}{4}u^7 + \frac{9}{4}u^6 + \cdots + \frac{27}{4}u - \frac{23}{4} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} \frac{1}{2}u^7 - \frac{3}{2}u^6 + \cdots - \frac{3}{2}u + \frac{3}{2} \\ \frac{1}{2}u^7 - \frac{1}{2}u^6 + \cdots - \frac{1}{2}u + \frac{3}{2} \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} \frac{3}{2}u^7 - 2u^6 + u^4 + \frac{7}{2}u^3 - 6u^2 + \frac{1}{2}u + 2 \\ 2u^7 - \frac{3}{2}u^6 - u^5 + 5u^3 - \frac{7}{2}u^2 - u + \frac{3}{2} \end{pmatrix}$$

$$a_8 = \begin{pmatrix} \frac{3}{2}u^7 - 2u^6 + u^4 + \frac{5}{2}u^3 - 5u^2 + \frac{1}{2}u + 1 \\ 2u^7 - \frac{3}{2}u^6 - u^5 + u^4 + 4u^3 - \frac{7}{2}u^2 + \frac{3}{2} \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4u^6 - 4u^4 + 12u^2 - 4$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$(u^4 - u^3 + 3u^2 - 2u + 1)^2$
c_2, c_5	$u^8 - u^6 + 3u^4 - 2u^2 + 1$
c_3	$2(2u^8 + 10u^7 + 29u^6 + 48u^5 + 58u^4 + 50u^3 + 27u^2 + 8u + 1)$
c_4	$2(2u^8 + 6u^7 + 17u^6 + 24u^5 + 30u^4 + 16u^3 + 11u^2 + 2u + 1)$
c_6	$2(2u^8 - 2u^7 - 3u^6 + 12u^5 + 14u^4 + 8u^3 + 7u^2 + 2u + 1)$
c_7, c_8, c_{11}	$u^8 - 5u^6 + 7u^4 - 2u^2 + 1$
c_9, c_{10}	$(u^2 + 1)^4$
c_{12}	$2(2u^8 - 2u^7 - 7u^6 + 16u^5 + 2u^4 - 26u^3 + 23u^2 - 8u + 1)$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$(y^4 + 5y^3 + 7y^2 + 2y + 1)^2$
c_2, c_5	$(y^4 - y^3 + 3y^2 - 2y + 1)^2$
c_3	$4(4y^8 + 16y^7 + 113y^6 + 168y^5 - 26y^4 - 78y^3 + 45y^2 - 10y + 1)$
c_4	$4(4y^8 + 32y^7 + \cdots + 18y + 1)$
c_6	$4(4y^8 - 16y^7 + 113y^6 - 168y^5 - 26y^4 + 78y^3 + 45y^2 + 10y + 1)$
c_7, c_8, c_{11}	$(y^4 - 5y^3 + 7y^2 - 2y + 1)^2$
c_9, c_{10}	$(y + 1)^8$
c_{12}	$4(4y^8 - 32y^7 + \cdots - 18y + 1)$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.720342 + 0.351808I$ $a = -0.433324 - 0.562927I$ $b = 0.114099 + 0.557947I$	$-0.21101 - 1.41510I$	$0.17326 + 4.90874I$
$u = 0.720342 - 0.351808I$ $a = -0.433324 + 0.562927I$ $b = 0.114099 - 0.557947I$	$-0.21101 + 1.41510I$	$0.17326 - 4.90874I$
$u = -0.720342 + 0.351808I$ $a = 1.19439 + 2.50547I$ $b = 1.74182 + 1.38460I$	$-0.21101 + 1.41510I$	$0.17326 - 4.90874I$
$u = -0.720342 - 0.351808I$ $a = 1.19439 - 2.50547I$ $b = 1.74182 - 1.38460I$	$-0.21101 - 1.41510I$	$0.17326 + 4.90874I$
$u = 0.911292 + 0.851808I$ $a = 0.352886 + 0.149146I$ $b = -0.194538 - 0.436506I$	$6.79074 - 3.16396I$	$3.82674 + 2.56480I$
$u = 0.911292 - 0.851808I$ $a = 0.352886 - 0.149146I$ $b = -0.194538 + 0.436506I$	$6.79074 + 3.16396I$	$3.82674 - 2.56480I$
$u = -0.911292 + 0.851808I$ $a = -0.613954 - 0.706599I$ $b = -1.161380 - 0.120947I$	$6.79074 + 3.16396I$	$3.82674 - 2.56480I$
$u = -0.911292 - 0.851808I$ $a = -0.613954 + 0.706599I$ $b = -1.161380 + 0.120947I$	$6.79074 - 3.16396I$	$3.82674 + 2.56480I$

III.

$\boldsymbol{I_3^u = \langle u^{11}+u^{10}+\cdots+4b-4u,\ u^{10}+u^9+\cdots+4a+4,\ u^{12}-4u^{10}+\cdots+u+2\rangle}$

(i) Arc colorings

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

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

$$a_3 = \begin{pmatrix}1\\u^2\end{pmatrix}$$

$$a_{10} = \begin{pmatrix}-\frac{1}{4}u^{10}-\frac{1}{4}u^9+\cdots+\frac{9}{4}u-1\\-\frac{1}{4}u^{11}-\frac{1}{4}u^{10}+\cdots-\frac{1}{4}u^2+u\end{pmatrix}$$

$$a_7 = \begin{pmatrix}-\frac{1}{4}u^{10}+\frac{5}{4}u^8+\cdots-\frac{1}{2}u-\frac{1}{2}\\-\frac{1}{4}u^9+\frac{1}{2}u^8+\cdots+\frac{5}{4}u+\frac{1}{2}\end{pmatrix}$$

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

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

$$a_{11} = \begin{pmatrix}-\frac{1}{4}u^9+\frac{3}{4}u^7+\cdots+\frac{7}{4}u-1\\-\frac{1}{4}u^{11}+\frac{3}{4}u^9+\cdots-\frac{3}{2}u^2+\frac{1}{2}u\end{pmatrix}$$

$$a_4 = \begin{pmatrix}\frac{1}{2}u^{11}-\frac{1}{4}u^{10}+\cdots-\frac{1}{2}u+\frac{3}{2}\\\frac{1}{2}u^{11}-u^9+\cdots-\frac{1}{4}u+\frac{1}{2}\end{pmatrix}$$

$$a_9 = \begin{pmatrix}-\frac{1}{4}u^{10}+\frac{3}{4}u^8+\cdots+\frac{3}{2}u-\frac{1}{2}\\-\frac{1}{4}u^{10}+\frac{3}{4}u^8+\cdots+\frac{1}{4}u^2+u\end{pmatrix}$$

$$a_{12} = \begin{pmatrix}-\frac{1}{4}u^9+\frac{1}{4}u^7+\cdots-\frac{5}{4}u+1\\-\frac{1}{2}u^9+u^7+\cdots+\frac{1}{2}u^2-\frac{1}{2}u\end{pmatrix}$$

$$a_8 = \begin{pmatrix}\frac{1}{2}u^8-u^6+\cdots+\frac{1}{2}u-\frac{1}{2}\\\frac{1}{4}u^{10}-\frac{1}{4}u^8+\cdots+\frac{3}{4}u^2+u\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -2u^9+6u^7-2u^6-6u^5+4u^4-6u^3-2u^2+8u+2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{12}+8u^{11}+\cdots-19u+4$
c_2,c_5,c_7 c_8,c_{11}	$u^{12}-4u^{10}-u^9+6u^8+3u^7+u^6-3u^5-9u^4+2u^3+5u^2-u+2$
c_3	$2(2u^{12}+2u^{11}+\cdots-56u+8)$
c_4	$2(2u^{12}+10u^{11}+\cdots+12u+8)$
c_6	$2(2u^{12}-2u^{11}+\cdots+66u+47)$
c_9	$(u^4-u^3+3u^2-2u+1)^3$
c_{10}	$(u^4-u^3+u^2+1)^3$
c_{12}	$2(2u^{12}-6u^{11}+\cdots-150u+103)$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{12} - 8y^{11} + \cdots - 417y + 16$
c_2, c_5, c_7 c_8, c_{11}	$y^{12} - 8y^{11} + \cdots + 19y + 4$
c_3	$4(4y^{12} - 88y^{11} + \cdots + 2080y + 64)$
c_4	$4(4y^{12} + 16y^{11} + \cdots + 688y + 64)$
c_6	$4(4y^{12} - 56y^{11} + \cdots - 4168y + 2209)$
c_9	$(y^4 + 5y^3 + 7y^2 + 2y + 1)^3$
c_{10}	$(y^4 + y^3 + 3y^2 + 2y + 1)^3$
c_{12}	$4(4y^{12} + 80y^{11} + \cdots + 116344y + 10609)$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.152073 + 1.050790I$ $a = -0.216032 - 1.219810I$ $b = 0.518508 - 0.302871I$	$-6.79074 + 3.16396I$	$-1.82674 - 2.56480I$
$u = 0.152073 - 1.050790I$ $a = -0.216032 + 1.219810I$ $b = 0.518508 + 0.302871I$	$-6.79074 - 3.16396I$	$-1.82674 + 2.56480I$
$u = -1.043920 + 0.280279I$ $a = -1.82414 - 0.12229I$ $b = -2.31130 + 0.43695I$	$0.21101 + 1.41510I$	$1.82674 - 4.90874I$
$u = -1.043920 - 0.280279I$ $a = -1.82414 + 0.12229I$ $b = -2.31130 - 0.43695I$	$0.21101 - 1.41510I$	$1.82674 + 4.90874I$
$u = 1.131290 + 0.219998I$ $a = 0.169450 - 1.077300I$ $b = 0.34978 - 1.74911I$	$0.21101 + 1.41510I$	$1.82674 - 4.90874I$
$u = 1.131290 - 0.219998I$ $a = 0.169450 + 1.077300I$ $b = 0.34978 + 1.74911I$	$0.21101 - 1.41510I$	$1.82674 + 4.90874I$
$u = 1.272550 + 0.614267I$ $a = -1.238380 + 0.267755I$ $b = -2.06161 - 0.05098I$	$-6.79074 - 3.16396I$	$-1.82674 + 2.56480I$
$u = 1.272550 - 0.614267I$ $a = -1.238380 - 0.267755I$ $b = -2.06161 + 0.05098I$	$-6.79074 + 3.16396I$	$-1.82674 - 2.56480I$
$u = -1.42462 + 0.43653I$ $a = 0.618232 - 0.037304I$ $b = 0.985647 + 0.714952I$	$-6.79074 - 3.16396I$	$-1.82674 + 2.56480I$
$u = -1.42462 - 0.43653I$ $a = 0.618232 + 0.037304I$ $b = 0.985647 - 0.714952I$	$-6.79074 + 3.16396I$	$-1.82674 - 2.56480I$

Solutions to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.087368 + 0.500278I$ $a = -1.25913 + 1.24198I$ $b = \ \ 0.018967 + 0.315552I$	$0.21101 - 1.41510I$	$1.82674 + 4.90874I$
$u = -0.087368 - 0.500278I$ $a = -1.25913 - 1.24198I$ $b = \ \ 0.018967 - 0.315552I$	$0.21101 + 1.41510I$	$1.82674 - 4.90874I$

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

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -6$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -1.23279 + 0.79255I$ $b = -1.57395 - 0.36899I$	-1.64493	-6.00000
$u = 1.00000$ $a = -1.23279 - 0.79255I$ $b = -1.57395 + 0.36899I$	-1.64493	-6.00000
$u = 1.00000$ $a = 0.465571$ $b = 1.14790$	-1.64493	-6.00000

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(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	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \cdots$ $a = \cdots$ $b = \cdots$	0	0

VI. $I_1^v = \langle a,\ b^3 + b + 1,\ v - 1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 6$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I^v_1	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v = 1.00000$ $a = 0$ $b = 0.341164 + 1.161540I$	1.64493	6.00000
$v = 1.00000$ $a = 0$ $b = 0.341164 - 1.161540I$	1.64493	6.00000
$v = 1.00000$ $a = 0$ $b = -0.682328$	1.64493	6.00000

VII. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$u^3(u+1)^3(u^4-u^3+\cdots-2u+1)^2(u^{12}+8u^{11}+\cdots-19u+4)$ $\cdot(u^{26}+14u^{25}+\cdots+1446u+961)$
c_2, c_5	$u^3(u+1)^3(u^8-u^6+3u^4-2u^2+1)$ $\cdot(u^{12}-4u^{10}-u^9+6u^8+3u^7+u^6-3u^5-9u^4+2u^3+5u^2-u+2)$ $\cdot(u^{26}-4u^{25}+\cdots-112u+31)$
c_3	$8(u^3+u+1)(u^3+2u^2+u-1)$ $\cdot(2u^8+10u^7+29u^6+48u^5+58u^4+50u^3+27u^2+8u+1)$ $\cdot(2u^{12}+2u^{11}+\cdots-56u+8)(2u^{26}-10u^{25}+\cdots+864u+183)$
c_4	$8(u^3+u+1)(u^3-2u^2+u+1)$ $\cdot(2u^8+6u^7+17u^6+24u^5+30u^4+16u^3+11u^2+2u+1)$ $\cdot(2u^{12}+10u^{11}+\cdots+12u+8)(2u^{26}+6u^{25}+\cdots+6u+93)$
c_6	$8(u^3+u-1)(u^3+2u^2+u-1)$ $\cdot(2u^8-2u^7-3u^6+12u^5+14u^4+8u^3+7u^2+2u+1)$ $\cdot(2u^{12}-2u^{11}+\cdots+66u+47)(2u^{26}+6u^{25}+\cdots+828u+216)$
c_7, c_8, c_{11}	$u^3(u-1)^3(u^8-5u^6+7u^4-2u^2+1)$ $\cdot(u^{12}-4u^{10}-u^9+6u^8+3u^7+u^6-3u^5-9u^4+2u^3+5u^2-u+2)$ $\cdot(u^{26}+4u^{25}+\cdots+104u+31)$
c_9	$3(u^2+1)^4(u^3+u-1)(u^3+u+1)(u^4-u^3+3u^2-2u+1)^3$ $\cdot(3u^{26}+6u^{25}+\cdots+28u+8)$
c_{10}	$3(u^2+1)^4(u^3+u-1)(u^3+u+1)(u^4-u^3+u^2+1)^3$ $\cdot(3u^{26}+6u^{25}+\cdots-28u+8)$
c_{12}	$8(u^3+u-1)(u^3-2u^2+u+1)$ $\cdot(2u^8-2u^7-7u^6+16u^5+2u^4-26u^3+23u^2-8u+1)$ $\cdot(2u^{12}-6u^{11}+\cdots-150u+103)(2u^{26}+2u^{25}+\cdots+552u+264)$

VIII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$y^3(y-1)^3(y^4+5y^3+\cdots+2y+1)^2(y^{12}-8y^{11}+\cdots-417y+16)$ $\cdot\,(y^{26}-2y^{25}+\cdots-2335010y+923521)$
c_2, c_5	$y^3(y-1)^3(y^4-y^3+\cdots-2y+1)^2(y^{12}-8y^{11}+\cdots+19y+4)$ $\cdot\,(y^{26}-14y^{25}+\cdots-1446y+961)$
c_3	$64(y^3-2y^2+5y-1)(y^3+2y^2+y-1)$ $\cdot\,(4y^8+16y^7+113y^6+168y^5-26y^4-78y^3+45y^2-10y+1)$ $\cdot\,(4y^{12}-88y^{11}+\cdots+2080y+64)$ $\cdot\,(4y^{26}-152y^{25}+\cdots+146544y+33489)$
c_4	$64(y^3-2y^2+5y-1)(y^3+2y^2+y-1)$ $\cdot\,(4y^8+32y^7+121y^6+296y^5+486y^4+342y^3+117y^2+18y+1)$ $\cdot\,(4y^{12}+16y^{11}+\cdots+688y+64)$ $\cdot\,(4y^{26}+56y^{25}+\cdots+74364y+8649)$
c_6	$64(y^3-2y^2+5y-1)(y^3+2y^2+y-1)$ $\cdot\,(4y^8-16y^7+113y^6-168y^5-26y^4+78y^3+45y^2+10y+1)$ $\cdot\,(4y^{12}-56y^{11}+\cdots-4168y+2209)$ $\cdot\,(4y^{26}-88y^{25}+\cdots-322704y+46656)$
c_7, c_8, c_{11}	$y^3(y-1)^3(y^4-5y^3+\cdots-2y+1)^2(y^{12}-8y^{11}+\cdots+19y+4)$ $\cdot\,(y^{26}-22y^{25}+\cdots+282y+961)$
c_9	$9(y+1)^8(y^3+2y^2+y-1)^2(y^4+5y^3+7y^2+2y+1)^3$ $\cdot\,(9y^{26}+276y^{25}+\cdots+4752y+64)$
c_{10}	$9(y+1)^8(y^3+2y^2+y-1)^2(y^4+y^3+3y^2+2y+1)^3$ $\cdot\,(9y^{26}+60y^{25}+\cdots+400y+64)$
c_{12}	$64(y^3-2y^2+5y-1)(y^3+2y^2+y-1)$ $\cdot\,(4y^8-32y^7+121y^6-296y^5+486y^4-342y^3+117y^2-18y+1)$ $\cdot\,(4y^{12}+80y^{11}+\cdots+116344y+10609)$ $\cdot\,(4y^{26}+184y^{25}+\cdots+708000y+69696)$