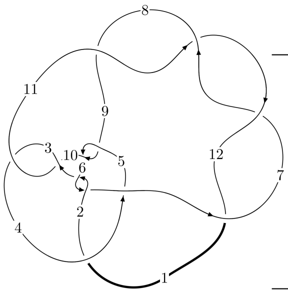
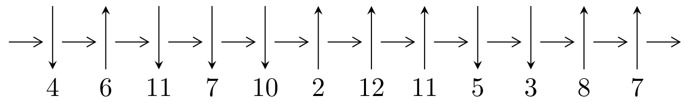
# $12n_{0818}$ ($K12n_{0818}$)




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle -9u^{23} - 69u^{22} + \cdots + 4b - 60,\ -u^{23} - 23u^{22} + \cdots + 8a - 92,\ u^{24} + 9u^{23} + \cdots + 60u + 8\rangle$$
$$I_2^u = \langle -23435100677a^5u^5 + 10963667366u^5a^4 + \cdots + 71553959584a + 30822539955,$$
$$2u^5a^4 - 5u^5a^3 + \cdots + 114a - 114,\ u^6 - u^5 + 3u^4 - 2u^3 + 2u^2 - u - 1\rangle$$
$$I_3^u = \langle -u^{13} + 2u^{12} - 9u^{11} + 14u^{10} - 29u^9 + 34u^8 - 38u^7 + 32u^6 - 14u^5 + 6u^4 + 5u^3 - 4u^2 + b - 1,$$
$$u^{14} - 2u^{13} + \cdots + a + 3,\ u^{15} - 2u^{14} + \cdots + 3u + 1\rangle$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 75 representations.

[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.** $I_1^u = \langle -9u^{23} - 69u^{22} + \cdots + 4b - 60,\ -u^{23} - 23u^{22} + \cdots + 8a - 92,\ u^{24} + 9u^{23} + \cdots + 60u + 8\rangle$

**(i) Arc colorings**

$$a_8 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} \frac{1}{8}u^{23} + \frac{23}{8}u^{22} + \cdots + \frac{283}{4}u + \frac{23}{2} \\ \frac{9}{4}u^{23} + \frac{69}{4}u^{22} + \cdots + 96u + 15 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 2.37500u^{23} + 20.1250u^{22} + \cdots + 166.750u + 26.5000 \\ \frac{9}{4}u^{23} + \frac{69}{4}u^{22} + \cdots + 96u + 15 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$
$$a_5 = \begin{pmatrix} \frac{1}{8}u^{23} + \frac{15}{8}u^{22} + \cdots + \frac{443}{4}u + \frac{35}{2} \\ -\frac{7}{4}u^{23} - \frac{51}{4}u^{22} + \cdots - 4u + 1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^2 + 1 \\ -u^4 - 2u^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -\frac{13}{8}u^{23} - \frac{111}{8}u^{22} + \cdots - \frac{625}{4}u - 26 \\ -\frac{1}{4}u^{23} - \frac{7}{4}u^{22} + \cdots - \frac{37}{2}u - 3 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} \frac{15}{8}u^{23} + \frac{123}{8}u^{22} + \cdots + \frac{279}{2}u + 22 \\ \frac{3}{2}u^{23} + 11u^{22} + \cdots + \frac{157}{2}u + 13 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -\frac{1}{8}u^{23} - \frac{11}{8}u^{22} + \cdots - \frac{41}{4}u - 1 \\ -\frac{3}{4}u^{23} - \frac{25}{4}u^{22} + \cdots - \frac{67}{2}u - 5 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u \\ u \end{pmatrix}$$

**(ii) Obstruction class** $= -1$

**(iii) Cusp Shapes**
$= 10u^{23} + 83u^{22} + 460u^{21} + 1851u^{20} + 6019u^{19} + 16308u^{18} + 37879u^{17} + 76523u^{16} + 135925u^{15} + 213724u^{14} + 298650u^{13} + 371570u^{12} + 411446u^{11} + 404553u^{10} + 351654u^9 + 268406u^8 + 178327u^7 + 101993u^6 + 49649u^5 + 20388u^4 + 7050u^3 + 2063u^2 + 490u + 66$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $u^{24} + 11u^{22} + \cdots + 2u + 1$ |
| $c_2, c_6$ | $u^{24} - 13u^{23} + \cdots - 736u + 64$ |
| $c_3, c_5, c_9$ $c_{10}$ | $u^{24} - u^{23} + \cdots + 2u + 1$ |
| $c_7, c_8, c_{11}$ $c_{12}$ | $u^{24} + 9u^{23} + \cdots + 60u + 8$ |

**(v) Riley Polynomials at the component**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $y^{24} + 22y^{23} + \cdots + 28y + 1$ |
| $c_2, c_6$ | $y^{24} + 21y^{23} + \cdots + 19456y + 4096$ |
| $c_3, c_5, c_9$ <br> $c_{10}$ | $y^{24} - 17y^{23} + \cdots - 6y + 1$ |
| $c_7, c_8, c_{11}$ <br> $c_{12}$ | $y^{24} + 23y^{23} + \cdots + 624y + 64$ |

**(vi) Complex Volumes and Cusp Shapes**

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.971536 + 0.221960I$<br>$a = 0.61723 + 1.27443I$<br>$b = -1.38087 - 0.69103I$ | $-3.82723 - 9.97673I$ | $-3.43940 + 6.32468I$ |
| $u = -0.971536 - 0.221960I$<br>$a = 0.61723 - 1.27443I$<br>$b = -1.38087 + 0.69103I$ | $-3.82723 + 9.97673I$ | $-3.43940 - 6.32468I$ |
| $u = -0.325915 + 0.983831I$<br>$a = -0.033935 - 0.418334I$<br>$b = -0.624731 + 0.626850I$ | $0.283464 + 0.443199I$ | $-0.97811 - 2.48365I$ |
| $u = -0.325915 - 0.983831I$<br>$a = -0.033935 + 0.418334I$<br>$b = -0.624731 - 0.626850I$ | $0.283464 - 0.443199I$ | $-0.97811 + 2.48365I$ |
| $u = -0.854577 + 0.270304I$<br>$a = -0.133719 - 1.288200I$<br>$b = 1.021730 + 0.517114I$ | $2.37599 - 4.87646I$ | $-0.51553 + 6.02315I$ |
| $u = -0.854577 - 0.270304I$<br>$a = -0.133719 + 1.288200I$<br>$b = 1.021730 - 0.517114I$ | $2.37599 + 4.87646I$ | $-0.51553 - 6.02315I$ |
| $u = -0.238805 + 1.148550I$<br>$a = 0.129829 + 1.005970I$<br>$b = 0.363709 - 0.617449I$ | $-1.74481 - 4.18781I$ | $-4.37804 + 0.87834I$ |
| $u = -0.238805 - 1.148550I$<br>$a = 0.129829 - 1.005970I$<br>$b = 0.363709 + 0.617449I$ | $-1.74481 + 4.18781I$ | $-4.37804 - 0.87834I$ |
| $u = 0.193901 + 1.206350I$<br>$a = 0.606162 + 0.345461I$<br>$b = 0.569981 - 0.522089I$ | $-4.59216 + 2.01653I$ | $-7.18080 - 3.39780I$ |
| $u = 0.193901 - 1.206350I$<br>$a = 0.606162 - 0.345461I$<br>$b = 0.569981 + 0.522089I$ | $-4.59216 - 2.01653I$ | $-7.18080 + 3.39780I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.661561 + 1.033500I$<br>$a = -0.328591 - 0.193748I$<br>$b = 1.202730 - 0.647830I$ | $-6.30317 + 4.38086I$ | $-4.52921 - 3.44715I$ |
| $u = -0.661561 - 1.033500I$<br>$a = -0.328591 + 0.193748I$<br>$b = 1.202730 + 0.647830I$ | $-6.30317 - 4.38086I$ | $-4.52921 + 3.44715I$ |
| $u = -0.618272 + 0.317395I$<br>$a = -0.638426 + 0.970996I$<br>$b = -0.676953 - 0.157022I$ | $0.809068 + 1.101490I$ | $-5.35892 + 1.01281I$ |
| $u = -0.618272 - 0.317395I$<br>$a = -0.638426 - 0.970996I$<br>$b = -0.676953 + 0.157022I$ | $0.809068 - 1.101490I$ | $-5.35892 - 1.01281I$ |
| $u = -0.42667 + 1.42118I$<br>$a = 0.69104 - 1.34370I$<br>$b = 1.50579 + 0.65933I$ | $-9.0022 - 14.9856I$ | $-7.09597 + 7.57547I$ |
| $u = -0.42667 - 1.42118I$<br>$a = 0.69104 + 1.34370I$<br>$b = 1.50579 - 0.65933I$ | $-9.0022 + 14.9856I$ | $-7.09597 - 7.57547I$ |
| $u = -0.37787 + 1.44359I$<br>$a = -0.810469 + 1.141880I$<br>$b = -1.219090 - 0.464171I$ | $-3.08328 - 9.37984I$ | $-4.94083 + 6.69996I$ |
| $u = -0.37787 - 1.44359I$<br>$a = -0.810469 - 1.141880I$<br>$b = -1.219090 + 0.464171I$ | $-3.08328 + 9.37984I$ | $-4.94083 - 6.69996I$ |
| $u = -0.30052 + 1.50793I$<br>$a = 0.873070 - 0.786162I$<br>$b = 1.056120 + 0.111001I$ | $-5.27850 - 2.45819I$ | $-6.52768 + 0.I$ |
| $u = -0.30052 - 1.50793I$<br>$a = 0.873070 + 0.786162I$<br>$b = 1.056120 - 0.111001I$ | $-5.27850 + 2.45819I$ | $-6.52768 + 0.I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \quad 0.152565 + 0.389462I$<br>$a = -0.640664 - 0.680814I$<br>$b = -0.289140 + 0.385262I$ | $-0.049661 + 0.901122I$ | $-1.07060 - 7.46829I$ |
| $u = \quad 0.152565 - 0.389462I$<br>$a = -0.640664 + 0.680814I$<br>$b = -0.289140 - 0.385262I$ | $-0.049661 - 0.901122I$ | $-1.07060 + 7.46829I$ |
| $u = -0.07074 + 1.75374I$<br>$a = -0.581532 + 0.242567I$<br>$b = -1.029280 + 0.409939I$ | $-16.4681 + 1.7281I$ | 0 |
| $u = -0.07074 - 1.75374I$<br>$a = -0.581532 - 0.242567I$<br>$b = -1.029280 - 0.409939I$ | $-16.4681 - 1.7281I$ | 0 |

**II.** $\boldsymbol{I_2^u = \langle -2.34\times 10^{10} a^5u^5 + 1.10\times 10^{10} a^4u^5 + \cdots + 7.16\times 10^{10} a + 3.08\times 10^{10},\ 2u^5a^4 - 5u^5a^3 + \cdots + 114a - 114,\ u^6 - u^5 + 3u^4 - 2u^3 + 2u^2 - u - 1\rangle}$

**(i) Arc colorings**

$$a_8 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} a \\ 0.347931a^5u^5 - 0.162773a^4u^5 + \cdots - 1.06233a - 0.457609 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 0.347931a^5u^5 - 0.162773a^4u^5 + \cdots - 0.0623316a - 0.457609 \\ 0.347931a^5u^5 - 0.162773a^4u^5 + \cdots - 1.06233a - 0.457609 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 0.180852a^5u^5 - 0.416166a^4u^5 + \cdots + 0.491548a - 0.144406 \\ -0.346810a^5u^5 - 0.643062a^4u^5 + \cdots + 0.451764a - 1.01177 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^2 + 1 \\ -u^4 - 2u^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -0.204126a^5u^5 + 0.255973a^4u^5 + \cdots + 0.0646899a + 0.294428 \\ 0.438515a^5u^5 - 0.212894a^4u^5 + \cdots - 0.142744a + 0.592655 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0.213990a^5u^5 - 0.398539a^4u^5 + \cdots - 0.880353a + 1.01839 \\ -0.329334a^5u^5 - 0.804316a^4u^5 + \cdots + 1.33815a - 0.0581934 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -0.0846058a^5u^5 + 0.661136a^4u^5 + \cdots + 0.296011a - 0.487725 \\ 0.149782a^5u^5 + 0.704215a^4u^5 + \cdots + 0.217957a - 1.60064 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u \\ u \end{pmatrix}$$

**(ii) Obstruction class** $= -1$

**(iii) Cusp Shapes**
$= -\frac{5658079336}{22451859377}a^5u^5 + \frac{18778081872}{22451859377}u^5a^4 + \cdots - \frac{16584590624}{22451859377}a - \frac{56541555310}{22451859377}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $u^{36} - 5u^{35} + \cdots - 36u + 1$ |
| $c_2, c_6$ | $(u^3 + u^2 + 2u + 1)^{12}$ |
| $c_3, c_5, c_9$ $c_{10}$ | $u^{36} - u^{35} + \cdots + 4988u - 2207$ |
| $c_7, c_8, c_{11}$ $c_{12}$ | $(u^6 - u^5 + 3u^4 - 2u^3 + 2u^2 - u - 1)^6$ |

**(v) Riley Polynomials at the component**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $y^{36} + 7y^{35} + \cdots - 912y + 1$ |
| $c_2, c_6$ | $(y^3 + 3y^2 + 2y - 1)^{12}$ |
| $c_3, c_5, c_9$ $c_{10}$ | $y^{36} - 25y^{35} + \cdots - 47603416y + 4870849$ |
| $c_7, c_8, c_{11}$ $c_{12}$ | $(y^6 + 5y^5 + 9y^4 + 4y^3 - 6y^2 - 5y + 1)^6$ |

**(vi) Complex Volumes and Cusp Shapes**

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.873214$<br>$a = -0.419995 + 1.215150I$<br>$b = 0.580895 - 0.775278I$ | $3.83874$ | $3.28901 + 0.I$ |
| $u = 0.873214$<br>$a = -0.419995 - 1.215150I$<br>$b = 0.580895 + 0.775278I$ | $3.83874$ | $3.28901 + 0.I$ |
| $u = 0.873214$<br>$a = 1.037200 + 0.778295I$<br>$b = -1.025490 - 0.187777I$ | $-0.29884 - 2.82812I$ | $-3.24026 + 2.97945I$ |
| $u = 0.873214$<br>$a = 1.037200 - 0.778295I$<br>$b = -1.025490 + 0.187777I$ | $-0.29884 + 2.82812I$ | $-3.24026 - 2.97945I$ |
| $u = 0.873214$<br>$a = -0.06083 + 1.60714I$<br>$b = -0.324929 - 1.334150I$ | $-0.29884 + 2.82812I$ | $-3.24026 - 2.97945I$ |
| $u = 0.873214$<br>$a = -0.06083 - 1.60714I$<br>$b = -0.324929 + 1.334150I$ | $-0.29884 - 2.82812I$ | $-3.24026 + 2.97945I$ |
| $u = -0.138835 + 1.234450I$<br>$a = 0.012228 - 1.187000I$<br>$b = 1.44703 + 1.08222I$ | $-10.91920 - 4.80053I$ | $-10.93403 + 6.66423I$ |
| $u = -0.138835 + 1.234450I$<br>$a = 1.137440 - 0.567294I$<br>$b = 1.42862 - 0.02132I$ | $-6.78159 - 1.97241I$ | $-4.40477 + 3.68478I$ |
| $u = -0.138835 + 1.234450I$<br>$a = -0.364631 + 0.343650I$<br>$b = -1.88950 + 0.34251I$ | $-10.91920 + 0.85571I$ | $-10.93403 + 0.70533I$ |
| $u = -0.138835 + 1.234450I$<br>$a = -0.10816 + 1.58237I$<br>$b = -1.056330 - 0.412957I$ | $-6.78159 - 1.97241I$ | $-4.40477 + 3.68478I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.138835+1.234450I$<br>$a=-2.21023+1.02274I$<br>$b=-1.45126-0.21009I$ | $-10.91920-4.80053I$ | $-10.93403+6.66423I$ |
| $u=-0.138835+1.234450I$<br>$a=\quad 0.16985-2.53916I$<br>$b=\quad 1.028260-0.205085I$ | $-10.91920+0.85571I$ | $-10.93403+0.70533I$ |
| $u=-0.138835-1.234450I$<br>$a=\quad 0.012228+1.187000I$<br>$b=\quad 1.44703-1.08222I$ | $-10.91920+4.80053I$ | $-10.93403-6.66423I$ |
| $u=-0.138835-1.234450I$<br>$a=\quad 1.137440+0.567294I$<br>$b=\quad 1.42862+0.02132I$ | $-6.78159+1.97241I$ | $-4.40477-3.68478I$ |
| $u=-0.138835-1.234450I$<br>$a=-0.364631-0.343650I$<br>$b=-1.88950-0.34251I$ | $-10.91920-0.85571I$ | $-10.93403-0.70533I$ |
| $u=-0.138835-1.234450I$<br>$a=-0.10816-1.58237I$<br>$b=-1.056330+0.412957I$ | $-6.78159+1.97241I$ | $-4.40477-3.68478I$ |
| $u=-0.138835-1.234450I$<br>$a=-2.21023-1.02274I$<br>$b=-1.45126+0.21009I$ | $-10.91920+4.80053I$ | $-10.93403-6.66423I$ |
| $u=-0.138835-1.234450I$<br>$a=\quad 0.16985+2.53916I$<br>$b=\quad 1.028260+0.205085I$ | $-10.91920-0.85571I$ | $-10.93403-0.70533I$ |
| $u=\quad 0.408802+1.276380I$<br>$a=\quad 0.887209+0.587298I$<br>$b=\quad 0.632640-0.969780I$ | $-4.26335+1.76400I$ | $-6.92862-0.22537I$ |
| $u=\quad 0.408802+1.276380I$<br>$a=-0.659750-0.545076I$<br>$b=\quad 0.04879+1.56085I$ | $-4.26335+7.42025I$ | $-6.92862-6.18427I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.408802 + 1.276380I$<br>$a = -0.517890 - 1.088660I$<br>$b = -0.847436 + 0.716450I$ | $-0.12577 + 4.59213I$ | $-0.39935 - 3.20482I$ |
| $u = 0.408802 + 1.276380I$<br>$a = 0.375953 + 0.353514I$<br>$b = -0.300632 - 0.839566I$ | $-0.12577 + 4.59213I$ | $-0.39935 - 3.20482I$ |
| $u = 0.408802 + 1.276380I$<br>$a = 0.09934 + 1.53963I$<br>$b = 1.164190 - 0.284914I$ | $-4.26335 + 7.42025I$ | $-6.92862 - 6.18427I$ |
| $u = 0.408802 + 1.276380I$<br>$a = 0.0031648 + 0.1271530I$<br>$b = 0.823310 - 0.019949I$ | $-4.26335 + 1.76400I$ | $-6.92862 - 0.22537I$ |
| $u = 0.408802 - 1.276380I$<br>$a = 0.887209 - 0.587298I$<br>$b = 0.632640 + 0.969780I$ | $-4.26335 - 1.76400I$ | $-6.92862 + 0.22537I$ |
| $u = 0.408802 - 1.276380I$<br>$a = -0.659750 + 0.545076I$<br>$b = 0.04879 - 1.56085I$ | $-4.26335 - 7.42025I$ | $-6.92862 + 6.18427I$ |
| $u = 0.408802 - 1.276380I$<br>$a = -0.517890 + 1.088660I$<br>$b = -0.847436 - 0.716450I$ | $-0.12577 - 4.59213I$ | $-0.39935 + 3.20482I$ |
| $u = 0.408802 - 1.276380I$<br>$a = 0.375953 - 0.353514I$<br>$b = -0.300632 + 0.839566I$ | $-0.12577 - 4.59213I$ | $-0.39935 + 3.20482I$ |
| $u = 0.408802 - 1.276380I$<br>$a = 0.09934 - 1.53963I$<br>$b = 1.164190 + 0.284914I$ | $-4.26335 - 7.42025I$ | $-6.92862 + 6.18427I$ |
| $u = 0.408802 - 1.276380I$<br>$a = 0.0031648 - 0.1271530I$<br>$b = 0.823310 + 0.019949I$ | $-4.26335 - 1.76400I$ | $-6.92862 + 0.22537I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.413150$<br>$a=\ \ 0.833798$<br>$b=-1.29141$ | $-3.08250$ | $4.43630$ |
| $u=-0.413150$<br>$a=-1.05083+2.06200I$<br>$b=\ \ 1.54512-0.28152I$ | $-7.22008+2.82812I$ | $-2.09298-2.97945I$ |
| $u=-0.413150$<br>$a=-1.05083-2.06200I$<br>$b=\ \ 1.54512+0.28152I$ | $-7.22008-2.82812I$ | $-2.09298+2.97945I$ |
| $u=-0.413150$<br>$a=-3.27825$<br>$b=\ \ 0.926293$ | $-3.08250$ | $4.43630$ |
| $u=-0.413150$<br>$a=\ \ 3.89216+0.35002I$<br>$b=-1.120730+0.641787I$ | $-7.22008+2.82812I$ | $-2.09298-2.97945I$ |
| $u=-0.413150$<br>$a=\ \ 3.89216-0.35002I$<br>$b=-1.120730-0.641787I$ | $-7.22008-2.82812I$ | $-2.09298+2.97945I$ |

**III.**

$$I_3^u = \langle -u^{13}+2u^{12}+\cdots+b-1,\ u^{14}-2u^{13}+\cdots+a+3,\ u^{15}-2u^{14}+\cdots+3u+1\rangle$$

**(i) Arc colorings**

$$a_8 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u^{14}+2u^{13}+\cdots+6u-3 \\ u^{13}-2u^{12}+\cdots+4u^2+1 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u^{14}+3u^{13}+\cdots+6u-2 \\ u^{13}-2u^{12}+\cdots+4u^2+1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u \\ u^3+u \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u^{14}+3u^{13}+\cdots+9u-2 \\ u^{13}-2u^{12}+\cdots+u^2+1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^2+1 \\ -u^4-2u^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^{13}-3u^{12}+\cdots+5u-1 \\ u^{14}-2u^{13}+\cdots+u+1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -2u^{13}+4u^{12}+\cdots-8u-1 \\ -u^{14}+u^{13}+\cdots-3u-1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 2u^{14}-5u^{13}+\cdots-5u+3 \\ -u^{13}+2u^{12}+\cdots-u-2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u \\ u \end{pmatrix}$$

**(ii) Obstruction class** $= 1$

**(iii) Cusp Shapes**
$= u^{13}-3u^{12}+11u^{11}-24u^{10}+45u^9-72u^8+86u^7-97u^6+81u^5-52u^4+36u^3-4u^2+7u-9$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $u^{15} + u^{13} + u^{12} + 5u^{11} - 3u^{10} + 4u^9 - u^7 - 2u^6 + 3u^5 + 4u^3 - 3u - 1$ |
| $c_2$ | $u^{15} + 9u^{13} + \cdots + 7u - 3$ |
| $c_3, c_9$ | $u^{15} + u^{14} + \cdots + u + 1$ |
| $c_5, c_{10}$ | $u^{15} - u^{14} + \cdots + u - 1$ |
| $c_6$ | $u^{15} + 9u^{13} + \cdots + 7u + 3$ |
| $c_7, c_8$ | $u^{15} + 2u^{14} + \cdots + 3u - 1$ |
| $c_{11}, c_{12}$ | $u^{15} - 2u^{14} + \cdots + 3u + 1$ |

**(v) Riley Polynomials at the component**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $y^{15} + 2y^{14} + \cdots + 9y - 1$ |
| $c_2, c_6$ | $y^{15} + 18y^{14} + \cdots - 29y - 9$ |
| $c_3, c_5, c_9$<br>$c_{10}$ | $y^{15} - 13y^{14} + \cdots - 5y - 1$ |
| $c_7, c_8, c_{11}$<br>$c_{12}$ | $y^{15} + 18y^{14} + \cdots + 19y - 1$ |

**(vi) Complex Volumes and Cusp Shapes**

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.067274+1.170430I$<br>$a=\ \ 0.95387-1.52946I$<br>$b=\ \ 1.53238+0.52140I$ | $-10.56770-3.31418I$ | $-9.17040+1.09581I$ |
| $u=-0.067274-1.170430I$<br>$a=\ \ 0.95387+1.52946I$<br>$b=\ \ 1.53238-0.52140I$ | $-10.56770+3.31418I$ | $-9.17040-1.09581I$ |
| $u=\ \ 0.762991+0.100003I$<br>$a=\ \ 0.471363+1.179970I$<br>$b=\ \ 0.113487-0.512613I$ | $1.70400-1.60852I$ | $1.70832+2.29891I$ |
| $u=\ \ 0.762991-0.100003I$<br>$a=\ \ 0.471363-1.179970I$<br>$b=\ \ 0.113487+0.512613I$ | $1.70400+1.60852I$ | $1.70832-2.29891I$ |
| $u=\ \ 0.345661+1.264130I$<br>$a=\ \ 0.235836+1.006840I$<br>$b=\ \ 0.286552-0.611540I$ | $-1.97026+5.58462I$ | $-5.72570-5.91133I$ |
| $u=\ \ 0.345661-1.264130I$<br>$a=\ \ 0.235836-1.006840I$<br>$b=\ \ 0.286552+0.611540I$ | $-1.97026-5.58462I$ | $-5.72570+5.91133I$ |
| $u=-0.116103+1.321650I$<br>$a=-0.771507+1.030610I$<br>$b=-1.278400-0.105005I$ | $-8.11583-1.16999I$ | $-10.61528+0.29534I$ |
| $u=-0.116103-1.321650I$<br>$a=-0.771507-1.030610I$<br>$b=-1.278400+0.105005I$ | $-8.11583+1.16999I$ | $-10.61528-0.29534I$ |
| $u=-0.163781+0.551604I$<br>$a=\ \ 0.74742+1.75607I$<br>$b=-1.329030+0.457754I$ | $-8.48637+2.50657I$ | $-9.80004-1.02375I$ |
| $u=-0.163781-0.551604I$<br>$a=\ \ 0.74742-1.75607I$<br>$b=-1.329030-0.457754I$ | $-8.48637-2.50657I$ | $-9.80004+1.02375I$ |

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.39099 + 1.41773I$<br>$a = -0.649469 - 0.501014I$<br>$b = -0.528118 + 0.547402I$ | $-3.19548 + 2.58951I$ | $-1.00193 - 4.07302I$ |
| $u = 0.39099 - 1.41773I$<br>$a = -0.649469 + 0.501014I$<br>$b = -0.528118 - 0.547402I$ | $-3.19548 - 2.58951I$ | $-1.00193 + 4.07302I$ |
| $u = -0.05414 + 1.69785I$<br>$a = 0.580701 - 0.387083I$<br>$b = 1.114480 - 0.359089I$ | $-16.8509 + 1.5277I$ | $-15.4381 + 2.1822I$ |
| $u = -0.05414 - 1.69785I$<br>$a = 0.580701 + 0.387083I$<br>$b = 1.114480 + 0.359089I$ | $-16.8509 - 1.5277I$ | $-15.4381 - 2.1822I$ |
| $u = -0.196681$<br>$a = -5.13644$<br>$b = 1.17730$ | $-3.73109$ | $-10.9140$ |

## IV. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $(u^{15}+u^{13}+u^{12}+5u^{11}-3u^{10}+4u^9-u^7-2u^6+3u^5+4u^3-3u-1)$ <br> $\cdot(u^{24}+11u^{22}+\cdots+2u+1)(u^{36}-5u^{35}+\cdots-36u+1)$ |
| $c_2$ | $((u^3+u^2+2u+1)^{12})(u^{15}+9u^{13}+\cdots+7u-3)$ <br> $\cdot(u^{24}-13u^{23}+\cdots-736u+64)$ |
| $c_3, c_9$ | $(u^{15}+u^{14}+\cdots+u+1)(u^{24}-u^{23}+\cdots+2u+1)$ <br> $\cdot(u^{36}-u^{35}+\cdots+4988u-2207)$ |
| $c_5, c_{10}$ | $(u^{15}-u^{14}+\cdots+u-1)(u^{24}-u^{23}+\cdots+2u+1)$ <br> $\cdot(u^{36}-u^{35}+\cdots+4988u-2207)$ |
| $c_6$ | $((u^3+u^2+2u+1)^{12})(u^{15}+9u^{13}+\cdots+7u+3)$ <br> $\cdot(u^{24}-13u^{23}+\cdots-736u+64)$ |
| $c_7, c_8$ | $((u^6-u^5+3u^4-2u^3+2u^2-u-1)^6)(u^{15}+2u^{14}+\cdots+3u-1)$ <br> $\cdot(u^{24}+9u^{23}+\cdots+60u+8)$ |
| $c_{11}, c_{12}$ | $((u^6-u^5+3u^4-2u^3+2u^2-u-1)^6)(u^{15}-2u^{14}+\cdots+3u+1)$ <br> $\cdot(u^{24}+9u^{23}+\cdots+60u+8)$ |

### V. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $(y^{15} + 2y^{14} + \cdots + 9y - 1)(y^{24} + 22y^{23} + \cdots + 28y + 1)$ <br> $\cdot\,(y^{36} + 7y^{35} + \cdots - 912y + 1)$ |
| $c_2, c_6$ | $((y^3 + 3y^2 + 2y - 1)^{12})(y^{15} + 18y^{14} + \cdots - 29y - 9)$ <br> $\cdot\,(y^{24} + 21y^{23} + \cdots + 19456y + 4096)$ |
| $c_3, c_5, c_9$ <br> $c_{10}$ | $(y^{15} - 13y^{14} + \cdots - 5y - 1)(y^{24} - 17y^{23} + \cdots - 6y + 1)$ <br> $\cdot\,(y^{36} - 25y^{35} + \cdots - 47603416y + 4870849)$ |
| $c_7, c_8, c_{11}$ <br> $c_{12}$ | $((y^6 + 5y^5 + \cdots - 5y + 1)^6)(y^{15} + 18y^{14} + \cdots + 19y - 1)$ <br> $\cdot\,(y^{24} + 23y^{23} + \cdots + 624y + 64)$ |