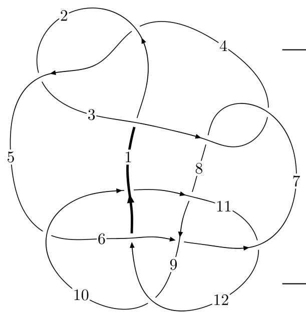
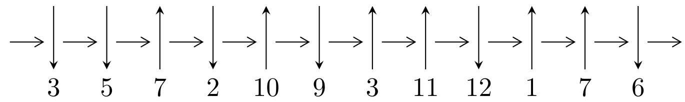
## $12n_{0174}$ ($K12n_{0174}$)




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$\begin{aligned}
I_1^u = \langle &-4.42510 \times 10^{95} u^{48} - 1.67612 \times 10^{96} u^{47} + \cdots + 3.37850 \times 10^{95} b + 3.34034 \times 10^{97},\\
&3.85868 \times 10^{98} u^{48} + 1.60673 \times 10^{99} u^{47} + \cdots + 4.32448 \times 10^{97} a - 1.18824 \times 10^{101},\\
&u^{49} + 5u^{48} + \cdots - 2656u - 256\rangle\\
I_2^u = \langle &3.65067 \times 10^{30} a u^{29} + 6.18961 \times 10^{29} u^{29} + \cdots - 4.67430 \times 10^{31} a + 3.01744 \times 10^{30},\\
&4.65337 \times 10^{30} a u^{29} + 5.16674 \times 10^{30} u^{29} + \cdots - 1.73780 \times 10^{31} a - 4.22817 \times 10^{31},\ u^{30} - 3u^{29} + \cdots - 36u +\\
I_3^u = \langle &62854845 u^{16} + 90595385 u^{15} + \cdots + 103426241 b - 86148102,\\
&825367762 u^{16} + 1637559900 u^{15} + \cdots + 103426241 a - 116862060,\ u^{17} + 2u^{16} + \cdots + u + 1\rangle
\end{aligned}$$

$$\begin{aligned}
I_1^v &= \langle a,\ 16v^3 - 48v^2 + b + 51v - 13,\ 4v^4 - 13v^3 + 16v^2 - 7v + 1\rangle\\
I_2^v &= \langle a,\ b^2 - bv + v^2 - b + 2v + 2,\ v^3 + 2v^2 + 3v + 1\rangle
\end{aligned}$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 136 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.** $\boldsymbol{I_1^u = \langle -4.43 \times 10^{95} u^{48} - 1.68 \times 10^{96} u^{47} + \cdots + 3.38 \times 10^{95} b + 3.34 \times 10^{97},\ 3.86 \times 10^{98} u^{48} + 1.61 \times 10^{99} u^{47} + \cdots + 4.32 \times 10^{97} a - 1.19 \times 10^{101},\ u^{49} + 5u^{48} + \cdots - 2656u - 256 \rangle}$

**(i) Arc colorings**

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -8.92288u^{48} - 37.1542u^{47} + \cdots + 25170.8u + 2747.71 \\ 1.30978u^{48} + 4.96113u^{47} + \cdots - 1531.46u - 98.8705 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -17.4967u^{48} - 72.9082u^{47} + \cdots + 49242.2u + 5362.98 \\ 5.84693u^{48} + 24.9569u^{47} + \cdots - 19011.2u - 2144.77 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -7.61310u^{48} - 32.1931u^{47} + \cdots + 23639.3u + 2648.84 \\ 1.30978u^{48} + 4.96113u^{47} + \cdots - 1531.46u - 98.8705 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 0.226092u^{48} + 1.59877u^{47} + \cdots - 3637.18u - 493.367 \\ 2.11651u^{48} + 9.72772u^{47} + \cdots - 10201.7u - 1249.45 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -0.0565490u^{48} - 0.741312u^{47} + \cdots + 2683.08u + 377.332 \\ -1.10782u^{48} - 5.50733u^{47} + \cdots + 7171.36u + 910.721 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -0.489227u^{48} - 1.92395u^{47} + \cdots + 911.166u + 83.6824 \\ 0.386968u^{48} + 1.50533u^{47} + \cdots - 983.961u - 119.278 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -0.370890u^{48} - 1.37191u^{47} + \cdots + 633.455u + 69.2818 \\ 0.118336u^{48} + 0.552043u^{47} + \cdots - 277.710u - 14.4006 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -0.489227u^{48} - 1.92395u^{47} + \cdots + 911.166u + 83.6824 \\ -0.118336u^{48} - 0.552043u^{47} + \cdots + 277.710u + 14.4006 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ -u \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -20.8192u^{48} - 85.4422u^{47} + \cdots + 52215.1u + 5489.55$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{49} + 23u^{48} + \cdots - 1887u + 256$ |
| $c_2, c_4$ | $u^{49} - 7u^{48} + \cdots - 97u + 16$ |
| $c_3, c_7$ | $u^{49} - 5u^{48} + \cdots - 2656u + 256$ |
| $c_5, c_{11}$ | $u^{49} - u^{47} + \cdots - 45u - 9$ |
| $c_6, c_{12}$ | $u^{49} - u^{48} + \cdots + 2u - 1$ |
| $c_8, c_{10}$ | $u^{49} - 6u^{48} + \cdots + 27u + 1$ |
| $c_9$ | $u^{49} - 29u^{48} + \cdots + 32u - 4$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{49} + 13y^{48} + \cdots - 6281407y - 65536$ |
| $c_2, c_4$ | $y^{49} - 23y^{48} + \cdots - 1887y - 256$ |
| $c_3, c_7$ | $y^{49} - 27y^{48} + \cdots + 881664y - 65536$ |
| $c_5, c_{11}$ | $y^{49} - 2y^{48} + \cdots + 1629y - 81$ |
| $c_6, c_{12}$ | $y^{49} + 21y^{48} + \cdots - 52y - 1$ |
| $c_8, c_{10}$ | $y^{49} - 38y^{48} + \cdots + 129y - 1$ |
| $c_9$ | $y^{49} - y^{48} + \cdots - 968y - 16$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.302575+0.946892I$<br>$a=\ \ 0.487795-0.470190I$<br>$b=-0.537829+0.119509I$ | $1.55793+0.36410I$ | $4.91876+0.I$ |
| $u=-0.302575-0.946892I$<br>$a=\ \ 0.487795+0.470190I$<br>$b=-0.537829-0.119509I$ | $1.55793-0.36410I$ | $4.91876+0.I$ |
| $u=\ \ 0.974131$<br>$a=\ \ 0.688714$<br>$b=-0.548762$ | $-2.79592$ | $-4.65070$ |
| $u=-0.219277+1.022680I$<br>$a=\ \ 0.539257+0.197168I$<br>$b=-0.834449-0.356396I$ | $1.68790+3.84694I$ | $5.34787-7.53538I$ |
| $u=-0.219277-1.022680I$<br>$a=\ \ 0.539257-0.197168I$<br>$b=-0.834449+0.356396I$ | $1.68790-3.84694I$ | $5.34787+7.53538I$ |
| $u=-0.293680+1.027110I$<br>$a=\ \ 0.358766-0.282615I$<br>$b=\ \ 0.665231+0.062646I$ | $-0.67993-2.04702I$ | $0$ |
| $u=-0.293680-1.027110I$<br>$a=\ \ 0.358766+0.282615I$<br>$b=\ \ 0.665231-0.062646I$ | $-0.67993+2.04702I$ | $0$ |
| $u=-0.923443+0.075172I$<br>$a=\ \ 0.691906-0.132695I$<br>$b=-0.595517-0.867911I$ | $0.783168+0.637600I$ | $3.87822+1.68066I$ |
| $u=-0.923443-0.075172I$<br>$a=\ \ 0.691906+0.132695I$<br>$b=-0.595517+0.867911I$ | $0.783168-0.637600I$ | $3.87822-1.68066I$ |
| $u=\ \ 1.073330+0.417383I$<br>$a=\ \ 0.707312-0.335231I$<br>$b=-0.346407-1.053070I$ | $-0.18835+5.00375I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.073330 - 0.417383I$<br>$a = 0.707312 + 0.335231I$<br>$b = -0.346407 + 1.053070I$ | $-0.18835 - 5.00375I$ | $0$ |
| $u = -0.819012 + 0.013094I$<br>$a = -2.62948 + 1.26317I$<br>$b = 0.659606 - 0.349888I$ | $0.26853 - 1.69713I$ | $7.44745 + 4.57395I$ |
| $u = -0.819012 - 0.013094I$<br>$a = -2.62948 - 1.26317I$<br>$b = 0.659606 + 0.349888I$ | $0.26853 + 1.69713I$ | $7.44745 - 4.57395I$ |
| $u = 0.459292 + 0.602444I$<br>$a = 1.39544 - 0.40680I$<br>$b = 0.147252 - 0.682059I$ | $-2.10843 - 0.93637I$ | $-6.13827 - 0.19831I$ |
| $u = 0.459292 - 0.602444I$<br>$a = 1.39544 + 0.40680I$<br>$b = 0.147252 + 0.682059I$ | $-2.10843 + 0.93637I$ | $-6.13827 + 0.19831I$ |
| $u = -1.305630 + 0.150067I$<br>$a = -0.987363 - 0.519908I$<br>$b = 0.79108 + 1.31437I$ | $4.85770 - 2.55718I$ | $0$ |
| $u = -1.305630 - 0.150067I$<br>$a = -0.987363 + 0.519908I$<br>$b = 0.79108 - 1.31437I$ | $4.85770 + 2.55718I$ | $0$ |
| $u = -1.302310 + 0.206487I$<br>$a = 1.49257 - 0.44915I$<br>$b = -1.07120 + 0.96030I$ | $-0.45845 - 8.65599I$ | $0$ |
| $u = -1.302310 - 0.206487I$<br>$a = 1.49257 + 0.44915I$<br>$b = -1.07120 - 0.96030I$ | $-0.45845 + 8.65599I$ | $0$ |
| $u = 1.294620 + 0.259705I$<br>$a = -1.253650 - 0.048468I$<br>$b = 0.55442 + 1.55115I$ | $4.63789 + 3.07349I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.294620 - 0.259705I$<br>$a = -1.253650 + 0.048468I$<br>$b = 0.55442 - 1.55115I$ | $4.63789 - 3.07349I$ | 0 |
| $u = 1.263480 + 0.434859I$<br>$a = -1.041090 + 0.700204I$<br>$b = 0.702629 + 0.155346I$ | $6.38898 + 0.61653I$ | 0 |
| $u = 1.263480 - 0.434859I$<br>$a = -1.041090 - 0.700204I$<br>$b = 0.702629 - 0.155346I$ | $6.38898 - 0.61653I$ | 0 |
| $u = 0.354370 + 1.295710I$<br>$a = 0.105629 + 0.157331I$<br>$b = 0.543974 + 0.270866I$ | $-7.18670 + 5.04005I$ | 0 |
| $u = 0.354370 - 1.295710I$<br>$a = 0.105629 - 0.157331I$<br>$b = 0.543974 - 0.270866I$ | $-7.18670 - 5.04005I$ | 0 |
| $u = 1.341470 + 0.323853I$<br>$a = -1.56393 + 0.05107I$<br>$b = 1.032020 + 0.307473I$ | $6.88817 + 3.81636I$ | 0 |
| $u = 1.341470 - 0.323853I$<br>$a = -1.56393 - 0.05107I$<br>$b = 1.032020 - 0.307473I$ | $6.88817 - 3.81636I$ | 0 |
| $u = 0.026734 + 1.387210I$<br>$a = 0.022345 - 0.231742I$<br>$b = 1.119070 - 0.793463I$ | $1.76109 - 5.81272I$ | 0 |
| $u = 0.026734 - 1.387210I$<br>$a = 0.022345 + 0.231742I$<br>$b = 1.119070 + 0.793463I$ | $1.76109 + 5.81272I$ | 0 |
| $u = -0.380557 + 1.343750I$<br>$a = 0.016368 + 0.214106I$<br>$b = 1.11855 + 1.08866I$ | $0.98269 + 11.73260I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.380557 - 1.343750I$<br>$a = 0.016368 - 0.214106I$<br>$b = 1.11855 - 1.08866I$ | $0.98269 - 11.73260I$ | $0$ |
| $u = -1.226540 + 0.689864I$<br>$a = -0.817481 - 0.645518I$<br>$b = 0.556910 - 0.381512I$ | $4.16675 - 6.30819I$ | $0$ |
| $u = -1.226540 - 0.689864I$<br>$a = -0.817481 + 0.645518I$<br>$b = 0.556910 + 0.381512I$ | $4.16675 + 6.30819I$ | $0$ |
| $u = 0.007957 + 0.579842I$<br>$a = 2.22180 + 3.71913I$<br>$b = -0.229643 + 1.056670I$ | $0.553056 - 0.011412I$ | $-0.409957 - 0.498269I$ |
| $u = 0.007957 - 0.579842I$<br>$a = 2.22180 - 3.71913I$<br>$b = -0.229643 - 1.056670I$ | $0.553056 + 0.011412I$ | $-0.409957 + 0.498269I$ |
| $u = -1.30886 + 0.58519I$<br>$a = -1.49711 - 0.39372I$<br>$b = 1.085290 - 0.452742I$ | $5.14203 - 9.72658I$ | $0$ |
| $u = -1.30886 - 0.58519I$<br>$a = -1.49711 + 0.39372I$<br>$b = 1.085290 + 0.452742I$ | $5.14203 + 9.72658I$ | $0$ |
| $u = -0.438088 + 0.264005I$<br>$a = 0.951300 + 0.031983I$<br>$b = -0.452918 + 0.612196I$ | $0.805812 - 1.108410I$ | $4.74408 + 4.07736I$ |
| $u = -0.438088 - 0.264005I$<br>$a = 0.951300 - 0.031983I$<br>$b = -0.452918 - 0.612196I$ | $0.805812 + 1.108410I$ | $4.74408 - 4.07736I$ |
| $u = -0.486204 + 0.026452I$<br>$a = 0.037081 + 0.205362I$<br>$b = 0.509879 + 1.181350I$ | $-3.95139 + 7.58730I$ | $10.40617 - 4.11305I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.486204 - 0.026452I$<br>$a = 0.037081 - 0.205362I$<br>$b = 0.509879 - 1.181350I$ | $-3.95139 - 7.58730I$ | $10.40617 + 4.11305I$ |
| $u = -1.37791 + 0.76656I$<br>$a = 1.39934 + 0.40752I$<br>$b = -1.14396 + 1.35722I$ | $4.1900 - 19.1789I$ | 0 |
| $u = -1.37791 - 0.76656I$<br>$a = 1.39934 - 0.40752I$<br>$b = -1.14396 - 1.35722I$ | $4.1900 + 19.1789I$ | 0 |
| $u = 1.49189 + 0.57453I$<br>$a = 1.347660 - 0.139984I$<br>$b = -1.22860 - 1.22772I$ | $6.6161 + 12.7102I$ | 0 |
| $u = 1.49189 - 0.57453I$<br>$a = 1.347660 + 0.139984I$<br>$b = -1.22860 + 1.22772I$ | $6.6161 - 12.7102I$ | 0 |
| $u = -1.56868 + 0.48166I$<br>$a = 0.749006 + 0.413054I$<br>$b = -1.377520 - 0.236905I$ | $7.24686 - 1.08754I$ | 0 |
| $u = -1.56868 - 0.48166I$<br>$a = 0.749006 - 0.413054I$<br>$b = -1.377520 + 0.236905I$ | $7.24686 + 1.08754I$ | 0 |
| $u = 1.65256 + 0.20506I$<br>$a = 0.875290 - 0.376854I$<br>$b = -1.39348 + 0.55816I$ | $8.42952 - 5.77862I$ | 0 |
| $u = 1.65256 - 0.20506I$<br>$a = 0.875290 + 0.376854I$<br>$b = -1.39348 - 0.55816I$ | $8.42952 + 5.77862I$ | 0 |

**II.** $\boldsymbol{I_2^u = \langle 3.65 \times 10^{30} au^{29} + 6.19 \times 10^{29} u^{29} + \cdots - 4.67 \times 10^{31} a + 3.02 \times 10^{30},\ 4.65 \times 10^{30} au^{29} + 5.17 \times 10^{30} u^{29} + \cdots - 1.74 \times 10^{31} a - 4.23 \times 10^{31},\ u^{30} - 3u^{29} + \cdots - 36u + 8 \rangle}$

**(i) Arc colorings**

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} a \\ -3.99021au^{29} - 0.676528u^{29} + \cdots + 51.0904a - 3.29808 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 1.53809au^{29} + 1.15252u^{29} + \cdots - 16.4838a - 3.16714 \\ 0.913366au^{29} - 0.111232u^{29} + \cdots - 19.3324a + 4.63278 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -3.99021au^{29} - 0.676528u^{29} + \cdots + 52.0904a - 3.29808 \\ -3.99021au^{29} - 0.676528u^{29} + \cdots + 51.0904a - 3.29808 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 3.08004au^{29} - 1.92711u^{29} + \cdots - 47.2217a + 20.8523 \\ 3.19127au^{29} - 3.19087u^{29} + \cdots - 51.8545a + 28.6522 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -1.83781au^{29} + 0.343590u^{29} + \cdots + 35.2484a - 7.86223 \\ -3.42270au^{29} + 1.58488u^{29} + \cdots + 52.6114a - 17.3631 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0.551238u^{29} - 0.841026u^{28} + \cdots + 9.99428u - 2.03557 \\ -0.111232u^{29} + 0.428317u^{28} + \cdots - 7.59237u + 3.63278 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -0.358930u^{29} + 0.546787u^{28} + \cdots - 7.26027u + 0.833169 \\ -0.910168u^{29} + 1.38781u^{28} + \cdots - 17.2545u + 2.86874 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 0.551238u^{29} - 0.841026u^{28} + \cdots + 9.99428u - 2.03557 \\ 0.910168u^{29} - 1.38781u^{28} + \cdots + 17.2545u - 2.86874 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ -u \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -3.90078u^{29} + 7.21462u^{28} + \cdots - 79.1331u + 24.9566$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u^{30} + 12u^{29} + \cdots - 31u + 1)^2$ |
| $c_2, c_4$ | $(u^{30} - 4u^{29} + \cdots + 5u - 1)^2$ |
| $c_3, c_7$ | $(u^{30} + 3u^{29} + \cdots + 36u + 8)^2$ |
| $c_5, c_{11}$ | $u^{60} - 2u^{59} + \cdots - 270u - 81$ |
| $c_6, c_{12}$ | $u^{60} - 6u^{59} + \cdots - 48u + 9$ |
| $c_8, c_{10}$ | $u^{60} + 2u^{59} + \cdots - 15444u - 13239$ |
| $c_9$ | $(u^{30} + 14u^{29} + \cdots - 8u^2 + 1)^2$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $(y^{30} + 16y^{29} + \cdots - 433y + 1)^2$ |
| $c_2, c_4$ | $(y^{30} - 12y^{29} + \cdots + 31y + 1)^2$ |
| $c_3, c_7$ | $(y^{30} - 21y^{29} + \cdots - 464y + 64)^2$ |
| $c_5, c_{11}$ | $y^{60} - 6y^{59} + \cdots - 1175148y + 6561$ |
| $c_6, c_{12}$ | $y^{60} - 14y^{59} + \cdots + 2088y + 81$ |
| $c_8, c_{10}$ | $y^{60} + 6y^{59} + \cdots - 3061177848y + 175271121$ |
| $c_9$ | $(y^{30} - 2y^{29} + \cdots - 16y + 1)^2$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.830725 + 0.628367I$<br>$a = 0.688019 + 0.947099I$<br>$b = 0.160329 - 0.753919I$ | $-1.64380 - 1.34107I$ | $-7.65064 + 5.35088I$ |
| $u = 0.830725 + 0.628367I$<br>$a = 1.56582 - 0.84528I$<br>$b = -0.39356 - 1.37701I$ | $-1.64380 - 1.34107I$ | $-7.65064 + 5.35088I$ |
| $u = 0.830725 - 0.628367I$<br>$a = 0.688019 - 0.947099I$<br>$b = 0.160329 + 0.753919I$ | $-1.64380 + 1.34107I$ | $-7.65064 - 5.35088I$ |
| $u = 0.830725 - 0.628367I$<br>$a = 1.56582 + 0.84528I$<br>$b = -0.39356 + 1.37701I$ | $-1.64380 + 1.34107I$ | $-7.65064 - 5.35088I$ |
| $u = -0.168778 + 1.072190I$<br>$a = 0.650690 + 0.898653I$<br>$b = 1.26293 + 1.13876I$ | $1.03788 - 3.22048I$ | $5.62712 + 10.05807I$ |
| $u = -0.168778 + 1.072190I$<br>$a = 0.467167 - 0.068877I$<br>$b = -0.502223 + 0.689712I$ | $1.03788 - 3.22048I$ | $5.62712 + 10.05807I$ |
| $u = -0.168778 - 1.072190I$<br>$a = 0.650690 - 0.898653I$<br>$b = 1.26293 - 1.13876I$ | $1.03788 + 3.22048I$ | $5.62712 - 10.05807I$ |
| $u = -0.168778 - 1.072190I$<br>$a = 0.467167 + 0.068877I$<br>$b = -0.502223 - 0.689712I$ | $1.03788 + 3.22048I$ | $5.62712 - 10.05807I$ |
| $u = 1.060350 + 0.303256I$<br>$a = 1.294080 - 0.561022I$<br>$b = -0.211404 - 0.480074I$ | $-0.55296 + 4.80222I$ | $-2.95250 - 5.41049I$ |
| $u = 1.060350 + 0.303256I$<br>$a = 0.304725 + 0.037696I$<br>$b = -0.229158 - 1.394020I$ | $-0.55296 + 4.80222I$ | $-2.95250 - 5.41049I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.060350 - 0.303256I$<br>$a = 1.294080 + 0.561022I$<br>$b = -0.211404 + 0.480074I$ | $-0.55296 - 4.80222I$ | $-2.95250 + 5.41049I$ |
| $u = 1.060350 - 0.303256I$<br>$a = 0.304725 - 0.037696I$<br>$b = -0.229158 + 1.394020I$ | $-0.55296 - 4.80222I$ | $-2.95250 + 5.41049I$ |
| $u = -1.077790 + 0.240862I$<br>$a = 1.65758 - 0.11424I$<br>$b = -0.239330 + 0.061735I$ | $-0.435749 + 0.269407I$ | $-2.76265 + 1.35969I$ |
| $u = -1.077790 + 0.240862I$<br>$a = 0.094420 + 0.237347I$<br>$b = -0.61150 - 1.52674I$ | $-0.435749 + 0.269407I$ | $-2.76265 + 1.35969I$ |
| $u = -1.077790 - 0.240862I$<br>$a = 1.65758 + 0.11424I$<br>$b = -0.239330 - 0.061735I$ | $-0.435749 - 0.269407I$ | $-2.76265 - 1.35969I$ |
| $u = -1.077790 - 0.240862I$<br>$a = 0.094420 - 0.237347I$<br>$b = -0.61150 + 1.52674I$ | $-0.435749 - 0.269407I$ | $-2.76265 - 1.35969I$ |
| $u = 1.192960 + 0.010682I$<br>$a = 0.183774 + 0.819595I$<br>$b = -0.276666 + 1.102260I$ | $1.73972 - 3.17328I$ | $2.25970 + 4.53501I$ |
| $u = 1.192960 + 0.010682I$<br>$a = -1.63092 + 0.75681I$<br>$b = 1.70671 - 0.84801I$ | $1.73972 - 3.17328I$ | $2.25970 + 4.53501I$ |
| $u = 1.192960 - 0.010682I$<br>$a = 0.183774 - 0.819595I$<br>$b = -0.276666 - 1.102260I$ | $1.73972 + 3.17328I$ | $2.25970 - 4.53501I$ |
| $u = 1.192960 - 0.010682I$<br>$a = -1.63092 - 0.75681I$<br>$b = 1.70671 + 0.84801I$ | $1.73972 + 3.17328I$ | $2.25970 - 4.53501I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -1.233140 + 0.387255I$<br>$a = -0.168429 + 0.838831I$<br>$b = -0.047811 + 1.029580I$ | $0.93505 - 8.49512I$ | $-0.70544 + 9.78968I$ |
| $u = -1.233140 + 0.387255I$<br>$a = -1.80216 - 0.00827I$<br>$b = 1.59192 - 1.20968I$ | $0.93505 - 8.49512I$ | $-0.70544 + 9.78968I$ |
| $u = -1.233140 - 0.387255I$<br>$a = -0.168429 - 0.838831I$<br>$b = -0.047811 - 1.029580I$ | $0.93505 + 8.49512I$ | $-0.70544 - 9.78968I$ |
| $u = -1.233140 - 0.387255I$<br>$a = -1.80216 + 0.00827I$<br>$b = 1.59192 + 1.20968I$ | $0.93505 + 8.49512I$ | $-0.70544 - 9.78968I$ |
| $u = -0.210876 + 0.639148I$<br>$a = -1.58258 + 0.71331I$<br>$b = -1.106760 - 0.872397I$ | $-2.28826 + 4.44786I$ | $-7.27742 - 9.17246I$ |
| $u = -0.210876 + 0.639148I$<br>$a = 3.14040 + 3.89458I$<br>$b = 0.357221 + 0.755095I$ | $-2.28826 + 4.44786I$ | $-7.27742 - 9.17246I$ |
| $u = -0.210876 - 0.639148I$<br>$a = -1.58258 - 0.71331I$<br>$b = -1.106760 + 0.872397I$ | $-2.28826 - 4.44786I$ | $-7.27742 + 9.17246I$ |
| $u = -0.210876 - 0.639148I$<br>$a = 3.14040 - 3.89458I$<br>$b = 0.357221 - 0.755095I$ | $-2.28826 - 4.44786I$ | $-7.27742 + 9.17246I$ |
| $u = 1.40234$<br>$a = 1.20292$<br>$b = -1.60235$ | $-2.47862$ | $-20.4370$ |
| $u = 1.40234$<br>$a = -0.335009$<br>$b = 0.0789471$ | $-2.47862$ | $-20.4370$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.328237 + 0.429693I$<br>$a = -2.85890 + 2.68232I$<br>$b = -0.453308 + 0.394776I$ | $-2.64797 - 3.16007I$ | $-9.92848 + 8.55630I$ |
| $u = -0.328237 + 0.429693I$<br>$a = -5.69041 - 5.45788I$<br>$b = 0.773105 - 1.012340I$ | $-2.64797 - 3.16007I$ | $-9.92848 + 8.55630I$ |
| $u = -0.328237 - 0.429693I$<br>$a = -2.85890 - 2.68232I$<br>$b = -0.453308 - 0.394776I$ | $-2.64797 + 3.16007I$ | $-9.92848 - 8.55630I$ |
| $u = -0.328237 - 0.429693I$<br>$a = -5.69041 + 5.45788I$<br>$b = 0.773105 + 1.012340I$ | $-2.64797 + 3.16007I$ | $-9.92848 - 8.55630I$ |
| $u = 0.539988$<br>$a = 0.257913 + 0.081587I$<br>$b = 0.238979 + 1.220830I$ | $-5.60678$ | $4.51860$ |
| $u = 0.539988$<br>$a = 0.257913 - 0.081587I$<br>$b = 0.238979 - 1.220830I$ | $-5.60678$ | $4.51860$ |
| $u = 0.30931 + 1.43313I$<br>$a = 0.414697 - 0.125231I$<br>$b = 1.62538 - 0.86203I$ | $-0.72901 - 3.16597I$ | $-11.1224 + 14.5296I$ |
| $u = 0.30931 + 1.43313I$<br>$a = 0.250658 + 0.025237I$<br>$b = -0.253505 + 0.236793I$ | $-0.72901 - 3.16597I$ | $-11.1224 + 14.5296I$ |
| $u = 0.30931 - 1.43313I$<br>$a = 0.414697 + 0.125231I$<br>$b = 1.62538 + 0.86203I$ | $-0.72901 + 3.16597I$ | $-11.1224 - 14.5296I$ |
| $u = 0.30931 - 1.43313I$<br>$a = 0.250658 - 0.025237I$<br>$b = -0.253505 - 0.236793I$ | $-0.72901 + 3.16597I$ | $-11.1224 - 14.5296I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.44530 + 0.50503I$<br>$a = 0.873903 - 0.794655I$<br>$b = -2.05881 + 0.78042I$ | $6.03993 + 9.01155I$ | $6.36928 - 7.51699I$ |
| $u = 1.44530 + 0.50503I$<br>$a = -1.42172 + 0.03163I$<br>$b = 0.890576 + 0.847975I$ | $6.03993 + 9.01155I$ | $6.36928 - 7.51699I$ |
| $u = 1.44530 - 0.50503I$<br>$a = 0.873903 + 0.794655I$<br>$b = -2.05881 - 0.78042I$ | $6.03993 - 9.01155I$ | $6.36928 + 7.51699I$ |
| $u = 1.44530 - 0.50503I$<br>$a = -1.42172 - 0.03163I$<br>$b = 0.890576 - 0.847975I$ | $6.03993 - 9.01155I$ | $6.36928 + 7.51699I$ |
| $u = 0.374069 + 0.272103I$<br>$a = 1.009080 - 0.139327I$<br>$b = -0.561974 + 0.976950I$ | $-0.25810 - 3.13859I$ | $5.54807 + 1.96798I$ |
| $u = 0.374069 + 0.272103I$<br>$a = 1.13211 + 2.46814I$<br>$b = 0.889012 + 0.000796I$ | $-0.25810 - 3.13859I$ | $5.54807 + 1.96798I$ |
| $u = 0.374069 - 0.272103I$<br>$a = 1.009080 + 0.139327I$<br>$b = -0.561974 - 0.976950I$ | $-0.25810 + 3.13859I$ | $5.54807 - 1.96798I$ |
| $u = 0.374069 - 0.272103I$<br>$a = 1.13211 - 2.46814I$<br>$b = 0.889012 - 0.000796I$ | $-0.25810 + 3.13859I$ | $5.54807 - 1.96798I$ |
| $u = -1.53404 + 0.18591I$<br>$a = -1.192930 + 0.300657I$<br>$b = 0.861605 - 0.648597I$ | $7.29465 - 2.57518I$ | $9.44800 + 2.42621I$ |
| $u = -1.53404 + 0.18591I$<br>$a = 1.106650 + 0.543891I$<br>$b = -1.93911 - 1.08341I$ | $7.29465 - 2.57518I$ | $9.44800 + 2.42621I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.53404-0.18591I$<br>$a=-1.192930-0.300657I$<br>$b=\ \ 0.861605+0.648597I$ | $7.29465+2.57518I$ | $9.44800-2.42621I$ |
| $u=-1.53404-0.18591I$<br>$a=\ \ 1.106650-0.543891I$<br>$b=-1.93911+1.08341I$ | $7.29465+2.57518I$ | $9.44800-2.42621I$ |
| $u=\ \ 1.40724+0.75831I$<br>$a=-0.908110+0.140923I$<br>$b=\ \ 0.584406+0.635478I$ | $2.76218+10.76250I$ | $0.-10.69821I$ |
| $u=\ \ 1.40724+0.75831I$<br>$a=\ \ 1.262290-0.375449I$<br>$b=-1.30126-1.53580I$ | $2.76218+10.76250I$ | $0.-10.69821I$ |
| $u=\ \ 1.40724-0.75831I$<br>$a=-0.908110-0.140923I$<br>$b=\ \ 0.584406-0.635478I$ | $2.76218-10.76250I$ | $0.+10.69821I$ |
| $u=\ \ 1.40724-0.75831I$<br>$a=\ \ 1.262290+0.375449I$<br>$b=-1.30126+1.53580I$ | $2.76218-10.76250I$ | $0.+10.69821I$ |
| $u=-1.53824+0.56889I$<br>$a=\ \ 1.221720+0.179869I$<br>$b=-1.57421+1.41354I$ | $5.12616-4.17577I$ | $0.+10.28228I$ |
| $u=-1.53824+0.56889I$<br>$a=-0.753482-0.099863I$<br>$b=\ \ 0.580107-0.368498I$ | $5.12616-4.17577I$ | $0.+10.28228I$ |
| $u=-1.53824-0.56889I$<br>$a=\ \ 1.221720-0.179869I$<br>$b=-1.57421-1.41354I$ | $5.12616+4.17577I$ | $0.-10.28228I$ |
| $u=-1.53824-0.56889I$<br>$a=-0.753482+0.099863I$<br>$b=\ \ 0.580107+0.368498I$ | $5.12616+4.17577I$ | $0.-10.28228I$ |

**III.**

$\boldsymbol{I^u_3 = \langle 6.29 \times 10^7 u^{16} + 9.06 \times 10^7 u^{15} + \cdots + 1.03 \times 10^8 b - 8.61 \times 10^7,\ 8.25 \times 10^8 u^{16} + 1.64 \times 10^9 u^{15} + \cdots + 1.03 \times 10^8 a - 1.17 \times 10^8,\ u^{17} + 2u^{16} + \cdots + u + 1\rangle}$

**(i) Arc colorings**

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -7.98025u^{16} - 15.8331u^{15} + \cdots - 58.7686u + 1.12991 \\ -0.607726u^{16} - 0.875942u^{15} + \cdots - 2.58963u + 0.832942 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 0.812543u^{16} - 1.15789u^{15} + \cdots - 20.2157u - 19.9470 \\ -0.0211113u^{16} - 0.134382u^{15} + \cdots - 2.23865u - 1.44347 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -8.58798u^{16} - 16.7091u^{15} + \cdots - 61.3582u + 1.96285 \\ -0.607726u^{16} - 0.875942u^{15} + \cdots - 2.58963u + 0.832942 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -8.56687u^{16} - 16.5747u^{15} + \cdots - 59.1196u + 4.40632 \\ -0.607726u^{16} - 0.875942u^{15} + \cdots - 2.58963u + 0.832942 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -5.33175u^{16} - 12.7204u^{15} + \cdots - 56.8680u - 13.8299 \\ -0.630211u^{16} - 1.49278u^{15} + \cdots - 5.14996u - 0.613392 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -1.25905u^{16} - 2.50310u^{15} + \cdots - 9.97824u - 1.22392 \\ -0.198592u^{16} - 0.408701u^{15} + \cdots - 0.862568u - 0.232357 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 0.995664u^{16} + 2.18008u^{15} + \cdots + 10.3597u + 0.976565 \\ -0.263385u^{16} - 0.323020u^{15} + \cdots + 0.381486u - 0.247351 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -1.25905u^{16} - 2.50310u^{15} + \cdots - 9.97824u - 1.22392 \\ -0.263385u^{16} - 0.323020u^{15} + \cdots + 0.381486u - 0.247351 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} u \\ u \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= \frac{821304331}{103426241}u^{16} + \frac{1347785326}{103426241}u^{15} + \cdots + \frac{2768366202}{103426241}u - \frac{3171807864}{103426241}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{17} - 10u^{16} + \cdots + 21u - 1$ |
| $c_2$ | $u^{17} + 4u^{16} + \cdots + 3u - 1$ |
| $c_3$ | $u^{17} - 2u^{16} + \cdots + u - 1$ |
| $c_4$ | $u^{17} - 4u^{16} + \cdots + 3u + 1$ |
| $c_5, c_{11}$ | $u^{17} - 3u^{15} + \cdots - 3u + 1$ |
| $c_6, c_{12}$ | $u^{17} - 3u^{16} + \cdots - 3u^2 + 1$ |
| $c_7$ | $u^{17} + 2u^{16} + \cdots + u + 1$ |
| $c_8, c_{10}$ | $u^{17} + 6u^{16} + \cdots + 7u + 1$ |
| $c_9$ | $u^{17} - 11u^{16} + \cdots + 11u - 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{17} - 2y^{16} + \cdots + 121y - 1$ |
| $c_2, c_4$ | $y^{17} - 10y^{16} + \cdots + 21y - 1$ |
| $c_3, c_7$ | $y^{17} - 6y^{16} + \cdots - 19y - 1$ |
| $c_5, c_{11}$ | $y^{17} - 6y^{16} + \cdots + 7y - 1$ |
| $c_6, c_{12}$ | $y^{17} - 7y^{16} + \cdots + 6y - 1$ |
| $c_8, c_{10}$ | $y^{17} + 6y^{16} + \cdots - 17y - 1$ |
| $c_9$ | $y^{17} + y^{16} + \cdots + 5y - 1$ |

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

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -1.043200 + 0.168287I$<br>$a = 1.038300 - 0.182643I$<br>$b = -0.798280 - 0.935617I$ | $0.36692 + 1.60299I$ | $0.36498 - 4.08341I$ |
| $u = -1.043200 - 0.168287I$<br>$a = 1.038300 + 0.182643I$<br>$b = -0.798280 + 0.935617I$ | $0.36692 - 1.60299I$ | $0.36498 + 4.08341I$ |
| $u = 1.022030 + 0.288227I$<br>$a = 0.783907 - 0.680893I$<br>$b = -0.600785 - 0.956560I$ | $0.09494 + 6.05613I$ | $1.62217 - 10.70941I$ |
| $u = 1.022030 - 0.288227I$<br>$a = 0.783907 + 0.680893I$<br>$b = -0.600785 + 0.956560I$ | $0.09494 - 6.05613I$ | $1.62217 + 10.70941I$ |
| $u = -0.345041 + 1.234750I$<br>$a = -0.175656 + 0.124962I$<br>$b = -0.459926 + 0.324004I$ | $-7.30928 - 5.03230I$ | $-35.8098 + 2.0999I$ |
| $u = -0.345041 - 1.234750I$<br>$a = -0.175656 - 0.124962I$<br>$b = -0.459926 - 0.324004I$ | $-7.30928 + 5.03230I$ | $-35.8098 - 2.0999I$ |
| $u = -0.087423 + 1.326950I$<br>$a = -0.0462067 + 0.0871223I$<br>$b = -0.920987 - 0.168672I$ | $-0.16476 + 2.91810I$ | $3.50192 - 5.82402I$ |
| $u = -0.087423 - 1.326950I$<br>$a = -0.0462067 - 0.0871223I$<br>$b = -0.920987 + 0.168672I$ | $-0.16476 - 2.91810I$ | $3.50192 + 5.82402I$ |
| $u = -1.34164$<br>$a = -0.890647$<br>$b = 0.861305$ | $-2.08721$ | $6.80050$ |
| $u = 0.021367 + 0.554259I$<br>$a = -2.01866 + 0.67494I$<br>$b = -0.702902 - 0.628013I$ | $-1.26702 + 3.69006I$ | $-2.09916 - 5.66136I$ |

| Solutions to $I_3^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.021367 - 0.554259I$<br>$a = -2.01866 - 0.67494I$<br>$b = -0.702902 + 0.628013I$ | $-1.26702 - 3.69006I$ | $-2.09916 + 5.66136I$ |
| $u = -1.38456 + 0.57144I$<br>$a = -1.243860 - 0.238832I$<br>$b = 1.182010 - 0.472177I$ | $4.17706 - 9.34432I$ | $-0.13250 + 7.24088I$ |
| $u = -1.38456 - 0.57144I$<br>$a = -1.243860 + 0.238832I$<br>$b = 1.182010 + 0.472177I$ | $4.17706 + 9.34432I$ | $-0.13250 - 7.24088I$ |
| $u = 1.47952 + 0.32711I$<br>$a = -1.140820 + 0.059425I$<br>$b = 1.164170 + 0.294594I$ | $5.82050 + 3.06022I$ | $3.26385 - 2.28981I$ |
| $u = 1.47952 - 0.32711I$<br>$a = -1.140820 - 0.059425I$<br>$b = 1.164170 - 0.294594I$ | $5.82050 - 3.06022I$ | $3.26385 + 2.28981I$ |
| $u = 0.008126 + 0.358392I$<br>$a = 5.7483 - 13.6218I$<br>$b = 0.706047 - 0.738870I$ | $-2.31969 - 3.66781I$ | $-26.6116 + 4.6726I$ |
| $u = 0.008126 - 0.358392I$<br>$a = 5.7483 + 13.6218I$<br>$b = 0.706047 + 0.738870I$ | $-2.31969 + 3.66781I$ | $-26.6116 - 4.6726I$ |

**IV.** $\boldsymbol{I_1^v = \langle a,\ 16v^3 - 48v^2 + b + 51v - 13,\ 4v^4 - 13v^3 + 16v^2 - 7v + 1\rangle}$

**(i) Arc colorings**

$$a_3 = \begin{pmatrix} v \\ 0 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 0 \\ -16v^3 + 48v^2 - 51v + 13 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 1 \\ 20v^3 - 57v^2 + 58v - 13 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -16v^3 + 48v^2 - 51v + 13 \\ -16v^3 + 48v^2 - 51v + 13 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 16v^3 - 48v^2 + 51v - 13 \\ 36v^3 - 105v^2 + 109v - 27 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -20v^3 + 57v^2 - 58v + 14 \\ -36v^3 + 105v^2 - 109v + 27 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -1 \\ 4v^3 - 13v^2 + 16v - 7 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 1 \\ -4v^3 + 13v^2 - 16v + 7 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} v - 1 \\ 4v^3 - 13v^2 + 16v - 7 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} v \\ 0 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 124v^3 - 368v^2 + 395v - 111$

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

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

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_4$ | $(y-1)^4$ |
| $c_3, c_7$ | $y^4$ |
| $c_5, c_8, c_{10}$ $c_{11}$ | $y^4 + 2y^3 + 3y^2 + y + 1$ |
| $c_6, c_{12}$ | $y^4 + 2y^3 + 7y^2 + 5y + 1$ |
| $c_9$ | $y^4 - y^3 + 2y^2 + 7y + 4$ |

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

| Solutions to $I_1^v$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $v = 1.28654 + 0.69736I$<br>$a = 0$<br>$b = -0.547424 + 0.585652I$ | $-0.66484 - 1.39709I$ | $-1.65357 + 2.46427I$ |
| $v = 1.28654 - 0.69736I$<br>$a = 0$<br>$b = -0.547424 - 0.585652I$ | $-0.66484 + 1.39709I$ | $-1.65357 - 2.46427I$ |
| $v = 0.338459 + 0.046758I$<br>$a = 0$<br>$b = 0.547424 - 1.120870I$ | $-4.26996 - 7.64338I$ | $-14.1277 + 8.8017I$ |
| $v = 0.338459 - 0.046758I$<br>$a = 0$<br>$b = 0.547424 + 1.120870I$ | $-4.26996 + 7.64338I$ | $-14.1277 - 8.8017I$ |

**V.** $\boldsymbol{I_2^v = \langle a,\ b^2 - bv + v^2 - b + 2v + 2,\ v^3 + 2v^2 + 3v + 1\rangle}$

**(i) Arc colorings**

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

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

**(iii) Cusp Shapes** $= -8v^2 - 9v - 17$

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

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

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_4$ | $(y-1)^6$ |
| $c_3, c_7$ | $y^6$ |
| $c_5, c_8, c_{10}$<br>$c_{11}$ | $y^6 + 3y^5 + 4y^4 + 2y^3 + 1$ |
| $c_6, c_{12}$ | $y^6 - y^5 + 4y^4 - 2y^3 + 8y^2 + 1$ |
| $c_9$ | $(y^3 - y^2 + 2y - 1)^2$ |

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

| Solutions to $I_2^v$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $v = -0.78492 + 1.30714I$<br>$a = 0$<br>$b = -0.498832 + 1.001300I$ | $-1.91067 - 2.82812I$ | $-1.19557 + 4.65175I$ |
| $v = -0.78492 + 1.30714I$<br>$a = 0$<br>$b = 0.713912 + 0.305839I$ | $-1.91067 - 2.82812I$ | $-1.19557 + 4.65175I$ |
| $v = -0.78492 - 1.30714I$<br>$a = 0$<br>$b = -0.498832 - 1.001300I$ | $-1.91067 + 2.82812I$ | $-1.19557 - 4.65175I$ |
| $v = -0.78492 - 1.30714I$<br>$a = 0$<br>$b = 0.713912 - 0.305839I$ | $-1.91067 + 2.82812I$ | $-1.19557 - 4.65175I$ |
| $v = -0.430160$<br>$a = 0$<br>$b = 0.284920 + 1.115140I$ | $-6.04826$ | $-14.6090$ |
| $v = -0.430160$<br>$a = 0$<br>$b = 0.284920 - 1.115140I$ | $-6.04826$ | $-14.6090$ |

## VI. u-Polynomials

| Crossings | u-Polynomials at each crossing |
| --- | --- |
| $c_1$ | $((u-1)^{10})(u^{17}-10u^{16}+\cdots+21u-1)(u^{30}+12u^{29}+\cdots-31u+1)^2$ <br> $\cdot(u^{49}+23u^{48}+\cdots-1887u+256)$ |
| $c_2$ | $((u-1)^{10})(u^{17}+4u^{16}+\cdots+3u-1)(u^{30}-4u^{29}+\cdots+5u-1)^2$ <br> $\cdot(u^{49}-7u^{48}+\cdots-97u+16)$ |
| $c_3$ | $u^{10}(u^{17}-2u^{16}+\cdots+u-1)(u^{30}+3u^{29}+\cdots+36u+8)^2$ <br> $\cdot(u^{49}-5u^{48}+\cdots-2656u+256)$ |
| $c_4$ | $((u+1)^{10})(u^{17}-4u^{16}+\cdots+3u+1)(u^{30}-4u^{29}+\cdots+5u-1)^2$ <br> $\cdot(u^{49}-7u^{48}+\cdots-97u+16)$ |
| $c_5$ | $(u^4+u^2+u+1)(u^6-u^5+2u^4-2u^3+2u^2-2u+1)$ <br> $\cdot(u^{17}-3u^{15}+\cdots-3u+1)(u^{49}-u^{47}+\cdots-45u-9)$ <br> $\cdot(u^{60}-2u^{59}+\cdots-270u-81)$ |
| $c_6$ | $(u^4-2u^3+3u^2-u+1)(u^6-3u^5+4u^4-2u^3+1)$ <br> $\cdot(u^{17}-3u^{16}+\cdots-3u^2+1)(u^{49}-u^{48}+\cdots+2u-1)$ <br> $\cdot(u^{60}-6u^{59}+\cdots-48u+9)$ |
| $c_7$ | $u^{10}(u^{17}+2u^{16}+\cdots+u+1)(u^{30}+3u^{29}+\cdots+36u+8)^2$ <br> $\cdot(u^{49}-5u^{48}+\cdots-2656u+256)$ |
| $c_8, c_{10}$ | $(u^4+u^2+u+1)(u^6-u^5+2u^4-2u^3+2u^2-2u+1)$ <br> $\cdot(u^{17}+6u^{16}+\cdots+7u+1)(u^{49}-6u^{48}+\cdots+27u+1)$ <br> $\cdot(u^{60}+2u^{59}+\cdots-15444u-13239)$ |
| $c_9$ | $((u^3-u^2+1)^2)(u^4+3u^3+\cdots+3u+2)(u^{17}-11u^{16}+\cdots+11u-1)$ <br> $\cdot((u^{30}+14u^{29}+\cdots-8u^2+1)^2)(u^{49}-29u^{48}+\cdots+32u-4)$ |
| $c_{11}$ | $(u^4+u^2-u+1)(u^6+u^5+2u^4+2u^3+2u^2+2u+1)$ <br> $\cdot(u^{17}-3u^{15}+\cdots-3u+1)(u^{49}-u^{47}+\cdots-45u-9)$ <br> $\cdot(u^{60}-2u^{59}+\cdots-270u-81)$ |
| $c_{12}$ | $(u^4+2u^3+3u^2+u+1)(u^6+3u^5+4u^4+2u^3+1)$ <br> $\cdot(u^{17}-3u^{16}+\cdots-3u^2+1)(u^{49}-u^{48}+\cdots+2u-1)$ <br> $\cdot(u^{60}-6u^{59}+\cdots-48u+9)$ |

## VII. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $((y-1)^{10})(y^{17}-2y^{16}+\cdots+121y-1)$ $\cdot(y^{30}+16y^{29}+\cdots-433y+1)^2$ $\cdot(y^{49}+13y^{48}+\cdots-6281407y-65536)$ |
| $c_2, c_4$ | $((y-1)^{10})(y^{17}-10y^{16}+\cdots+21y-1)(y^{30}-12y^{29}+\cdots+31y+1)^2$ $\cdot(y^{49}-23y^{48}+\cdots-1887y-256)$ |
| $c_3, c_7$ | $y^{10}(y^{17}-6y^{16}+\cdots-19y-1)(y^{30}-21y^{29}+\cdots-464y+64)^2$ $\cdot(y^{49}-27y^{48}+\cdots+881664y-65536)$ |
| $c_5, c_{11}$ | $(y^4+2y^3+3y^2+y+1)(y^6+3y^5+4y^4+2y^3+1)$ $\cdot(y^{17}-6y^{16}+\cdots+7y-1)(y^{49}-2y^{48}+\cdots+1629y-81)$ $\cdot(y^{60}-6y^{59}+\cdots-1175148y+6561)$ |
| $c_6, c_{12}$ | $(y^4+2y^3+7y^2+5y+1)(y^6-y^5+4y^4-2y^3+8y^2+1)$ $\cdot(y^{17}-7y^{16}+\cdots+6y-1)(y^{49}+21y^{48}+\cdots-52y-1)$ $\cdot(y^{60}-14y^{59}+\cdots+2088y+81)$ |
| $c_8, c_{10}$ | $(y^4+2y^3+3y^2+y+1)(y^6+3y^5+4y^4+2y^3+1)$ $\cdot(y^{17}+6y^{16}+\cdots-17y-1)(y^{49}-38y^{48}+\cdots+129y-1)$ $\cdot(y^{60}+6y^{59}+\cdots-3061177848y+175271121)$ |
| $c_9$ | $((y^3-y^2+2y-1)^2)(y^4-y^3+2y^2+7y+4)(y^{17}+y^{16}+\cdots+5y-1)$ $\cdot((y^{30}-2y^{29}+\cdots-16y+1)^2)(y^{49}-y^{48}+\cdots-968y-16)$ |