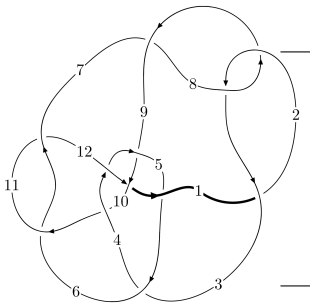
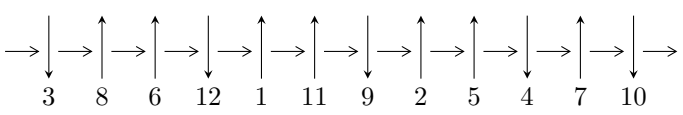
## $12a_{0711}$ $(K12a_{0711})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

$$\underset{c_{11}}{7,11} \to \underset{c_4}{4,12} \to \underset{c_6}{5} \longrightarrow \underset{c_3}{6} \longrightarrow \underset{c_{10}}{3} \to \underset{c_{12}}{10} \to \underset{c_9}{1} \longrightarrow \underset{c_7}{9} \longrightarrow \underset{c_2}{8} \longrightarrow 2 \longrightarrow\!\!\!\!\rightarrow c_1, c_5, c_8$$

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

$$\begin{aligned}
I_1^u &= \langle 8.24922 \times 10^{742} u^{150} - 6.55529 \times 10^{743} u^{149} + \cdots + 3.04139 \times 10^{743} b - 5.19965 \times 10^{746}, \\
&\quad - 1.91365 \times 10^{744} u^{150} + 1.50999 \times 10^{745} u^{149} + \cdots + 2.56085 \times 10^{745} a + 1.17408 \times 10^{748}, \\
&\quad u^{151} - 9u^{150} + \cdots - 77784u + 6736 \rangle \\
I_2^u &= \langle -u^{37} - u^{36} + \cdots + b - 1,\ 6999926753u^{38} + 2532872060u^{37} + \cdots + 288793a - 11032994937, \\
&\quad u^{39} + u^{38} + \cdots - u - 1 \rangle \\
I_3^u &= \langle -85a^8 - 32a^7 - 448a^6 - 448a^5 - 2000a^4 + 136a^3 - 192a^2 + 6925b - 2531a + 6968, \\
&\quad a^9 + 2a^8 + 5a^7 + 8a^6 + 23a^5 + 32a^4 + 14a^3 + 64a^2 + 45a + 19,\ u + 1 \rangle
\end{aligned}$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 199 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.** $\boldsymbol{I_1^u = \langle 8.25 \times 10^{742} u^{150} - 6.56 \times 10^{743} u^{149} + \cdots + 3.04 \times 10^{743} b - 5.20 \times 10^{746},\ -1.91 \times 10^{744} u^{150} + 1.51 \times 10^{745} u^{149} + \cdots + 2.56 \times 10^{745} a + 1.17 \times 10^{748},\ u^{151} - 9u^{150} + \cdots - 77784u + 6736 \rangle}$

**(i) Arc colorings**

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

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

$$a_4 = \begin{pmatrix} 0.0747273u^{150} - 0.589646u^{149} + \cdots + 4669.48u - 458.472 \\ -0.271232u^{150} + 2.15536u^{149} + \cdots - 18159.9u + 1709.63 \end{pmatrix}$$

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

$$a_5 = \begin{pmatrix} 0.259176u^{150} - 2.05119u^{149} + \cdots + 16884.5u - 1609.69 \\ -0.482694u^{150} + 3.83638u^{149} + \cdots - 32357.4u + 3046.71 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} 0.285342u^{150} - 2.26639u^{149} + \cdots + 19122.6u - 1824.73 \\ -0.481847u^{150} + 3.83211u^{149} + \cdots - 32613.1u + 3075.89 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.156568u^{150} - 1.18601u^{149} + \cdots + 6150.56u - 500.970 \\ -0.237458u^{150} + 1.84504u^{149} + \cdots - 12246.5u + 1099.36 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.0511511u^{150} + 0.360790u^{149} + \cdots - 94.6698u - 31.6119 \\ 0.169936u^{150} - 1.30531u^{149} + \cdots + 8352.58u - 755.541 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.00946656u^{150} + 0.0828584u^{149} + \cdots - 794.621u + 60.1216 \\ -0.0350054u^{150} + 0.281146u^{149} + \cdots - 2352.55u + 222.943 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 0.133701u^{150} - 1.12764u^{149} + \cdots + 14432.4u - 1420.98 \\ 0.182247u^{150} - 1.40174u^{149} + \cdots + 8483.12u - 742.235 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.0873086u^{150} + 0.720271u^{149} + \cdots - 9059.99u + 925.738 \\ 0.299897u^{150} - 2.44549u^{149} + \cdots + 24187.2u - 2325.01 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -1.63892u^{150} + 13.2222u^{149} + \cdots - 122765.u + 11717.8$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_7$ | $u^{151} + 48u^{150} + \cdots - 80674u - 2401$ |
| $c_2, c_8$ | $u^{151} + 24u^{149} + \cdots - 426u - 49$ |
| $c_3$ | $u^{151} - 14u^{150} + \cdots - 257214751u - 31536997$ |
| $c_4$ | $u^{151} + 5u^{150} + \cdots + 966u - 59$ |
| $c_5$ | $u^{151} - 2u^{150} + \cdots - 79507801u - 5859071$ |
| $c_6, c_{11}$ | $u^{151} + 9u^{150} + \cdots - 77784u - 6736$ |
| $c_9$ | $u^{151} - 3u^{150} + \cdots - 8069u - 2036$ |
| $c_{10}$ | $u^{151} - u^{150} + \cdots - 2526120u - 565463$ |
| $c_{12}$ | $u^{151} - 13u^{150} + \cdots + 38u - 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_7$ | $y^{151} + 128y^{150} + \cdots - 1298802126y - 5764801$ |
| $c_2, c_8$ | $y^{151} + 48y^{150} + \cdots - 80674y - 2401$ |
| $c_3$ | $y^{151} - 60y^{150} + \cdots + 55902493354214959y - 994582179778009$ |
| $c_4$ | $y^{151} + 17y^{150} + \cdots - 183124y - 3481$ |
| $c_5$ | $y^{151} - 32y^{150} + \cdots + 1942239802906837y - 34328712983041$ |
| $c_6, c_{11}$ | $y^{151} - 91y^{150} + \cdots + 1433388480y - 45373696$ |
| $c_9$ | $y^{151} - 13y^{150} + \cdots + 100856849y - 4145296$ |
| $c_{10}$ | $y^{151} + 37y^{150} + \cdots - 18861220167282y - 319748404369$ |
| $c_{12}$ | $y^{151} + 19y^{150} + \cdots + 64y - 1$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.990792 + 0.090174I$<br>$a = 0.345343 - 0.435342I$<br>$b = 1.128770 - 0.095895I$ | $1.58633 + 5.54457I$ | 0 |
| $u = 0.990792 - 0.090174I$<br>$a = 0.345343 + 0.435342I$<br>$b = 1.128770 + 0.095895I$ | $1.58633 - 5.54457I$ | 0 |
| $u = -0.097465 + 1.000600I$<br>$a = 0.177347 - 0.154694I$<br>$b = -0.604109 - 0.815814I$ | $0.96753 - 4.94438I$ | 0 |
| $u = -0.097465 - 1.000600I$<br>$a = 0.177347 + 0.154694I$<br>$b = -0.604109 + 0.815814I$ | $0.96753 + 4.94438I$ | 0 |
| $u = -0.896502 + 0.420675I$<br>$a = 0.48637 - 2.61506I$<br>$b = 0.760440 + 0.547402I$ | $3.04760 - 10.11650I$ | 0 |
| $u = -0.896502 - 0.420675I$<br>$a = 0.48637 + 2.61506I$<br>$b = 0.760440 - 0.547402I$ | $3.04760 + 10.11650I$ | 0 |
| $u = -0.940240 + 0.371833I$<br>$a = 0.82612 - 2.07358I$<br>$b = 0.28924 + 1.75611I$ | $3.17478 - 2.69679I$ | 0 |
| $u = -0.940240 - 0.371833I$<br>$a = 0.82612 + 2.07358I$<br>$b = 0.28924 - 1.75611I$ | $3.17478 + 2.69679I$ | 0 |
| $u = 0.240395 + 0.950698I$<br>$a = 0.146458 - 0.347474I$<br>$b = -0.599763 - 0.094709I$ | $-4.26814 - 0.40982I$ | 0 |
| $u = 0.240395 - 0.950698I$<br>$a = 0.146458 + 0.347474I$<br>$b = -0.599763 + 0.094709I$ | $-4.26814 + 0.40982I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.944500+0.236617I$<br>$a=-0.45444-2.58476I$<br>$b=\ \ 0.528643+0.577970I$ | $-1.52725-5.23665I$ | 0 |
| $u=-0.944500-0.236617I$<br>$a=-0.45444+2.58476I$<br>$b=\ \ 0.528643-0.577970I$ | $-1.52725+5.23665I$ | 0 |
| $u=-0.145553+1.029410I$<br>$a=-0.261417-0.006944I$<br>$b=\ \ 0.711117-0.924155I$ | $-2.40306+8.16907I$ | 0 |
| $u=-0.145553-1.029410I$<br>$a=-0.261417+0.006944I$<br>$b=\ \ 0.711117+0.924155I$ | $-2.40306-8.16907I$ | 0 |
| $u=\ \ 0.923625+0.504405I$<br>$a=-0.539231-1.297580I$<br>$b=\ \ 0.088491+0.428512I$ | $2.54439+6.83425I$ | 0 |
| $u=\ \ 0.923625-0.504405I$<br>$a=-0.539231+1.297580I$<br>$b=\ \ 0.088491-0.428512I$ | $2.54439-6.83425I$ | 0 |
| $u=\ \ 0.953080+0.451898I$<br>$a=-0.47890-2.33450I$<br>$b=-0.803642+0.629421I$ | $3.63677+4.61625I$ | 0 |
| $u=\ \ 0.953080-0.451898I$<br>$a=-0.47890+2.33450I$<br>$b=-0.803642-0.629421I$ | $3.63677-4.61625I$ | 0 |
| $u=\ \ 0.535628+0.928000I$<br>$a=\ \ 0.004657-0.342697I$<br>$b=\ \ 0.608148+0.495795I$ | $0.91816-1.80329I$ | 0 |
| $u=\ \ 0.535628-0.928000I$<br>$a=\ \ 0.004657+0.342697I$<br>$b=\ \ 0.608148-0.495795I$ | $0.91816+1.80329I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.922462 + 0.091805I$<br>$a = 1.58299 - 0.09258I$<br>$b = -2.23222 - 0.08350I$ | $-2.45429 + 4.42305I$ | 0 |
| $u = 0.922462 - 0.091805I$<br>$a = 1.58299 + 0.09258I$<br>$b = -2.23222 + 0.08350I$ | $-2.45429 - 4.42305I$ | 0 |
| $u = -0.982086 + 0.456771I$<br>$a = 0.657622 - 1.221370I$<br>$b = -0.086785 + 0.561386I$ | $3.23791 - 1.48499I$ | 0 |
| $u = -0.982086 - 0.456771I$<br>$a = 0.657622 + 1.221370I$<br>$b = -0.086785 - 0.561386I$ | $3.23791 + 1.48499I$ | 0 |
| $u = -0.701039 + 0.579573I$<br>$a = -0.508038 + 0.202618I$<br>$b = -1.181510 + 0.532304I$ | $2.52298 + 6.05680I$ | 0 |
| $u = -0.701039 - 0.579573I$<br>$a = -0.508038 - 0.202618I$<br>$b = -1.181510 - 0.532304I$ | $2.52298 - 6.05680I$ | 0 |
| $u = 0.880837 + 0.675537I$<br>$a = -0.73406 - 1.50022I$<br>$b = -0.295580 + 1.106030I$ | $2.21348 + 7.46414I$ | 0 |
| $u = 0.880837 - 0.675537I$<br>$a = -0.73406 + 1.50022I$<br>$b = -0.295580 - 1.106030I$ | $2.21348 - 7.46414I$ | 0 |
| $u = 1.098470 + 0.204652I$<br>$a = -0.61191 + 1.33296I$<br>$b = 0.976007 - 0.980967I$ | $-0.84041 + 4.53199I$ | 0 |
| $u = 1.098470 - 0.204652I$<br>$a = -0.61191 - 1.33296I$<br>$b = 0.976007 + 0.980967I$ | $-0.84041 - 4.53199I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.620699 + 0.618026I$<br>$a = 0.512205 + 0.175779I$<br>$b = 1.140330 + 0.571912I$ | $2.68045 - 0.36688I$ | 0 |
| $u = 0.620699 - 0.618026I$<br>$a = 0.512205 - 0.175779I$<br>$b = 1.140330 - 0.571912I$ | $2.68045 + 0.36688I$ | 0 |
| $u = -1.110890 + 0.203709I$<br>$a = -1.242330 + 0.326624I$<br>$b = 2.15503 - 0.66248I$ | $6.37818 - 4.27792I$ | 0 |
| $u = -1.110890 - 0.203709I$<br>$a = -1.242330 - 0.326624I$<br>$b = 2.15503 + 0.66248I$ | $6.37818 + 4.27792I$ | 0 |
| $u = 0.742672 + 0.435982I$<br>$a = -0.244433 - 0.808376I$<br>$b = 0.434088 + 0.279550I$ | $-1.95317 + 1.88366I$ | 0 |
| $u = 0.742672 - 0.435982I$<br>$a = -0.244433 + 0.808376I$<br>$b = 0.434088 - 0.279550I$ | $-1.95317 - 1.88366I$ | 0 |
| $u = 1.112610 + 0.260116I$<br>$a = 1.126110 + 0.275836I$<br>$b = -2.02751 - 0.67548I$ | $5.46003 + 10.65750I$ | 0 |
| $u = 1.112610 - 0.260116I$<br>$a = 1.126110 - 0.275836I$<br>$b = -2.02751 + 0.67548I$ | $5.46003 - 10.65750I$ | 0 |
| $u = 0.964916 + 0.613090I$<br>$a = -0.987478 - 0.710650I$<br>$b = -0.179113 + 1.272620I$ | $2.47938 + 2.48193I$ | 0 |
| $u = 0.964916 - 0.613090I$<br>$a = -0.987478 + 0.710650I$<br>$b = -0.179113 - 1.272620I$ | $2.47938 - 2.48193I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.085390+0.399085I$<br>$a=\ \ 0.818888-1.013450I$<br>$b=-0.082968+1.034270I$ | $2.81189-1.06682I$ | 0 |
| $u=-1.085390-0.399085I$<br>$a=\ \ 0.818888+1.013450I$<br>$b=-0.082968-1.034270I$ | $2.81189+1.06682I$ | 0 |
| $u=-0.492041+1.058440I$<br>$a=-0.014033-0.329602I$<br>$b=-0.559794+0.545163I$ | $0.73524-3.70950I$ | 0 |
| $u=-0.492041-1.058440I$<br>$a=-0.014033+0.329602I$<br>$b=-0.559794-0.545163I$ | $0.73524+3.70950I$ | 0 |
| $u=-1.159600+0.140957I$<br>$a=\ \ 0.424271+1.317780I$<br>$b=\ \ 0.667907-1.030360I$ | $7.26308-6.02666I$ | 0 |
| $u=-1.159600-0.140957I$<br>$a=\ \ 0.424271-1.317780I$<br>$b=\ \ 0.667907+1.030360I$ | $7.26308+6.02666I$ | 0 |
| $u=-0.790336+0.247385I$<br>$a=-0.515385+0.350199I$<br>$b=-1.151130+0.338241I$ | $-2.05263+2.93425I$ | 0 |
| $u=-0.790336-0.247385I$<br>$a=-0.515385-0.350199I$<br>$b=-1.151130-0.338241I$ | $-2.05263-2.93425I$ | 0 |
| $u=\ \ 1.174220+0.150913I$<br>$a=-0.82492-1.28779I$<br>$b=-0.425548+0.884737I$ | $5.38239+2.26850I$ | 0 |
| $u=\ \ 1.174220-0.150913I$<br>$a=-0.82492+1.28779I$<br>$b=-0.425548-0.884737I$ | $5.38239-2.26850I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.186280 + 0.088260I$<br>$a = -0.523496 + 1.298170I$<br>$b = -0.627000 - 0.986357I$ | $8.30145 + 0.09663I$ | 0 |
| $u = 1.186280 - 0.088260I$<br>$a = -0.523496 - 1.298170I$<br>$b = -0.627000 + 0.986357I$ | $8.30145 - 0.09663I$ | 0 |
| $u = 1.202490 + 0.067128I$<br>$a = 0.65583 - 1.49984I$<br>$b = -0.287309 + 0.769328I$ | $2.54949 + 4.60244I$ | 0 |
| $u = 1.202490 - 0.067128I$<br>$a = 0.65583 + 1.49984I$<br>$b = -0.287309 - 0.769328I$ | $2.54949 - 4.60244I$ | 0 |
| $u = 1.120120 + 0.488044I$<br>$a = -0.38701 - 1.78560I$<br>$b = -0.88858 + 1.17973I$ | $2.13720 + 6.41486I$ | 0 |
| $u = 1.120120 - 0.488044I$<br>$a = -0.38701 + 1.78560I$<br>$b = -0.88858 - 1.17973I$ | $2.13720 - 6.41486I$ | 0 |
| $u = -0.767180$<br>$a = 1.55361$<br>$b = -1.18797$ | 1.35732 | 0 |
| $u = 0.498180 + 0.576239I$<br>$a = -0.96802 - 1.05085I$<br>$b = 0.124400 + 0.921156I$ | $-2.11145 + 2.25706I$ | 0 |
| $u = 0.498180 - 0.576239I$<br>$a = -0.96802 + 1.05085I$<br>$b = 0.124400 - 0.921156I$ | $-2.11145 - 2.25706I$ | 0 |
| $u = 1.141830 + 0.498175I$<br>$a = 0.771661 + 0.283895I$<br>$b = 0.152214 - 0.560241I$ | $2.15085 - 3.79029I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.141830 - 0.498175I$<br>$a = 0.771661 - 0.283895I$<br>$b = 0.152214 + 0.560241I$ | $2.15085 + 3.79029I$ | 0 |
| $u = -1.057230 + 0.671307I$<br>$a = 0.55735 - 1.51450I$<br>$b = 0.474326 + 1.113390I$ | $2.66996 - 2.40157I$ | 0 |
| $u = -1.057230 - 0.671307I$<br>$a = 0.55735 + 1.51450I$<br>$b = 0.474326 - 1.113390I$ | $2.66996 + 2.40157I$ | 0 |
| $u = -1.223470 + 0.305858I$<br>$a = 0.88771 - 1.22998I$<br>$b = 0.335104 + 0.757621I$ | $2.62183 - 5.13975I$ | 0 |
| $u = -1.223470 - 0.305858I$<br>$a = 0.88771 + 1.22998I$<br>$b = 0.335104 - 0.757621I$ | $2.62183 + 5.13975I$ | 0 |
| $u = 0.096371 + 1.257980I$<br>$a = 0.1337440 + 0.0227093I$<br>$b = -0.611020 - 1.024920I$ | $5.05268 - 7.43776I$ | 0 |
| $u = 0.096371 - 1.257980I$<br>$a = 0.1337440 - 0.0227093I$<br>$b = -0.611020 + 1.024920I$ | $5.05268 + 7.43776I$ | 0 |
| $u = -0.152115 + 1.264010I$<br>$a = -0.141925 + 0.046588I$<br>$b = 0.640021 - 1.044650I$ | $4.2392 + 13.5307I$ | 0 |
| $u = -0.152115 - 1.264010I$<br>$a = -0.141925 - 0.046588I$<br>$b = 0.640021 + 1.044650I$ | $4.2392 - 13.5307I$ | 0 |
| $u = -0.175416 + 0.702624I$<br>$a = 0.982872 + 0.483727I$<br>$b = 0.614213 + 1.041840I$ | $5.06633 - 5.69054I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.175416-0.702624I$<br>$a=\ \ 0.982872-0.483727I$<br>$b=\ \ 0.614213-1.041840I$ | $5.06633+5.69054I$ | 0 |
| $u=\ \ 0.693152+0.203678I$<br>$a=-0.86379+2.22176I$<br>$b=\ \ 0.875411-0.893420I$ | $-2.62905-2.52442I$ | 0 |
| $u=\ \ 0.693152-0.203678I$<br>$a=-0.86379-2.22176I$<br>$b=\ \ 0.875411+0.893420I$ | $-2.62905+2.52442I$ | 0 |
| $u=\ \ 1.225270+0.371026I$<br>$a=\ \ 0.01194-1.65800I$<br>$b=-0.520936+0.928388I$ | $1.98992+4.93153I$ | 0 |
| $u=\ \ 1.225270-0.371026I$<br>$a=\ \ 0.01194+1.65800I$<br>$b=-0.520936-0.928388I$ | $1.98992-4.93153I$ | 0 |
| $u=-1.233620+0.380606I$<br>$a=\ \ 0.08212-1.75557I$<br>$b=\ \ 1.37609+1.50801I$ | $9.48617-3.60923I$ | 0 |
| $u=-1.233620-0.380606I$<br>$a=\ \ 0.08212+1.75557I$<br>$b=\ \ 1.37609-1.50801I$ | $9.48617+3.60923I$ | 0 |
| $u=-0.155061+1.293000I$<br>$a=-0.003426-0.305317I$<br>$b=-0.213839+0.554536I$ | $-3.68689-0.26852I$ | 0 |
| $u=-0.155061-1.293000I$<br>$a=-0.003426+0.305317I$<br>$b=-0.213839-0.554536I$ | $-3.68689+0.26852I$ | 0 |
| $u=\ \ 1.242740+0.417172I$<br>$a=-0.14549-1.69583I$<br>$b=-1.36277+1.40709I$ | $9.04153+9.78181I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.242740 - 0.417172I$<br>$a = -0.14549 + 1.69583I$<br>$b = -1.36277 - 1.40709I$ | $9.04153 - 9.78181I$ | 0 |
| $u = 0.567632 + 0.381756I$<br>$a = 0.220383 - 0.723401I$<br>$b = 0.755907 - 0.275228I$ | $-2.12073 + 2.12358I$ | 0 |
| $u = 0.567632 - 0.381756I$<br>$a = 0.220383 + 0.723401I$<br>$b = 0.755907 + 0.275228I$ | $-2.12073 - 2.12358I$ | 0 |
| $u = 0.094666 + 0.669223I$<br>$a = -0.151849 - 0.815065I$<br>$b = 0.039253 + 0.601579I$ | $0.63812 - 2.48409I$ | 0 |
| $u = 0.094666 - 0.669223I$<br>$a = -0.151849 + 0.815065I$<br>$b = 0.039253 - 0.601579I$ | $0.63812 + 2.48409I$ | 0 |
| $u = -1.280980 + 0.410808I$<br>$a = 0.09614 + 1.67676I$<br>$b = -0.92056 - 1.47271I$ | $1.82648 - 5.88485I$ | 0 |
| $u = -1.280980 - 0.410808I$<br>$a = 0.09614 - 1.67676I$<br>$b = -0.92056 + 1.47271I$ | $1.82648 + 5.88485I$ | 0 |
| $u = 0.191587 + 0.617127I$<br>$a = 0.101658 + 0.329832I$<br>$b = 0.672867 + 0.737268I$ | $-0.45055 - 2.11746I$ | 0 |
| $u = 0.191587 - 0.617127I$<br>$a = 0.101658 - 0.329832I$<br>$b = 0.672867 - 0.737268I$ | $-0.45055 + 2.11746I$ | 0 |
| $u = -0.613506 + 0.160444I$<br>$a = 2.25997 - 1.62041I$<br>$b = 0.279292 + 1.040840I$ | $4.90559 - 5.35572I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.613506-0.160444I$<br>$a=\ \ 2.25997+1.62041I$<br>$b=\ \ 0.279292-1.040840I$ | $4.90559+5.35572I$ | 0 |
| $u=\ \ 1.203950+0.660215I$<br>$a=-0.745928-0.723015I$<br>$b=-0.00968+1.43454I$ | $7.58653+5.39209I$ | 0 |
| $u=\ \ 1.203950-0.660215I$<br>$a=-0.745928+0.723015I$<br>$b=-0.00968-1.43454I$ | $7.58653-5.39209I$ | 0 |
| $u=\ \ 0.490712+0.387798I$<br>$a=-2.16357-0.31721I$<br>$b=-0.375975+1.052690I$ | $5.44213-0.03382I$ | 0 |
| $u=\ \ 0.490712-0.387798I$<br>$a=-2.16357+0.31721I$<br>$b=-0.375975-1.052690I$ | $5.44213+0.03382I$ | 0 |
| $u=\ \ 1.357970+0.228240I$<br>$a=-0.86803-1.16168I$<br>$b=-0.464668+0.714373I$ | $9.47773+3.90174I$ | 0 |
| $u=\ \ 1.357970-0.228240I$<br>$a=-0.86803+1.16168I$<br>$b=-0.464668-0.714373I$ | $9.47773-3.90174I$ | 0 |
| $u=-1.233930+0.612559I$<br>$a=\ \ 0.724861-0.761909I$<br>$b=-0.04560+1.42053I$ | $7.75639+0.46178I$ | 0 |
| $u=-1.233930-0.612559I$<br>$a=\ \ 0.724861+0.761909I$<br>$b=-0.04560-1.42053I$ | $7.75639-0.46178I$ | 0 |
| $u=\ \ 0.301429+0.533894I$<br>$a=-1.61041+0.52167I$<br>$b=-0.492614+1.036000I$ | $5.43794-0.01836I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.301429 - 0.533894I$<br>$a = -1.61041 - 0.52167I$<br>$b = -0.492614 - 1.036000I$ | $5.43794 + 0.01836I$ | 0 |
| $u = -1.368160 + 0.264330I$<br>$a = 0.89128 - 1.16431I$<br>$b = 0.447629 + 0.689937I$ | $8.79024 - 9.85441I$ | 0 |
| $u = -1.368160 - 0.264330I$<br>$a = 0.89128 + 1.16431I$<br>$b = 0.447629 - 0.689937I$ | $8.79024 + 9.85441I$ | 0 |
| $u = 0.437196 + 0.391752I$<br>$a = 0.663003 - 0.816916I$<br>$b = -1.210100 + 0.087442I$ | $-3.16416 + 4.90372I$ | 0 |
| $u = 0.437196 - 0.391752I$<br>$a = 0.663003 + 0.816916I$<br>$b = -1.210100 - 0.087442I$ | $-3.16416 - 4.90372I$ | 0 |
| $u = -1.30203 + 0.55210I$<br>$a = -0.15605 + 1.61693I$<br>$b = -0.92472 - 1.41818I$ | $1.24569 - 13.83460I$ | 0 |
| $u = -1.30203 - 0.55210I$<br>$a = -0.15605 - 1.61693I$<br>$b = -0.92472 + 1.41818I$ | $1.24569 + 13.83460I$ | 0 |
| $u = -0.61855 + 1.28211I$<br>$a = -0.101123 - 0.114471I$<br>$b = -0.222248 - 0.640083I$ | $4.37644 - 2.16011I$ | 0 |
| $u = -0.61855 - 1.28211I$<br>$a = -0.101123 + 0.114471I$<br>$b = -0.222248 + 0.640083I$ | $4.37644 + 2.16011I$ | 0 |
| $u = 1.34492 + 0.47852I$<br>$a = 0.02791 + 1.56345I$<br>$b = 0.93297 - 1.44945I$ | $5.41844 + 10.16540I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.34492 - 0.47852I$<br>$a = 0.02791 - 1.56345I$<br>$b = 0.93297 + 1.44945I$ | $5.41844 - 10.16540I$ | 0 |
| $u = -1.42284 + 0.23028I$<br>$a = 0.291449 + 1.339720I$<br>$b = -0.89665 - 1.44570I$ | $10.57850 - 0.33416I$ | 0 |
| $u = -1.42284 - 0.23028I$<br>$a = 0.291449 - 1.339720I$<br>$b = -0.89665 + 1.44570I$ | $10.57850 + 0.33416I$ | 0 |
| $u = 0.047425 + 0.556371I$<br>$a = 0.255862 - 0.555739I$<br>$b = 0.850477 + 0.314286I$ | $-1.43480 - 1.49531I$ | 0 |
| $u = 0.047425 - 0.556371I$<br>$a = 0.255862 + 0.555739I$<br>$b = 0.850477 - 0.314286I$ | $-1.43480 + 1.49531I$ | 0 |
| $u = -1.31100 + 0.61553I$<br>$a = 0.28226 - 1.39388I$<br>$b = 0.537453 + 1.075340I$ | $0.13796 - 6.15807I$ | 0 |
| $u = -1.31100 - 0.61553I$<br>$a = 0.28226 + 1.39388I$<br>$b = 0.537453 - 1.075340I$ | $0.13796 + 6.15807I$ | 0 |
| $u = 1.43002 + 0.28690I$<br>$a = -0.223499 + 1.373720I$<br>$b = 0.91428 - 1.46247I$ | $11.09130 + 6.81403I$ | 0 |
| $u = 1.43002 - 0.28690I$<br>$a = -0.223499 - 1.373720I$<br>$b = 0.91428 + 1.46247I$ | $11.09130 - 6.81403I$ | 0 |
| $u = -1.37214 + 0.63105I$<br>$a = -0.24208 + 1.48481I$<br>$b = -0.97101 - 1.40205I$ | $8.1389 - 20.1404I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.37214-0.63105I$<br>$a=-0.24208-1.48481I$<br>$b=-0.97101+1.40205I$ | $8.1389+20.1404I$ | 0 |
| $u=1.38495+0.60554I$<br>$a=0.20405+1.47787I$<br>$b=0.96857-1.41499I$ | $9.1687+13.9281I$ | 0 |
| $u=1.38495-0.60554I$<br>$a=0.20405-1.47787I$<br>$b=0.96857+1.41499I$ | $9.1687-13.9281I$ | 0 |
| $u=-0.03170+1.51306I$<br>$a=-0.001362-0.295086I$<br>$b=-0.031985+0.769642I$ | $0.11829+2.78143I$ | 0 |
| $u=-0.03170-1.51306I$<br>$a=-0.001362+0.295086I$<br>$b=-0.031985-0.769642I$ | $0.11829-2.78143I$ | 0 |
| $u=1.46143+0.47637I$<br>$a=-0.154078+0.631352I$<br>$b=0.818001-0.643538I$ | $-0.35703+5.04445I$ | 0 |
| $u=1.46143-0.47637I$<br>$a=-0.154078-0.631352I$<br>$b=0.818001+0.643538I$ | $-0.35703-5.04445I$ | 0 |
| $u=-0.243160+0.377967I$<br>$a=1.53210+0.53906I$<br>$b=-0.465241+0.841200I$ | $1.49965-0.50922I$ | $6.99226+0.92477I$ |
| $u=-0.243160-0.377967I$<br>$a=1.53210-0.53906I$<br>$b=-0.465241-0.841200I$ | $1.49965+0.50922I$ | $6.99226-0.92477I$ |
| $u=0.024281+0.445046I$<br>$a=-0.762843-0.718866I$<br>$b=0.880437-0.606000I$ | $-2.17802+1.98571I$ | $-4.36249-3.00195I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.024281 - 0.445046I$<br>$a = -0.762843 + 0.718866I$<br>$b = 0.880437 + 0.606000I$ | $-2.17802 - 1.98571I$ | $-4.36249 + 3.00195I$ |
| $u = 1.41404 + 0.67758I$<br>$a = 0.130727 + 0.814415I$<br>$b = 0.769118 - 0.915190I$ | $6.87921 + 11.83050I$ | 0 |
| $u = 1.41404 - 0.67758I$<br>$a = 0.130727 - 0.814415I$<br>$b = 0.769118 + 0.915190I$ | $6.87921 - 11.83050I$ | 0 |
| $u = -1.44600 + 0.65448I$<br>$a = -0.128289 + 0.769507I$<br>$b = -0.725175 - 0.896250I$ | $7.95815 - 5.54333I$ | 0 |
| $u = -1.44600 - 0.65448I$<br>$a = -0.128289 - 0.769507I$<br>$b = -0.725175 + 0.896250I$ | $7.95815 + 5.54333I$ | 0 |
| $u = -1.46513 + 0.61925I$<br>$a = -0.239922 + 0.449501I$<br>$b = -0.429699 - 0.661287I$ | $4.62626 - 1.11864I$ | 0 |
| $u = -1.46513 - 0.61925I$<br>$a = -0.239922 - 0.449501I$<br>$b = -0.429699 + 0.661287I$ | $4.62626 + 1.11864I$ | 0 |
| $u = 0.340188 + 0.214103I$<br>$a = -1.03813 + 4.69804I$<br>$b = 0.731479 - 0.775424I$ | $3.10168 - 8.29589I$ | $1.49522 + 2.45881I$ |
| $u = 0.340188 - 0.214103I$<br>$a = -1.03813 - 4.69804I$<br>$b = 0.731479 + 0.775424I$ | $3.10168 + 8.29589I$ | $1.49522 - 2.45881I$ |
| $u = 0.57478 + 1.49360I$<br>$a = 0.0931614 - 0.0896343I$<br>$b = 0.047867 - 0.581698I$ | $3.28514 - 4.19483I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.57478 - 1.49360I$<br>$a = 0.0931614 + 0.0896343I$<br>$b = 0.047867 + 0.581698I$ | $3.28514 + 4.19483I$ | 0 |
| $u = 1.51732 + 0.51589I$<br>$a = -0.108884 - 1.240360I$<br>$b = -0.470351 + 1.120550I$ | $5.62558 + 4.28163I$ | 0 |
| $u = 1.51732 - 0.51589I$<br>$a = -0.108884 + 1.240360I$<br>$b = -0.470351 - 1.120550I$ | $5.62558 - 4.28163I$ | 0 |
| $u = -1.50946 + 0.57392I$<br>$a = 0.160342 - 1.234390I$<br>$b = 0.496554 + 1.125960I$ | $5.25304 - 10.02420I$ | 0 |
| $u = -1.50946 - 0.57392I$<br>$a = 0.160342 + 1.234390I$<br>$b = 0.496554 - 1.125960I$ | $5.25304 + 10.02420I$ | 0 |
| $u = -1.59471 + 0.36275I$<br>$a = -0.359951 + 0.775548I$<br>$b = -0.189647 - 1.003210I$ | $10.87520 + 1.09690I$ | 0 |
| $u = -1.59471 - 0.36275I$<br>$a = -0.359951 - 0.775548I$<br>$b = -0.189647 + 1.003210I$ | $10.87520 - 1.09690I$ | 0 |
| $u = 1.60959 + 0.30739I$<br>$a = 0.359251 + 0.813293I$<br>$b = 0.136675 - 1.025940I$ | $10.42140 - 7.33115I$ | 0 |
| $u = 1.60959 - 0.30739I$<br>$a = 0.359251 - 0.813293I$<br>$b = 0.136675 + 1.025940I$ | $10.42140 + 7.33115I$ | 0 |
| $u = -0.321499 + 0.116471I$<br>$a = 2.51073 + 4.69380I$<br>$b = -0.677777 - 0.809393I$ | $4.04032 + 2.46988I$ | $3.68254 + 2.40878I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.321499-0.116471I$ | | |
| $a=\ \ 2.51073-4.69380I$ | $4.04032-2.46988I$ | $3.68254-2.40878I$ |
| $b=-0.677777+0.809393I$ | | |

**II.** $\boldsymbol{I_2^u = \langle -u^{37} - u^{36} + \cdots + b - 1,\ 7.00 \times 10^9 u^{38} + 2.53 \times 10^9 u^{37} + \cdots + 2.89 \times 10^5 a - 1.10 \times 10^{10},\ u^{39} + u^{38} + \cdots - u - 1\rangle}$

**(i) Arc colorings**

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

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

$$a_4 = \begin{pmatrix} -24238.6u^{38} - 8770.55u^{37} + \cdots - 22161.5u + 38203.8 \\ u^{37} + u^{36} + \cdots + 2u + 1 \end{pmatrix}$$

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

$$a_5 = \begin{pmatrix} -14370.0u^{38} - 5217.57u^{37} + \cdots - 13393.0u + 22734.8 \\ -4067.85u^{38} - 1474.55u^{37} + \cdots - 3550.98u + 6316.63 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} -14370.0u^{38} - 5217.57u^{37} + \cdots - 13392.0u + 22734.8 \\ -9868.61u^{38} - 3551.98u^{37} + \cdots - 8767.55u + 15470.0 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -26188.7u^{38} - 9336.96u^{37} + \cdots - 23302.2u + 41091.3 \\ -12u^{38} - 12u^{37} + \cdots - 14u^2 - 13u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 2439.39u^{38} + 1310.09u^{37} + \cdots + 3404.73u - 3497.87 \\ 13030.6u^{38} + 4290.32u^{37} + \cdots + 10563.5u - 20758.7 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 9119.20u^{38} + 2918.57u^{37} + \cdots + 7220.32u - 14340.2 \\ -20883.9u^{38} - 7173.04u^{37} + \cdots - 17870.9u + 32940.0 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 13136.7u^{38} + 3823.66u^{37} + \cdots + 8670.64u - 20781.4 \\ -14107.9u^{38} - 4977.64u^{37} + \cdots - 13710.4u + 22252.6 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -6623.13u^{38} - 2361.39u^{37} + \cdots - 6363.83u + 11133.2 \\ -4052.45u^{38} - 1454.40u^{37} + \cdots - 3812.80u + 6842.79 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= \frac{34885289890}{288793}u^{38} + \frac{12852539843}{288793}u^{37} + \cdots + \frac{31470072458}{288793}u - \frac{53859849288}{288793}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_7$ | $u^{39} - 15u^{38} + \cdots - 10u + 1$ |
| $c_2$ | $u^{39} - u^{38} + \cdots - 4u + 1$ |
| $c_3$ | $u^{39} + 13u^{38} + \cdots - u + 1$ |
| $c_4$ | $u^{39} + 2u^{37} + \cdots + 39u^3 + 1$ |
| $c_5$ | $u^{39} + u^{38} + \cdots - 5u - 1$ |
| $c_6$ | $u^{39} - u^{38} + \cdots - u + 1$ |
| $c_8$ | $u^{39} + u^{38} + \cdots - 4u - 1$ |
| $c_9$ | $u^{39} - u^{37} + \cdots + 11u^2 - 1$ |
| $c_{10}$ | $u^{39} - 6u^{37} + \cdots - 11u^2 - 1$ |
| $c_{11}$ | $u^{39} + u^{38} + \cdots - u - 1$ |
| $c_{12}$ | $u^{39} + 6u^{38} + \cdots - 4u^2 + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_7$ | $y^{39} + 27y^{38} + \cdots - 66y - 1$ |
| $c_2, c_8$ | $y^{39} + 15y^{38} + \cdots - 10y - 1$ |
| $c_3$ | $y^{39} - 5y^{38} + \cdots + 63y - 1$ |
| $c_4$ | $y^{39} + 4y^{38} + \cdots + 24y^2 - 1$ |
| $c_5$ | $y^{39} + 19y^{38} + \cdots + 5y - 1$ |
| $c_6, c_{11}$ | $y^{39} - 19y^{38} + \cdots + 37y - 1$ |
| $c_9$ | $y^{39} - 2y^{38} + \cdots + 22y - 1$ |
| $c_{10}$ | $y^{39} - 12y^{38} + \cdots - 22y - 1$ |
| $c_{12}$ | $y^{39} + 2y^{38} + \cdots + 8y - 1$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.004560 + 0.400961I$<br>$a = -0.91036 - 1.19285I$<br>$b = -0.254020 + 1.294820I$ | $3.56096 + 1.76607I$ | 0 |
| $u = 1.004560 - 0.400961I$<br>$a = -0.91036 + 1.19285I$<br>$b = -0.254020 - 1.294820I$ | $3.56096 - 1.76607I$ | 0 |
| $u = 0.803657$<br>$a = -2.62415$<br>$b = 2.26935$ | 0.885543 | $-10.7800$ |
| $u = 1.147670 + 0.403289I$<br>$a = -0.01331 - 1.78773I$<br>$b = -0.625178 + 1.135460I$ | $0.85079 + 3.93164I$ | 0 |
| $u = 1.147670 - 0.403289I$<br>$a = -0.01331 + 1.78773I$<br>$b = -0.625178 - 1.135460I$ | $0.85079 - 3.93164I$ | 0 |
| $u = -0.768221 + 0.014874I$<br>$a = 1.64479 + 0.16043I$<br>$b = -1.86563 + 0.14025I$ | $-2.77504 + 4.02177I$ | $-4.54164 + 0.79272I$ |
| $u = -0.768221 - 0.014874I$<br>$a = 1.64479 - 0.16043I$<br>$b = -1.86563 - 0.14025I$ | $-2.77504 - 4.02177I$ | $-4.54164 - 0.79272I$ |
| $u = 1.123000 + 0.526240I$<br>$a = -0.33470 - 1.85086I$<br>$b = -0.432453 + 0.955921I$ | $3.31356 + 8.08716I$ | 0 |
| $u = 1.123000 - 0.526240I$<br>$a = -0.33470 + 1.85086I$<br>$b = -0.432453 - 0.955921I$ | $3.31356 - 8.08716I$ | 0 |
| $u = 0.926441 + 0.863271I$<br>$a = -0.595021 - 0.004595I$<br>$b = -0.167146 + 0.671875I$ | $4.45396 + 1.74718I$ | 0 |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.926441 - 0.863271I$<br>$a = -0.595021 + 0.004595I$<br>$b = -0.167146 - 0.671875I$ | $4.45396 - 1.74718I$ | 0 |
| $u = 0.002534 + 1.273350I$<br>$a = -0.054883 - 0.573523I$<br>$b = -0.000229 + 0.485748I$ | $-0.52823 - 2.66079I$ | 0 |
| $u = 0.002534 - 1.273350I$<br>$a = -0.054883 + 0.573523I$<br>$b = -0.000229 - 0.485748I$ | $-0.52823 + 2.66079I$ | 0 |
| $u = -0.027348 + 1.276510I$<br>$a = -0.160775 - 0.251169I$<br>$b = 0.002492 + 0.485534I$ | $-3.58357 + 0.62486I$ | 0 |
| $u = -0.027348 - 1.276510I$<br>$a = -0.160775 + 0.251169I$<br>$b = 0.002492 - 0.485534I$ | $-3.58357 - 0.62486I$ | 0 |
| $u = -1.166290 + 0.539397I$<br>$a = 0.36920 - 1.76074I$<br>$b = 0.478303 + 0.900623I$ | $3.54436 - 2.93705I$ | 0 |
| $u = -1.166290 - 0.539397I$<br>$a = 0.36920 + 1.76074I$<br>$b = 0.478303 - 0.900623I$ | $3.54436 + 2.93705I$ | 0 |
| $u = 0.669109 + 0.177926I$<br>$a = -2.44855 - 2.08941I$<br>$b = 0.875959 + 0.661864I$ | $4.48568 + 3.02129I$ | $10.78011 - 6.15555I$ |
| $u = 0.669109 - 0.177926I$<br>$a = -2.44855 + 2.08941I$<br>$b = 0.875959 - 0.661864I$ | $4.48568 - 3.02129I$ | $10.78011 + 6.15555I$ |
| $u = 0.682451 + 0.105656I$<br>$a = 0.242326 - 0.211572I$<br>$b = 1.121600 + 0.490267I$ | $-1.51915 - 1.59157I$ | $5.80671 - 3.27929I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.682451 - 0.105656I$<br>$a = 0.242326 + 0.211572I$<br>$b = 1.121600 - 0.490267I$ | $-1.51915 + 1.59157I$ | $5.80671 + 3.27929I$ |
| $u = -1.241590 + 0.454156I$<br>$a = 0.21383 - 1.53607I$<br>$b = 0.670744 + 0.901521I$ | $1.13677 - 6.00123I$ | 0 |
| $u = -1.241590 - 0.454156I$<br>$a = 0.21383 + 1.53607I$<br>$b = 0.670744 - 0.901521I$ | $1.13677 + 6.00123I$ | 0 |
| $u = -0.623710 + 0.151678I$<br>$a = 2.38554 - 2.60157I$<br>$b = -0.837767 + 0.489263I$ | $3.62339 - 8.83511I$ | $9.09297 + 9.73420I$ |
| $u = -0.623710 - 0.151678I$<br>$a = 2.38554 + 2.60157I$<br>$b = -0.837767 - 0.489263I$ | $3.62339 + 8.83511I$ | $9.09297 - 9.73420I$ |
| $u = -0.636375 + 0.007188I$<br>$a = 0.13060 + 1.68704I$<br>$b = -1.068960 + 0.028513I$ | $-2.20327 + 3.88401I$ | $-0.89172 - 8.12719I$ |
| $u = -0.636375 - 0.007188I$<br>$a = 0.13060 - 1.68704I$<br>$b = -1.068960 - 0.028513I$ | $-2.20327 - 3.88401I$ | $-0.89172 + 8.12719I$ |
| $u = 1.332220 + 0.307011I$<br>$a = -0.066657 - 1.057700I$<br>$b = -1.022510 + 0.777923I$ | $8.29603 + 3.46418I$ | 0 |
| $u = 1.332220 - 0.307011I$<br>$a = -0.066657 + 1.057700I$<br>$b = -1.022510 - 0.777923I$ | $8.29603 - 3.46418I$ | 0 |
| $u = -0.630757 + 1.225160I$<br>$a = 0.154796 + 0.277565I$<br>$b = 0.083231 + 0.521368I$ | $3.10502 + 4.21874I$ | 0 |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.630757-1.225160I$<br>$a=\ \ 0.154796-0.277565I$<br>$b=\ \ 0.083231-0.521368I$ | $3.10502-4.21874I$ | 0 |
| $u=-1.351890+0.339088I$<br>$a=\ \ 0.155826-1.089140I$<br>$b=\ \ 0.945031+0.739987I$ | $7.70291-9.58771I$ | 0 |
| $u=-1.351890-0.339088I$<br>$a=\ \ 0.155826+1.089140I$<br>$b=\ \ 0.945031-0.739987I$ | $7.70291+9.58771I$ | 0 |
| $u=\ \ 0.593961+0.114993I$<br>$a=\ \ 1.86649+0.22845I$<br>$b=\ \ 0.827916+0.345362I$ | $0.46507-4.90237I$ | $-1.01936+5.02583I$ |
| $u=\ \ 0.593961-0.114993I$<br>$a=\ \ 1.86649-0.22845I$<br>$b=\ \ 0.827916-0.345362I$ | $0.46507+4.90237I$ | $-1.01936-5.02583I$ |
| $u=-1.357780+0.332404I$<br>$a=-0.295256-0.789703I$<br>$b=\ \ 0.957998+0.726185I$ | $-0.19285-4.82413I$ | 0 |
| $u=-1.357780-0.332404I$<br>$a=-0.295256+0.789703I$<br>$b=\ \ 0.957998-0.726185I$ | $-0.19285+4.82413I$ | 0 |
| $u=-0.579805+0.088328I$<br>$a=-1.97180+0.96089I$<br>$b=-0.824062+0.257186I$ | $0.364435-0.161337I$ | $-2.17868+0.60419I$ |
| $u=-0.579805-0.088328I$<br>$a=-1.97180-0.96089I$<br>$b=-0.824062-0.257186I$ | $0.364435+0.161337I$ | $-2.17868-0.60419I$ |

**III.**

$$\boldsymbol{I_3^u = \langle -85a^8 + 6925b + \cdots - 2531a + 6968,\ a^9 + 2a^8 + \cdots + 45a + 19,\ u + 1\rangle}$$

**(i) Arc colorings**

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

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

$$a_4 = \begin{pmatrix} a \\ 0.0122744a^8 + 0.00462094a^7 + \cdots + 0.365487a - 1.00621 \end{pmatrix}$$

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

$$a_5 = \begin{pmatrix} -0.0122744a^8 - 0.00462094a^7 + \cdots - 0.365487a + 1.00621 \\ 0.0245487a^8 + 0.00924188a^7 + \cdots + 1.73097a - 2.01242 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} -0.0122744a^8 - 0.00462094a^7 + \cdots - 0.365487a + 1.00621 \\ 0.0245487a^8 + 0.00924188a^7 + \cdots + 1.73097a - 2.01242 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.0199278a^8 - 0.00332130a^7 + \cdots + 1.55856a + 1.23321 \\ 0.0103971a^8 + 0.0382671a^7 + \cdots + 0.167942a - 1.34267 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.0257040a^8 - 0.0623827a^7 + \cdots + 0.325921a + 0.223827 \\ -0.0216606a^8 - 0.0363899a^7 + \cdots - 3.35321a - 1.47610 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.0473646a^8 - 0.0987726a^7 + \cdots - 3.02729a - 1.25227 \\ 0.170108a^8 + 0.304982a^7 + \cdots + 9.76217a + 4.55018 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 0.0122744a^8 + 0.00462094a^7 + \cdots + 1.36549a - 1.00621 \\ -0.0851986a^8 - 0.0791336a^7 + \cdots - 5.18397a + 2.23134 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0.0485199a^8 + 0.0719134a^7 + \cdots + 3.53040a + 1.76087 \\ -0.166065a^8 - 0.278989a^7 + \cdots - 10.6413a - 5.45011 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 6$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_5, c_7$ | $u^9 + 2u^8 + 3u^7 + 2u^6 - u^5 - 2u^4 - 2u^3 + u - 1$ |
| $c_2, c_8, c_{12}$ | $u^9 + u^7 + u^5 - u + 1$ |
| $c_3$ | $u^9 + 2u^8 - u^7 - 6u^6 - u^5 + 10u^4 + 6u^3 - 8u^2 + u - 1$ |
| $c_4$ | $u^9 - 2u^8 - u^7 + 6u^6 - u^5 - 10u^4 + 6u^3 + 8u^2 + u + 1$ |
| $c_6, c_{11}$ | $(u-1)^9$ |
| $c_9$ | $u^9 + u^7 + 3u^6 - u^5 + 2u^4 - 6u^3 + 15u^2 - 7u + 1$ |
| $c_{10}$ | $u^9 - 3u^7 + 4u^6 - 5u^5 + 8u^4 - 10u^3 + 4u^2 - u + 3$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_5, c_7$ | $y^9 + 2y^8 - y^7 - 6y^6 - y^5 + 10y^4 + 6y^3 - 8y^2 + y - 1$ |
| $c_2, c_8, c_{12}$ | $y^9 + 2y^8 + 3y^7 + 2y^6 - y^5 - 2y^4 - 2y^3 + y - 1$ |
| $c_3, c_4$ | $y^9 - 6y^8 + 23y^7 - 62y^6 + 143y^5 - 206y^4 + 182y^3 - 32y^2 - 15y - 1$ |
| $c_6, c_{11}$ | $(y-1)^9$ |
| $c_9$ | $y^9 + 2y^8 - y^7 - 23y^6 - 37y^5 - 96y^4 - 16y^3 - 145y^2 + 19y - 1$ |
| $c_{10}$ | $y^9 - 6y^8 - y^7 - 6y^6 + 19y^5 + 10y^4 + 22y^3 - 44y^2 - 23y - 9$ |

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

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.00000$<br>$a=-0.373506+0.408775I$<br>$b=-1.170530+0.142656I$ | 1.64493 | 6.00000 |
| $u=-1.00000$<br>$a=-0.373506-0.408775I$<br>$b=-1.170530-0.142656I$ | 1.64493 | 6.00000 |
| $u=-1.00000$<br>$a=\ \ 0.82025+1.25476I$<br>$b=-0.804581-0.921503I$ | 1.64493 | 6.00000 |
| $u=-1.00000$<br>$a=\ \ 0.82025-1.25476I$<br>$b=-0.804581+0.921503I$ | 1.64493 | 6.00000 |
| $u=-1.00000$<br>$a=-1.71880$<br>$b=\ \ 2.49568$ | 1.64493 | 6.00000 |
| $u=-1.00000$<br>$a=\ \ 0.74270+1.64110I$<br>$b=\ \ 0.439148-1.099530I$ | 1.64493 | 6.00000 |
| $u=-1.00000$<br>$a=\ \ 0.74270-1.64110I$<br>$b=\ \ 0.439148+1.099530I$ | 1.64493 | 6.00000 |
| $u=-1.00000$<br>$a=-1.33004+1.78195I$<br>$b=\ \ 0.288120-0.573655I$ | 1.64493 | 6.00000 |
| $u=-1.00000$<br>$a=-1.33004-1.78195I$<br>$b=\ \ 0.288120+0.573655I$ | 1.64493 | 6.00000 |

**IV. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_7$ | $(u^9+2u^8+3u^7+2u^6-u^5-2u^4-2u^3+u-1)$ $\cdot(u^{39}-15u^{38}+\cdots-10u+1)(u^{151}+48u^{150}+\cdots-80674u-2401)$ |
| $c_2$ | $(u^9+u^7+u^5-u+1)(u^{39}-u^{38}+\cdots-4u+1)$ $\cdot(u^{151}+24u^{149}+\cdots-426u-49)$ |
| $c_3$ | $(u^9+2u^8-u^7-6u^6-u^5+10u^4+6u^3-8u^2+u-1)$ $\cdot(u^{39}+13u^{38}+\cdots-u+1)$ $\cdot(u^{151}-14u^{150}+\cdots-257214751u-31536997)$ |
| $c_4$ | $(u^9-2u^8-u^7+6u^6-u^5-10u^4+6u^3+8u^2+u+1)$ $\cdot(u^{39}+2u^{37}+\cdots+39u^3+1)(u^{151}+5u^{150}+\cdots+966u-59)$ |
| $c_5$ | $(u^9+2u^8+\cdots+u-1)(u^{39}+u^{38}+\cdots-5u-1)$ $\cdot(u^{151}-2u^{150}+\cdots-79507801u-5859071)$ |
| $c_6$ | $((u-1)^9)(u^{39}-u^{38}+\cdots-u+1)(u^{151}+9u^{150}+\cdots-77784u-6736)$ |
| $c_8$ | $(u^9+u^7+u^5-u+1)(u^{39}+u^{38}+\cdots-4u-1)$ $\cdot(u^{151}+24u^{149}+\cdots-426u-49)$ |
| $c_9$ | $(u^9+u^7+3u^6-u^5+2u^4-6u^3+15u^2-7u+1)$ $\cdot(u^{39}-u^{37}+\cdots+11u^2-1)(u^{151}-3u^{150}+\cdots-8069u-2036)$ |
| $c_{10}$ | $(u^9-3u^7+4u^6-5u^5+8u^4-10u^3+4u^2-u+3)$ $\cdot(u^{39}-6u^{37}+\cdots-11u^2-1)(u^{151}-u^{150}+\cdots-2526120u-565463)$ |
| $c_{11}$ | $((u-1)^9)(u^{39}+u^{38}+\cdots-u-1)(u^{151}+9u^{150}+\cdots-77784u-6736)$ |
| $c_{12}$ | $(u^9+u^7+u^5-u+1)(u^{39}+6u^{38}+\cdots-4u^2+1)$ $\cdot(u^{151}-13u^{150}+\cdots+38u-1)$ |

**V. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_7$ | $(y^9+2y^8-y^7-6y^6-y^5+10y^4+6y^3-8y^2+y-1)$ $\cdot(y^{39}+27y^{38}+\cdots-66y-1)$ $\cdot(y^{151}+128y^{150}+\cdots-1298802126y-5764801)$ |
| $c_2, c_8$ | $(y^9+2y^8+3y^7+2y^6-y^5-2y^4-2y^3+y-1)$ $\cdot(y^{39}+15y^{38}+\cdots-10y-1)(y^{151}+48y^{150}+\cdots-80674y-2401)$ |
| $c_3$ | $(y^9-6y^8+23y^7-62y^6+143y^5-206y^4+182y^3-32y^2-15y-1)$ $\cdot(y^{39}-5y^{38}+\cdots+63y-1)$ $\cdot(y^{151}-60y^{150}+\cdots+55902493354214959y-994582179778009)$ |
| $c_4$ | $(y^9-6y^8+23y^7-62y^6+143y^5-206y^4+182y^3-32y^2-15y-1)$ $\cdot(y^{39}+4y^{38}+\cdots+24y^2-1)(y^{151}+17y^{150}+\cdots-183124y-3481)$ |
| $c_5$ | $(y^9+2y^8-y^7-6y^6-y^5+10y^4+6y^3-8y^2+y-1)$ $\cdot(y^{39}+19y^{38}+\cdots+5y-1)$ $\cdot(y^{151}-32y^{150}+\cdots+1942239802906837y-34328712983041)$ |
| $c_6, c_{11}$ | $((y-1)^9)(y^{39}-19y^{38}+\cdots+37y-1)$ $\cdot(y^{151}-91y^{150}+\cdots+1433388480y-45373696)$ |
| $c_9$ | $(y^9+2y^8-y^7-23y^6-37y^5-96y^4-16y^3-145y^2+19y-1)$ $\cdot(y^{39}-2y^{38}+\cdots+22y-1)$ $\cdot(y^{151}-13y^{150}+\cdots+100856849y-4145296)$ |
| $c_{10}$ | $(y^9-6y^8-y^7-6y^6+19y^5+10y^4+22y^3-44y^2-23y-9)$ $\cdot(y^{39}-12y^{38}+\cdots-22y-1)$ $\cdot(y^{151}+37y^{150}+\cdots-18861220167282y-319748404369)$ |
| $c_{12}$ | $(y^9+2y^8+3y^7+2y^6-y^5-2y^4-2y^3+y-1)$ $\cdot(y^{39}+2y^{38}+\cdots+8y-1)(y^{151}+19y^{150}+\cdots+64y-1)$ |