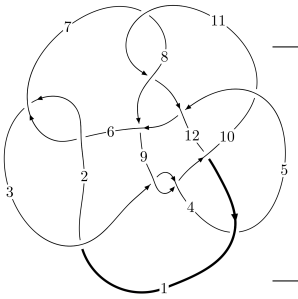
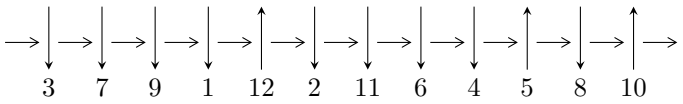
## $12a_{0618}$ $(K12a_{0618})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$\begin{aligned} I_1^u = \langle & 2.06637 \times 10^{1122} u^{171} + 5.66934 \times 10^{1121} u^{170} + \cdots + 1.53519 \times 10^{1123} b - 1.66928 \times 10^{1126}, \\ & 3.27108 \times 10^{1126} u^{171} - 1.40860 \times 10^{1126} u^{170} + \cdots + 9.43066 \times 10^{1126} a - 9.90581 \times 10^{1129}, \\ & u^{172} - u^{171} + \cdots - 565196u + 6143 \rangle \\ I_2^u = \langle & -6.20622 \times 10^{35} u^{43} + 5.45751 \times 10^{35} u^{42} + \cdots + 9.02348 \times 10^{35} b - 3.80488 \times 10^{36}, \\ & -2.88632 \times 10^{37} u^{43} + 2.61790 \times 10^{37} u^{42} + \cdots + 9.92583 \times 10^{36} a - 9.38464 \times 10^{36}, \\ & u^{44} - 20u^{42} + \cdots + 6u + 1 \rangle \end{aligned}$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 216 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.** $\boldsymbol{I_1^u = \langle 2.07 \times 10^{1122} u^{171} + 5.67 \times 10^{1121} u^{170} + \cdots + 1.54 \times 10^{1123} b - 1.67 \times 10^{1126},\ 3.27 \times 10^{1126} u^{171} - 1.41 \times 10^{1126} u^{170} + \cdots + 9.43 \times 10^{1126} a - 9.91 \times 10^{1129},\ u^{172} - u^{171} + \cdots - 565196u + 6143 \rangle}$

**(i) Arc colorings**

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

$$a_9 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -0.346856u^{171} + 0.149363u^{170} + \cdots - 98479.0u + 1050.38 \\ -0.134600u^{171} - 0.0369293u^{170} + \cdots - 99069.3u + 1087.35 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0.157037u^{171} + 0.104546u^{170} + \cdots + 117461.u - 1234.56 \\ 0.454629u^{171} + 0.0738660u^{170} + \cdots + 260835.u - 2863.48 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0.611666u^{171} + 0.178412u^{170} + \cdots + 378296.u - 4098.05 \\ 0.454629u^{171} + 0.0738660u^{170} + \cdots + 260835.u - 2863.48 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -0.606909u^{171} + 0.180406u^{170} + \cdots - 201820.u + 2162.42 \\ -0.00630853u^{171} - 0.0496697u^{170} + \cdots - 36441.4u + 399.211 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -0.140540u^{171} - 0.0387226u^{170} + \cdots - 93510.5u + 1042.83 \\ 0.690234u^{171} + 0.128825u^{170} + \cdots + 409669.u - 4493.60 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.380933u^{171} - 0.190485u^{170} + \cdots - 267616.u + 2933.23 \\ 0.0984214u^{171} + 0.0757543u^{170} + \cdots + 97871.5u - 1070.89 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 0.230346u^{171} + 0.114479u^{170} + \cdots + 157045.u - 1670.25 \\ 0.415235u^{171} + 0.0578417u^{170} + \cdots + 232774.u - 2556.09 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0.0205703u^{171} - 0.0861297u^{170} + \cdots - 13104.7u + 183.881 \\ -0.132302u^{171} + 0.0268440u^{170} + \cdots - 53696.3u + 590.151 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -2.22960u^{171} - 0.108089u^{170} + \cdots - 1.16389 \times 10^6 u + 12794.1$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{172} + 79u^{171} + \cdots + 1449530204u + 56445169$ |
| $c_2, c_6$ | $u^{172} - u^{171} + \cdots - 23706u - 7513$ |
| $c_3, c_9$ | $u^{172} - u^{171} + \cdots - 565196u + 6143$ |
| $c_4$ | $u^{172} - 10u^{171} + \cdots - 9148u + 271$ |
| $c_5$ | $u^{172} - 4u^{171} + \cdots - 11762454u - 858173$ |
| $c_7, c_{11}$ | $u^{172} + 7u^{171} + \cdots + 30336u + 1009$ |
| $c_8$ | $u^{172} - 5u^{171} + \cdots - 21167440263u + 1101672697$ |
| $c_{10}$ | $u^{172} + u^{171} + \cdots + 1522u - 41$ |
| $c_{12}$ | $u^{172} + 17u^{171} + \cdots + 493972u + 667$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{172} + 33y^{171} + \cdots - 49226118750771920y + 3186057103438561$ |
| $c_2, c_6$ | $y^{172} - 79y^{171} + \cdots - 1449530204y + 56445169$ |
| $c_3, c_9$ | $y^{172} - 127y^{171} + \cdots - 334380335706y + 37736449$ |
| $c_4$ | $y^{172} - 10y^{171} + \cdots - 2951210y + 73441$ |
| $c_5$ | $y^{172} + 46y^{171} + \cdots + 307627127926670y + 736460897929$ |
| $c_7, c_{11}$ | $y^{172} - 99y^{171} + \cdots - 261670344y + 1018081$ |
| $c_8$ | $y^{172} - 43y^{171} + \cdots - 9.57 \times 10^{19}y + 1.21 \times 10^{18}$ |
| $c_{10}$ | $y^{172} - 23y^{171} + \cdots - 3429060y + 1681$ |
| $c_{12}$ | $y^{172} + 29y^{171} + \cdots - 234106980580y + 444889$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.998590 + 0.083018I$<br>$a = -2.70315 - 1.43498I$<br>$b = -0.838096 + 0.342183I$ | $-4.01393 - 5.49936I$ | 0 |
| $u = 0.998590 - 0.083018I$<br>$a = -2.70315 + 1.43498I$<br>$b = -0.838096 - 0.342183I$ | $-4.01393 + 5.49936I$ | 0 |
| $u = -0.671216 + 0.734904I$<br>$a = -0.352902 - 0.428254I$<br>$b = 1.018330 + 0.591636I$ | $1.007700 - 0.949864I$ | 0 |
| $u = -0.671216 - 0.734904I$<br>$a = -0.352902 + 0.428254I$<br>$b = 1.018330 - 0.591636I$ | $1.007700 + 0.949864I$ | 0 |
| $u = 0.840186 + 0.514785I$<br>$a = -0.88529 + 2.30523I$<br>$b = -0.797168 - 0.308580I$ | $-3.50219 + 0.65545I$ | 0 |
| $u = 0.840186 - 0.514785I$<br>$a = -0.88529 - 2.30523I$<br>$b = -0.797168 + 0.308580I$ | $-3.50219 - 0.65545I$ | 0 |
| $u = -1.017000 + 0.033684I$<br>$a = -1.64594 + 1.48163I$<br>$b = -0.984969 - 0.459473I$ | $-1.87008 + 0.90962I$ | 0 |
| $u = -1.017000 - 0.033684I$<br>$a = -1.64594 - 1.48163I$<br>$b = -0.984969 + 0.459473I$ | $-1.87008 - 0.90962I$ | 0 |
| $u = 0.969751 + 0.311784I$<br>$a = 0.252577 + 0.225147I$<br>$b = -0.384266 - 0.700131I$ | $-0.08093 - 4.78645I$ | 0 |
| $u = 0.969751 - 0.311784I$<br>$a = 0.252577 - 0.225147I$<br>$b = -0.384266 + 0.700131I$ | $-0.08093 + 4.78645I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.902338+0.352876I$<br>$a=\ \ 0.535598+0.489012I$<br>$b=-0.273026-1.110210I$ | $-0.60716+5.91889I$ | 0 |
| $u=-0.902338-0.352876I$<br>$a=\ \ 0.535598-0.489012I$<br>$b=-0.273026+1.110210I$ | $-0.60716-5.91889I$ | 0 |
| $u=-0.958081+0.051887I$<br>$a=\ \ 0.08488-1.58109I$<br>$b=-0.941235+0.832001I$ | $0.105599+0.893550I$ | 0 |
| $u=-0.958081-0.051887I$<br>$a=\ \ 0.08488+1.58109I$<br>$b=-0.941235-0.832001I$ | $0.105599-0.893550I$ | 0 |
| $u=\ \ 1.05279$<br>$a=\ \ 0.463582$<br>$b=\ \ 1.78832$ | $-7.87076$ | 0 |
| $u=-0.907574+0.268502I$<br>$a=-0.207023+0.209027I$<br>$b=\ \ 0.685759+0.628492I$ | $-0.314311+0.258798I$ | 0 |
| $u=-0.907574-0.268502I$<br>$a=-0.207023-0.209027I$<br>$b=\ \ 0.685759-0.628492I$ | $-0.314311-0.258798I$ | 0 |
| $u=-1.056610+0.006391I$<br>$a=-0.710384+0.337117I$<br>$b=\ \ 0.479639-0.683385I$ | $-2.04073-0.45074I$ | 0 |
| $u=-1.056610-0.006391I$<br>$a=-0.710384-0.337117I$<br>$b=\ \ 0.479639+0.683385I$ | $-2.04073+0.45074I$ | 0 |
| $u=-0.616429+0.862114I$<br>$a=\ \ 0.773597+0.398347I$<br>$b=-0.997849-0.055178I$ | $-5.16587+7.46097I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.616429-0.862114I$<br>$a=\ \ 0.773597-0.398347I$<br>$b=-0.997849+0.055178I$ | $-5.16587-7.46097I$ | 0 |
| $u=-1.057080+0.114780I$<br>$a=\ \ 1.158650+0.468383I$<br>$b=\ \ 0.941807-0.404110I$ | $-0.826616+0.812580I$ | 0 |
| $u=-1.057080-0.114780I$<br>$a=\ \ 1.158650-0.468383I$<br>$b=\ \ 0.941807+0.404110I$ | $-0.826616-0.812580I$ | 0 |
| $u=\ \ 0.758962+0.537007I$<br>$a=\ \ 0.638146-0.538369I$<br>$b=-0.360538+0.711399I$ | $2.49080-1.08580I$ | 0 |
| $u=\ \ 0.758962-0.537007I$<br>$a=\ \ 0.638146+0.538369I$<br>$b=-0.360538-0.711399I$ | $2.49080+1.08580I$ | 0 |
| $u=\ \ 0.918625+0.567748I$<br>$a=-0.359273-0.525823I$<br>$b=\ \ 0.865900-0.398912I$ | $-0.57933+2.45902I$ | 0 |
| $u=\ \ 0.918625-0.567748I$<br>$a=-0.359273+0.525823I$<br>$b=\ \ 0.865900+0.398912I$ | $-0.57933-2.45902I$ | 0 |
| $u=\ \ 1.080630+0.095630I$<br>$a=-0.857223+0.793288I$<br>$b=-1.43812-0.46639I$ | $-7.17053-0.75192I$ | 0 |
| $u=\ \ 1.080630-0.095630I$<br>$a=-0.857223-0.793288I$<br>$b=-1.43812+0.46639I$ | $-7.17053+0.75192I$ | 0 |
| $u=\ \ 0.899924+0.111700I$<br>$a=\ \ 0.808056+0.990079I$<br>$b=-0.815202-0.803021I$ | $0.45794-5.21108I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.899924 - 0.111700I$<br>$a = 0.808056 - 0.990079I$<br>$b = -0.815202 + 0.803021I$ | $0.45794 + 5.21108I$ | 0 |
| $u = -0.023761 + 1.095910I$<br>$a = -0.13852 + 1.48753I$<br>$b = 0.534497 - 0.796796I$ | $0.23858 - 8.55795I$ | 0 |
| $u = -0.023761 - 1.095910I$<br>$a = -0.13852 - 1.48753I$<br>$b = 0.534497 + 0.796796I$ | $0.23858 + 8.55795I$ | 0 |
| $u = -0.350017 + 0.831037I$<br>$a = 1.00244 - 1.73243I$<br>$b = -0.834234 + 0.742856I$ | $1.071920 + 0.352220I$ | 0 |
| $u = -0.350017 - 0.831037I$<br>$a = 1.00244 + 1.73243I$<br>$b = -0.834234 - 0.742856I$ | $1.071920 - 0.352220I$ | 0 |
| $u = -1.090900 + 0.139400I$<br>$a = 0.016464 - 0.677979I$<br>$b = -0.55127 + 1.34233I$ | $-3.24330 + 6.85137I$ | 0 |
| $u = -1.090900 - 0.139400I$<br>$a = 0.016464 + 0.677979I$<br>$b = -0.55127 - 1.34233I$ | $-3.24330 - 6.85137I$ | 0 |
| $u = 1.102380 + 0.019608I$<br>$a = -1.170270 + 0.218937I$<br>$b = 0.413295 - 0.730782I$ | $-4.70366 - 4.85783I$ | 0 |
| $u = 1.102380 - 0.019608I$<br>$a = -1.170270 - 0.218937I$<br>$b = 0.413295 + 0.730782I$ | $-4.70366 + 4.85783I$ | 0 |
| $u = -0.972081 + 0.541376I$<br>$a = -0.66541 - 1.60487I$<br>$b = -1.154500 + 0.536515I$ | $0.10544 + 5.89897I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.972081-0.541376I$<br>$a=-0.66541+1.60487I$<br>$b=-1.154500-0.536515I$ | $0.10544-5.89897I$ | 0 |
| $u=0.851388+0.721308I$<br>$a=0.210838-1.081940I$<br>$b=0.575580+0.629970I$ | $2.34860-3.86760I$ | 0 |
| $u=0.851388-0.721308I$<br>$a=0.210838+1.081940I$<br>$b=0.575580-0.629970I$ | $2.34860+3.86760I$ | 0 |
| $u=0.355867+0.805051I$<br>$a=-0.767638+0.555425I$<br>$b=1.071560-0.641416I$ | $-1.21606+7.47943I$ | 0 |
| $u=0.355867-0.805051I$<br>$a=-0.767638-0.555425I$<br>$b=1.071560+0.641416I$ | $-1.21606-7.47943I$ | 0 |
| $u=-1.122630+0.179327I$<br>$a=0.90061+2.22103I$<br>$b=1.104150-0.601771I$ | $-6.71802+9.97895I$ | 0 |
| $u=-1.122630-0.179327I$<br>$a=0.90061-2.22103I$<br>$b=1.104150+0.601771I$ | $-6.71802-9.97895I$ | 0 |
| $u=1.135510+0.072608I$<br>$a=-0.706587-1.095310I$<br>$b=0.474319+0.587346I$ | $-5.57452-2.69571I$ | 0 |
| $u=1.135510-0.072608I$<br>$a=-0.706587+1.095310I$<br>$b=0.474319-0.587346I$ | $-5.57452+2.69571I$ | 0 |
| $u=1.128100+0.150398I$<br>$a=1.15262-0.98837I$<br>$b=0.966602+0.612007I$ | $-1.17125-5.16205I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.128100 - 0.150398I$<br>$a = 1.15262 + 0.98837I$<br>$b = 0.966602 - 0.612007I$ | $-1.17125 + 5.16205I$ | 0 |
| $u = -0.042131 + 0.860814I$<br>$a = 0.44215 - 1.48535I$<br>$b = -0.931653 + 0.700856I$ | $2.93049 + 3.20631I$ | 0 |
| $u = -0.042131 - 0.860814I$<br>$a = 0.44215 + 1.48535I$<br>$b = -0.931653 - 0.700856I$ | $2.93049 - 3.20631I$ | 0 |
| $u = 0.384843 + 0.770500I$<br>$a = 1.24256 + 1.42581I$<br>$b = -0.932114 - 0.593403I$ | $0.75465 - 1.94944I$ | 0 |
| $u = 0.384843 - 0.770500I$<br>$a = 1.24256 - 1.42581I$<br>$b = -0.932114 + 0.593403I$ | $0.75465 + 1.94944I$ | 0 |
| $u = 1.145900 + 0.180926I$<br>$a = 0.73810 - 1.83195I$<br>$b = 1.041890 + 0.599815I$ | $-3.64420 - 5.41523I$ | 0 |
| $u = 1.145900 - 0.180926I$<br>$a = 0.73810 + 1.83195I$<br>$b = 1.041890 - 0.599815I$ | $-3.64420 + 5.41523I$ | 0 |
| $u = -1.149230 + 0.230360I$<br>$a = 0.18034 + 1.95929I$<br>$b = 1.022580 - 0.483336I$ | $-7.21720 + 1.49192I$ | 0 |
| $u = -1.149230 - 0.230360I$<br>$a = 0.18034 - 1.95929I$<br>$b = 1.022580 + 0.483336I$ | $-7.21720 - 1.49192I$ | 0 |
| $u = -0.151449 + 0.803928I$<br>$a = 0.42985 - 1.47905I$<br>$b = -0.753373 + 0.771225I$ | $3.47545 + 2.34473I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.151449-0.803928I$<br>$a=\ \ 0.42985+1.47905I$<br>$b=-0.753373-0.771225I$ | $3.47545-2.34473I$ | 0 |
| $u=\ \ 0.327063+0.746465I$<br>$a=\ \ 0.64210-2.14956I$<br>$b=-0.890841+0.744951I$ | $0.91188+5.28410I$ | 0 |
| $u=\ \ 0.327063-0.746465I$<br>$a=\ \ 0.64210+2.14956I$<br>$b=-0.890841-0.744951I$ | $0.91188-5.28410I$ | 0 |
| $u=-0.542555+0.601420I$<br>$a=\ \ 0.601527+1.247000I$<br>$b=\ \ 0.534772-0.819837I$ | $0.41977-2.01791I$ | 0 |
| $u=-0.542555-0.601420I$<br>$a=\ \ 0.601527-1.247000I$<br>$b=\ \ 0.534772+0.819837I$ | $0.41977+2.01791I$ | 0 |
| $u=\ \ 0.114065+1.190940I$<br>$a=-0.115655-1.272080I$<br>$b=\ \ 0.614371+0.627266I$ | $3.11305+2.49566I$ | 0 |
| $u=\ \ 0.114065-1.190940I$<br>$a=-0.115655+1.272080I$<br>$b=\ \ 0.614371-0.627266I$ | $3.11305-2.49566I$ | 0 |
| $u=\ \ 0.801618$<br>$a=-1.81982$<br>$b=-1.50325$ | $-7.00476$ | 0 |
| $u=\ \ 1.148720+0.345750I$<br>$a=-0.261247+0.324088I$<br>$b=\ \ 0.169590-0.985522I$ | $0.10710-5.28156I$ | 0 |
| $u=\ \ 1.148720-0.345750I$<br>$a=-0.261247-0.324088I$<br>$b=\ \ 0.169590+0.985522I$ | $0.10710+5.28156I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.108760 + 0.472888I$<br>$a = -0.58310 + 1.42647I$<br>$b = -1.239820 - 0.677361I$ | $-3.52735 - 12.20950I$ | 0 |
| $u = 1.108760 - 0.472888I$<br>$a = -0.58310 - 1.42647I$<br>$b = -1.239820 + 0.677361I$ | $-3.52735 + 12.20950I$ | 0 |
| $u = 1.20705$<br>$a = -1.32736$<br>$b = -1.27163$ | $-6.35449$ | 0 |
| $u = 1.103180 + 0.502200I$<br>$a = -0.991477 - 0.358403I$<br>$b = 0.793961 - 0.400031I$ | $-1.44409 - 2.82165I$ | 0 |
| $u = 1.103180 - 0.502200I$<br>$a = -0.991477 + 0.358403I$<br>$b = 0.793961 + 0.400031I$ | $-1.44409 + 2.82165I$ | 0 |
| $u = 0.109090 + 0.772843I$<br>$a = 0.419557 + 1.171380I$<br>$b = -1.037470 - 0.634989I$ | $1.59568 - 6.71993I$ | 0 |
| $u = 0.109090 - 0.772843I$<br>$a = 0.419557 - 1.171380I$<br>$b = -1.037470 + 0.634989I$ | $1.59568 + 6.71993I$ | 0 |
| $u = -1.22022$<br>$a = -0.671099$<br>$b = -1.60020$ | $-6.41930$ | 0 |
| $u = -0.042478 + 0.753549I$<br>$a = 0.70835 + 1.40352I$<br>$b = -0.034371 - 0.482778I$ | $-2.58094 + 0.53449I$ | 0 |
| $u = -0.042478 - 0.753549I$<br>$a = 0.70835 - 1.40352I$<br>$b = -0.034371 + 0.482778I$ | $-2.58094 - 0.53449I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.512305+1.144340I$<br>$a=\ \ 0.786948+1.054200I$<br>$b=-1.011110-0.473275I$ | $-4.67500-3.97099I$ | 0 |
| $u=-0.512305-1.144340I$<br>$a=\ \ 0.786948-1.054200I$<br>$b=-1.011110+0.473275I$ | $-4.67500+3.97099I$ | 0 |
| $u=-1.148210+0.531016I$<br>$a=-1.041120-0.136801I$<br>$b=\ \ 0.755046+0.678130I$ | $-1.41753+4.72367I$ | 0 |
| $u=-1.148210-0.531016I$<br>$a=-1.041120+0.136801I$<br>$b=\ \ 0.755046-0.678130I$ | $-1.41753-4.72367I$ | 0 |
| $u=-1.202760+0.410604I$<br>$a=-0.448550-0.278364I$<br>$b=\ \ 0.522545+0.870296I$ | $0.21839+2.08193I$ | 0 |
| $u=-1.202760-0.410604I$<br>$a=-0.448550+0.278364I$<br>$b=\ \ 0.522545-0.870296I$ | $0.21839-2.08193I$ | 0 |
| $u=\ \ 1.261080+0.163710I$<br>$a=\ \ 0.217143-1.081370I$<br>$b=\ \ 0.937483+0.914940I$ | $-4.24744-3.11310I$ | 0 |
| $u=\ \ 1.261080-0.163710I$<br>$a=\ \ 0.217143+1.081370I$<br>$b=\ \ 0.937483-0.914940I$ | $-4.24744+3.11310I$ | 0 |
| $u=-1.269440+0.079003I$<br>$a=\ \ 0.230927+0.872934I$<br>$b=\ \ 1.19548-0.86969I$ | $-4.93877+4.11641I$ | 0 |
| $u=-1.269440-0.079003I$<br>$a=\ \ 0.230927-0.872934I$<br>$b=\ \ 1.19548+0.86969I$ | $-4.93877-4.11641I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.167760 + 0.549132I$<br>$a = -0.146242 + 1.286230I$<br>$b = 0.382585 - 0.390444I$ | $-4.53113 + 3.56547I$ | 0 |
| $u = 1.167760 - 0.549132I$<br>$a = -0.146242 - 1.286230I$<br>$b = 0.382585 + 0.390444I$ | $-4.53113 - 3.56547I$ | 0 |
| $u = -1.249990 + 0.349953I$<br>$a = 1.62100 + 1.21358I$<br>$b = 0.949362 - 0.457267I$ | $-2.04894 + 6.40652I$ | 0 |
| $u = -1.249990 - 0.349953I$<br>$a = 1.62100 - 1.21358I$<br>$b = 0.949362 + 0.457267I$ | $-2.04894 - 6.40652I$ | 0 |
| $u = -0.085322 + 1.299100I$<br>$a = -0.485765 + 1.230370I$<br>$b = 1.069820 - 0.642227I$ | $-1.38147 + 13.97860I$ | 0 |
| $u = -0.085322 - 1.299100I$<br>$a = -0.485765 - 1.230370I$<br>$b = 1.069820 + 0.642227I$ | $-1.38147 - 13.97860I$ | 0 |
| $u = 1.226950 + 0.435585I$<br>$a = 1.26021 - 1.82680I$<br>$b = 0.941981 + 0.627852I$ | $-2.00424 - 9.78934I$ | 0 |
| $u = 1.226950 - 0.435585I$<br>$a = 1.26021 + 1.82680I$<br>$b = 0.941981 - 0.627852I$ | $-2.00424 + 9.78934I$ | 0 |
| $u = 0.159664 + 0.671926I$<br>$a = 0.143454 + 1.182010I$<br>$b = -0.535188 - 0.757867I$ | $3.07778 + 1.44225I$ | 0 |
| $u = 0.159664 - 0.671926I$<br>$a = 0.143454 - 1.182010I$<br>$b = -0.535188 + 0.757867I$ | $3.07778 - 1.44225I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.259853 + 1.288290I$<br>$a = -0.309473 + 0.724937I$<br>$b = 1.011020 - 0.341449I$ | $-5.41386 + 2.32416I$ | 0 |
| $u = 0.259853 - 1.288290I$<br>$a = -0.309473 - 0.724937I$<br>$b = 1.011020 + 0.341449I$ | $-5.41386 - 2.32416I$ | 0 |
| $u = -1.336930 + 0.057521I$<br>$a = -1.020810 - 0.585017I$<br>$b = -1.165680 - 0.238914I$ | $-9.28643 + 2.28089I$ | 0 |
| $u = -1.336930 - 0.057521I$<br>$a = -1.020810 + 0.585017I$<br>$b = -1.165680 + 0.238914I$ | $-9.28643 - 2.28089I$ | 0 |
| $u = -1.093550 + 0.776338I$<br>$a = -0.47922 - 1.56155I$<br>$b = -0.980501 + 0.417713I$ | $-0.50308 + 5.35081I$ | 0 |
| $u = -1.093550 - 0.776338I$<br>$a = -0.47922 + 1.56155I$<br>$b = -0.980501 - 0.417713I$ | $-0.50308 - 5.35081I$ | 0 |
| $u = -1.254000 + 0.498619I$<br>$a = 0.353611 + 0.779468I$<br>$b = -0.114679 - 0.874953I$ | $-6.10140 + 4.22576I$ | 0 |
| $u = -1.254000 - 0.498619I$<br>$a = 0.353611 - 0.779468I$<br>$b = -0.114679 + 0.874953I$ | $-6.10140 - 4.22576I$ | 0 |
| $u = 1.328680 + 0.297617I$<br>$a = 0.326746 + 0.245963I$<br>$b = 1.308420 - 0.312619I$ | $-10.72340 + 0.03355I$ | 0 |
| $u = 1.328680 - 0.297617I$<br>$a = 0.326746 - 0.245963I$<br>$b = 1.308420 + 0.312619I$ | $-10.72340 - 0.03355I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.259210 + 0.549836I$<br>$a = -0.724990 + 0.861993I$<br>$b = 0.480409 - 0.824482I$ | $-5.80576 - 5.37340I$ | 0 |
| $u = 1.259210 - 0.549836I$<br>$a = -0.724990 - 0.861993I$<br>$b = 0.480409 + 0.824482I$ | $-5.80576 + 5.37340I$ | 0 |
| $u = 0.799397 + 1.118970I$<br>$a = 0.566525 - 0.757762I$<br>$b = -0.858471 + 0.346278I$ | $0.08172 - 2.26660I$ | 0 |
| $u = 0.799397 - 1.118970I$<br>$a = 0.566525 + 0.757762I$<br>$b = -0.858471 - 0.346278I$ | $0.08172 + 2.26660I$ | 0 |
| $u = 1.384640 + 0.082717I$<br>$a = -1.004530 - 0.181068I$<br>$b = -1.068940 - 0.069049I$ | $-6.89103 - 1.05292I$ | 0 |
| $u = 1.384640 - 0.082717I$<br>$a = -1.004530 + 0.181068I$<br>$b = -1.068940 + 0.069049I$ | $-6.89103 + 1.05292I$ | 0 |
| $u = -0.612876$<br>$a = 0.663834$<br>$b = 0.504299$ | $-0.951403$ | 0 |
| $u = -1.336290 + 0.380072I$<br>$a = 0.82342 + 1.18995I$<br>$b = 1.211440 - 0.617972I$ | $-2.89733 + 10.96930I$ | 0 |
| $u = -1.336290 - 0.380072I$<br>$a = 0.82342 - 1.18995I$<br>$b = 1.211440 + 0.617972I$ | $-2.89733 - 10.96930I$ | 0 |
| $u = -1.359100 + 0.289253I$<br>$a = 0.625095 - 0.099927I$<br>$b = 1.242870 + 0.092408I$ | $-6.61459 + 5.82404I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.359100-0.289253I$<br>$a=\ 0.625095+0.099927I$<br>$b=\ 1.242870-0.092408I$ | $-6.61459-5.82404I$ | 0 |
| $u=\ 1.364230+0.294735I$<br>$a=\ 0.500379-0.199704I$<br>$b=\ 1.401460+0.021802I$ | $-11.1084-10.9874I$ | 0 |
| $u=\ 1.364230-0.294735I$<br>$a=\ 0.500379+0.199704I$<br>$b=\ 1.401460-0.021802I$ | $-11.1084+10.9874I$ | 0 |
| $u=\ 1.349580+0.406070I$<br>$a=\ 0.82516-1.34911I$<br>$b=\ 1.085380+0.678313I$ | $-1.47869-7.80448I$ | 0 |
| $u=\ 1.349580-0.406070I$<br>$a=\ 0.82516+1.34911I$<br>$b=\ 1.085380-0.678313I$ | $-1.47869+7.80448I$ | 0 |
| $u=-1.31980+0.52740I$<br>$a=-0.337232-0.729937I$<br>$b=\ 0.579825+0.683070I$ | $-1.52491+1.56540I$ | 0 |
| $u=-1.31980-0.52740I$<br>$a=-0.337232+0.729937I$<br>$b=\ 0.579825-0.683070I$ | $-1.52491-1.56540I$ | 0 |
| $u=-0.243701+0.523659I$<br>$a=-0.19023+2.63527I$<br>$b=-0.786842-0.641066I$ | $1.23767-2.89064I$ | 0 |
| $u=-0.243701-0.523659I$<br>$a=-0.19023-2.63527I$<br>$b=-0.786842+0.641066I$ | $1.23767+2.89064I$ | 0 |
| $u=\ 0.351885+0.448093I$<br>$a=-0.114027-0.308074I$<br>$b=\ 0.062567-0.530066I$ | $1.44477+1.59152I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.351885 - 0.448093I$<br>$a = -0.114027 + 0.308074I$<br>$b = 0.062567 + 0.530066I$ | $1.44477 - 1.59152I$ | 0 |
| $u = -0.505387 + 0.259815I$<br>$a = 0.562521 - 0.450150I$<br>$b = 0.737299 - 0.072449I$ | $-1.149250 + 0.056990I$ | 0 |
| $u = -0.505387 - 0.259815I$<br>$a = 0.562521 + 0.450150I$<br>$b = 0.737299 + 0.072449I$ | $-1.149250 - 0.056990I$ | 0 |
| $u = 0.10760 + 1.43221I$<br>$a = -0.339211 - 1.136350I$<br>$b = 0.992436 + 0.581582I$ | $1.97716 - 7.26559I$ | 0 |
| $u = 0.10760 - 1.43221I$<br>$a = -0.339211 + 1.136350I$<br>$b = 0.992436 - 0.581582I$ | $1.97716 + 7.26559I$ | 0 |
| $u = 1.32344 + 0.55896I$<br>$a = 0.443021 - 0.645431I$<br>$b = -0.431089 + 0.880936I$ | $-0.73057 - 8.49882I$ | 0 |
| $u = 1.32344 - 0.55896I$<br>$a = 0.443021 + 0.645431I$<br>$b = -0.431089 - 0.880936I$ | $-0.73057 + 8.49882I$ | 0 |
| $u = -1.34383 + 0.53049I$<br>$a = 0.528385 + 0.663994I$<br>$b = -0.462330 - 1.018120I$ | $-3.9068 + 14.2702I$ | 0 |
| $u = -1.34383 - 0.53049I$<br>$a = 0.528385 - 0.663994I$<br>$b = -0.462330 + 1.018120I$ | $-3.9068 - 14.2702I$ | 0 |
| $u = -0.539194 + 0.114319I$<br>$a = 2.43005 - 1.22633I$<br>$b = -1.024180 - 0.404154I$ | $-4.76460 - 8.42888I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.539194-0.114319I$<br>$a=\ \ 2.43005+1.22633I$<br>$b=-1.024180+0.404154I$ | $-4.76460+8.42888I$ | 0 |
| $u=-0.347449+0.413474I$<br>$a=\ \ 2.91043-0.50359I$<br>$b=-0.973884-0.146380I$ | $-4.72180+1.18594I$ | 0 |
| $u=-0.347449-0.413474I$<br>$a=\ \ 2.91043+0.50359I$<br>$b=-0.973884+0.146380I$ | $-4.72180-1.18594I$ | 0 |
| $u=-1.50172+0.13595I$<br>$a=-0.561304-0.159721I$<br>$b=-0.960942-0.444610I$ | $-7.64378-4.26202I$ | 0 |
| $u=-1.50172-0.13595I$<br>$a=-0.561304+0.159721I$<br>$b=-0.960942+0.444610I$ | $-7.64378+4.26202I$ | 0 |
| $u=-1.34715+0.68196I$<br>$a=\ \ 0.22814+1.70279I$<br>$b=\ \ 1.101010-0.647754I$ | $-7.66123+10.88750I$ | 0 |
| $u=-1.34715-0.68196I$<br>$a=\ \ 0.22814-1.70279I$<br>$b=\ \ 1.101010+0.647754I$ | $-7.66123-10.88750I$ | 0 |
| $u=\ \ 1.51034+0.02862I$<br>$a=-0.956226+0.015529I$<br>$b=-0.790805+0.378359I$ | $-6.96844-0.80038I$ | 0 |
| $u=\ \ 1.51034-0.02862I$<br>$a=-0.956226-0.015529I$<br>$b=-0.790805-0.378359I$ | $-6.96844+0.80038I$ | 0 |
| $u=\ \ 1.38592+0.62946I$<br>$a=-0.419266+1.334070I$<br>$b=-1.175050-0.512438I$ | $-9.27131-9.10281I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.38592 - 0.62946I$<br>$a = -0.419266 - 1.334070I$<br>$b = -1.175050 + 0.512438I$ | $-9.27131 + 9.10281I$ | 0 |
| $u = -1.48744 + 0.34894I$<br>$a = -0.429082 - 0.173192I$<br>$b = -1.187870 - 0.075409I$ | $-11.48550 + 3.23271I$ | 0 |
| $u = -1.48744 - 0.34894I$<br>$a = -0.429082 + 0.173192I$<br>$b = -1.187870 + 0.075409I$ | $-11.48550 - 3.23271I$ | 0 |
| $u = 1.43525 + 0.58085I$<br>$a = -0.47231 + 1.47471I$<br>$b = -1.175510 - 0.697807I$ | $-6.1324 - 20.4683I$ | 0 |
| $u = 1.43525 - 0.58085I$<br>$a = -0.47231 - 1.47471I$<br>$b = -1.175510 + 0.697807I$ | $-6.1324 + 20.4683I$ | 0 |
| $u = -1.44968 + 0.60453I$<br>$a = -0.47889 - 1.40475I$<br>$b = -1.134340 + 0.643643I$ | $-2.8585 + 14.1270I$ | 0 |
| $u = -1.44968 - 0.60453I$<br>$a = -0.47889 + 1.40475I$<br>$b = -1.134340 - 0.643643I$ | $-2.8585 - 14.1270I$ | 0 |
| $u = 0.143722 + 0.343781I$<br>$a = -1.23341 - 0.76427I$<br>$b = 1.163920 - 0.361344I$ | $-4.68589 - 0.94693I$ | $-9.76471 + 5.85345I$ |
| $u = 0.143722 - 0.343781I$<br>$a = -1.23341 + 0.76427I$<br>$b = 1.163920 + 0.361344I$ | $-4.68589 + 0.94693I$ | $-9.76471 - 5.85345I$ |
| $u = -0.266154 + 0.172836I$<br>$a = -0.22800 + 1.68476I$<br>$b = 0.189222 + 0.866563I$ | $-1.14221 - 5.34706I$ | $-3.94019 + 5.65009I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.266154-0.172836I$<br>$a=-0.22800-1.68476I$<br>$b=\ \ 0.189222-0.866563I$ | $-1.14221+5.34706I$ | $-3.94019-5.65009I$ |
| $u=\ \ 0.287851+0.076632I$<br>$a=\ \ 2.95502+2.92029I$<br>$b=-0.899062+0.332036I$ | $-0.98061+3.88705I$ | $-10.08732-6.71034I$ |
| $u=\ \ 0.287851-0.076632I$<br>$a=\ \ 2.95502-2.92029I$<br>$b=-0.899062-0.332036I$ | $-0.98061-3.88705I$ | $-10.08732+6.71034I$ |
| $u=\ \ 1.60615+0.60306I$<br>$a=\ \ 0.312232-1.298830I$<br>$b=\ \ 1.001710+0.613928I$ | $-2.75443-6.59029I$ | 0 |
| $u=\ \ 1.60615-0.60306I$<br>$a=\ \ 0.312232+1.298830I$<br>$b=\ \ 1.001710-0.613928I$ | $-2.75443+6.59029I$ | 0 |
| $u=-1.39519+1.19829I$<br>$a=-0.072995+1.214310I$<br>$b=\ \ 0.991711-0.435192I$ | $-6.19486-0.10581I$ | 0 |
| $u=-1.39519-1.19829I$<br>$a=-0.072995-1.214310I$<br>$b=\ \ 0.991711+0.435192I$ | $-6.19486+0.10581I$ | 0 |
| $u=\ \ 0.0106565$<br>$a=-41.0229$<br>$b=\ \ 1.18073$ | $-2.71462$ | 11.4260 |
| $u=\ \ 2.02245+0.29318I$<br>$a=-0.430631+0.881694I$<br>$b=-0.780075-0.373359I$ | $-5.34589+2.23996I$ | 0 |
| $u=\ \ 2.02245-0.29318I$<br>$a=-0.430631-0.881694I$<br>$b=-0.780075+0.373359I$ | $-5.34589-2.23996I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-2.06853+0.78427I$<br>$a=\quad 0.008729+0.643538I$<br>$b=-0.966079-0.464302I$ | $-6.11602-5.79435I$ | 0 |
| $u=-2.06853-0.78427I$<br>$a=\quad 0.008729-0.643538I$<br>$b=-0.966079+0.464302I$ | $-6.11602+5.79435I$ | 0 |

**II. $I_2^u = \langle -6.21\times 10^{35}u^{43} + 5.46\times 10^{35}u^{42} + \cdots + 9.02\times 10^{35}b - 3.80\times 10^{36},\ -2.89\times 10^{37}u^{43} + 2.62\times 10^{37}u^{42} + \cdots + 9.93\times 10^{36}a - 9.38\times 10^{36},\ u^{44} - 20u^{42} + \cdots + 6u + 1\rangle$**

**(i) Arc colorings**

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

$$a_9 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 2.90788u^{43} - 2.63746u^{42} + \cdots + 20.4129u + 0.945477 \\ 0.687785u^{43} - 0.604812u^{42} + \cdots + 13.2809u + 4.21665 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.657762u^{43} + 1.56723u^{42} + \cdots - 7.57170u + 3.04304 \\ -1.24340u^{43} + 0.917446u^{42} + \cdots - 17.5432u - 5.57922 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -1.90117u^{43} + 2.48467u^{42} + \cdots - 25.1149u - 2.53617 \\ -1.24340u^{43} + 0.917446u^{42} + \cdots - 17.5432u - 5.57922 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1.02309u^{43} - 1.53973u^{42} + \cdots + 0.388988u - 2.06293 \\ 2.67525u^{43} - 1.11088u^{42} + \cdots + 23.8189u + 8.06484 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 4.85988u^{43} - 2.11516u^{42} + \cdots + 33.5061u + 8.24005 \\ -1.05936u^{43} + 1.03701u^{42} + \cdots - 15.6824u - 3.66271 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -2.97865u^{43} + 0.749786u^{42} + \cdots - 25.8021u - 8.35982 \\ -0.874147u^{43} + 0.164133u^{42} + \cdots + 0.980105u - 0.0871693 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -1.16958u^{43} + 1.48867u^{42} + \cdots - 11.7672u + 0.159567 \\ -1.96414u^{43} + 1.41460u^{42} + \cdots - 25.6465u - 7.27896 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -5.02588u^{43} + 2.56542u^{42} + \cdots - 47.0608u - 10.4571 \\ -2.17590u^{43} + 0.687432u^{42} + \cdots - 17.3919u - 5.84439 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -38.2555u^{43} + 2.09449u^{42} + \cdots - 146.950u - 67.1161$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{44} - 24u^{43} + \cdots - 20u + 1$ |
| $c_2$ | $u^{44} - 12u^{42} + \cdots - 4u + 1$ |
| $c_3$ | $u^{44} - 20u^{42} + \cdots + 6u + 1$ |
| $c_4$ | $u^{44} + 3u^{43} + \cdots + 12u - 1$ |
| $c_5$ | $u^{44} - u^{43} + \cdots + 2u + 1$ |
| $c_6$ | $u^{44} - 12u^{42} + \cdots + 4u + 1$ |
| $c_7$ | $u^{44} - 4u^{43} + \cdots - 16u^2 + 1$ |
| $c_8$ | $u^{44} + 8u^{43} + \cdots - 27u - 11$ |
| $c_9$ | $u^{44} - 20u^{42} + \cdots - 6u + 1$ |
| $c_{10}$ | $u^{44} - 8u^{42} + \cdots + 2u + 1$ |
| $c_{11}$ | $u^{44} + 4u^{43} + \cdots - 16u^2 + 1$ |
| $c_{12}$ | $u^{44} - 2u^{42} + \cdots - 2u + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{44} - 4y^{43} + \cdots + 16y + 1$ |
| $c_2, c_6$ | $y^{44} - 24y^{43} + \cdots - 20y + 1$ |
| $c_3, c_9$ | $y^{44} - 40y^{43} + \cdots - 22y + 1$ |
| $c_4$ | $y^{44} - 3y^{43} + \cdots - 42y + 1$ |
| $c_5$ | $y^{44} + y^{43} + \cdots - 14y + 1$ |
| $c_7, c_{11}$ | $y^{44} - 24y^{43} + \cdots - 32y + 1$ |
| $c_8$ | $y^{44} - 4y^{43} + \cdots - 1609y + 121$ |
| $c_{10}$ | $y^{44} - 16y^{43} + \cdots + 12y + 1$ |
| $c_{12}$ | $y^{44} - 4y^{43} + \cdots + 8y + 1$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.901073+0.377916I$<br>$a=-2.00991-0.00283I$<br>$b=\ \ 0.490343+0.410936I$ | $-3.15019+6.29675I$ | $-7.67907-7.91628I$ |
| $u=-0.901073-0.377916I$<br>$a=-2.00991+0.00283I$<br>$b=\ \ 0.490343-0.410936I$ | $-3.15019-6.29675I$ | $-7.67907+7.91628I$ |
| $u=-0.944951+0.183483I$<br>$a=-0.1175490+0.0432031I$<br>$b=-0.350597+0.984100I$ | $-2.33559+6.42558I$ | $-8.45343-7.17592I$ |
| $u=-0.944951-0.183483I$<br>$a=-0.1175490-0.0432031I$<br>$b=-0.350597-0.984100I$ | $-2.33559-6.42558I$ | $-8.45343+7.17592I$ |
| $u=\ \ 1.005250+0.264516I$<br>$a=\ \ 0.616657+0.166776I$<br>$b=-0.366918-0.678496I$ | $-0.69003-4.31512I$ | $-11.20538+1.54587I$ |
| $u=\ \ 1.005250-0.264516I$<br>$a=\ \ 0.616657-0.166776I$<br>$b=-0.366918+0.678496I$ | $-0.69003+4.31512I$ | $-11.20538-1.54587I$ |
| $u=\ \ 0.882120+0.644463I$<br>$a=-0.02434-1.48921I$<br>$b=\ \ 1.077520+0.430394I$ | $-5.54274-0.47109I$ | $0$ |
| $u=\ \ 0.882120-0.644463I$<br>$a=-0.02434+1.48921I$<br>$b=\ \ 1.077520-0.430394I$ | $-5.54274+0.47109I$ | $0$ |
| $u=\ \ 0.764290+0.455149I$<br>$a=\ \ 0.279914-0.889213I$<br>$b=\ \ 0.575453-0.336588I$ | $-0.12785+1.44431I$ | $-7.64136-1.00900I$ |
| $u=\ \ 0.764290-0.455149I$<br>$a=\ \ 0.279914+0.889213I$<br>$b=\ \ 0.575453+0.336588I$ | $-0.12785-1.44431I$ | $-7.64136+1.00900I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \quad 1.11197$<br>$a = -0.504938$<br>$b = -1.75607$ | $-8.14919$ | $-29.8720$ |
| $u = \quad 0.450595 + 0.732211I$<br>$a = -0.262400 + 1.223210I$<br>$b = -0.799390 - 0.663228I$ | $2.09845 - 4.91731I$ | $-3.94608 + 7.90276I$ |
| $u = \quad 0.450595 - 0.732211I$<br>$a = -0.262400 - 1.223210I$<br>$b = -0.799390 + 0.663228I$ | $2.09845 + 4.91731I$ | $-3.94608 - 7.90276I$ |
| $u = \quad 0.798854 + 0.854683I$<br>$a = -0.769386 + 0.887797I$<br>$b = \quad 0.716127 - 0.404844I$ | $0.73484 - 2.35047I$ | $0$ |
| $u = \quad 0.798854 - 0.854683I$<br>$a = -0.769386 - 0.887797I$<br>$b = \quad 0.716127 + 0.404844I$ | $0.73484 + 2.35047I$ | $0$ |
| $u = -0.967285 + 0.675896I$<br>$a = \quad 0.48770 + 1.79525I$<br>$b = \quad 1.063870 - 0.458204I$ | $-0.53790 + 5.94345I$ | $0$ |
| $u = -0.967285 - 0.675896I$<br>$a = \quad 0.48770 - 1.79525I$<br>$b = \quad 1.063870 + 0.458204I$ | $-0.53790 - 5.94345I$ | $0$ |
| $u = \quad 1.108340 + 0.416965I$<br>$a = \quad 0.88412 - 1.97267I$<br>$b = \quad 1.132540 + 0.566419I$ | $-5.42907 - 10.68940I$ | $0$ |
| $u = \quad 1.108340 - 0.416965I$<br>$a = \quad 0.88412 + 1.97267I$<br>$b = \quad 1.132540 - 0.566419I$ | $-5.42907 + 10.68940I$ | $0$ |
| $u = \quad 0.801691$<br>$a = \quad 1.67330$<br>$b = \quad 1.54650$ | $-6.93215$ | $45.5880$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.20182$<br>$a=-1.08290$<br>$b=-1.44210$ | $-5.79012$ | 0 |
| $u=1.144900+0.422526I$<br>$a=-0.719230-0.277160I$<br>$b=0.592086-0.585267I$ | $-0.69468-3.52169I$ | 0 |
| $u=1.144900-0.422526I$<br>$a=-0.719230+0.277160I$<br>$b=0.592086+0.585267I$ | $-0.69468+3.52169I$ | 0 |
| $u=-1.322200+0.079677I$<br>$a=0.276319-1.040440I$<br>$b=0.811710+0.807885I$ | $-3.62581-4.82408I$ | 0 |
| $u=-1.322200-0.079677I$<br>$a=0.276319+1.040440I$<br>$b=0.811710-0.807885I$ | $-3.62581+4.82408I$ | 0 |
| $u=0.285240+0.590878I$<br>$a=1.45956+1.56106I$<br>$b=-0.827595-0.691568I$ | $1.93596-0.62619I$ | $-0.776154+0.510272I$ |
| $u=0.285240-0.590878I$<br>$a=1.45956-1.56106I$<br>$b=-0.827595+0.691568I$ | $1.93596+0.62619I$ | $-0.776154-0.510272I$ |
| $u=-1.306490+0.374508I$<br>$a=1.11857+1.39987I$<br>$b=1.046080-0.629497I$ | $-2.12726+8.45956I$ | 0 |
| $u=-1.306490-0.374508I$<br>$a=1.11857-1.39987I$<br>$b=1.046080+0.629497I$ | $-2.12726-8.45956I$ | 0 |
| $u=1.370410+0.052913I$<br>$a=-0.626713+0.633790I$<br>$b=-1.106550+0.099422I$ | $-8.89608-1.59803I$ | 0 |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.370410 - 0.052913I$<br>$a = -0.626713 - 0.633790I$<br>$b = -1.106550 - 0.099422I$ | $-8.89608 + 1.59803I$ | 0 |
| $u = -0.415689 + 0.442578I$<br>$a = 0.469014 - 0.049308I$<br>$b = -0.941891 - 0.712504I$ | $1.66272 - 0.38886I$ | $-0.61899 - 1.69904I$ |
| $u = -0.415689 - 0.442578I$<br>$a = 0.469014 + 0.049308I$<br>$b = -0.941891 + 0.712504I$ | $1.66272 + 0.38886I$ | $-0.61899 + 1.69904I$ |
| $u = -1.43454 + 0.00369I$<br>$a = -1.117540 + 0.725121I$<br>$b = -0.827726 + 0.023429I$ | $-7.74384 + 2.07606I$ | 0 |
| $u = -1.43454 - 0.00369I$<br>$a = -1.117540 - 0.725121I$<br>$b = -0.827726 - 0.023429I$ | $-7.74384 - 2.07606I$ | 0 |
| $u = -0.189388 + 0.405757I$<br>$a = 0.27116 + 2.94288I$<br>$b = -0.900574 - 0.714895I$ | $1.72947 - 4.77449I$ | $-1.56456 + 4.15887I$ |
| $u = -0.189388 - 0.405757I$<br>$a = 0.27116 - 2.94288I$<br>$b = -0.900574 + 0.714895I$ | $1.72947 + 4.77449I$ | $-1.56456 - 4.15887I$ |
| $u = -0.409827 + 0.156202I$<br>$a = -1.41559 - 3.63251I$<br>$b = 0.643151 + 0.079540I$ | $-3.27989 - 1.65905I$ | $-10.10690 + 4.47702I$ |
| $u = -0.409827 - 0.156202I$<br>$a = -1.41559 + 3.63251I$<br>$b = 0.643151 - 0.079540I$ | $-3.27989 + 1.65905I$ | $-10.10690 - 4.47702I$ |
| $u = -0.359131$<br>$a = -0.662925$<br>$b = 1.10438$ | $-2.96256$ | $-22.2880$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.75462 + 0.69728I$<br>$a = 0.127895 - 0.480651I$<br>$b = -0.954922 + 0.451774I$ | $-5.93903 + 5.50757I$ | 0 |
| $u = 1.75462 - 0.69728I$<br>$a = 0.127895 + 0.480651I$<br>$b = -0.954922 - 0.451774I$ | $-5.93903 - 5.50757I$ | 0 |
| $u = -1.84953 + 0.39250I$<br>$a = -0.639534 - 0.925630I$<br>$b = -0.799070 + 0.405271I$ | $-5.34209 - 1.94609I$ | 0 |
| $u = -1.84953 - 0.39250I$<br>$a = -0.639534 + 0.925630I$<br>$b = -0.799070 - 0.405271I$ | $-5.34209 + 1.94609I$ | 0 |

**III. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u^{44}-24u^{43}+\cdots-20u+1)$ $\cdot(u^{172}+79u^{171}+\cdots+1449530204u+56445169)$ |
| $c_2$ | $(u^{44}-12u^{42}+\cdots-4u+1)(u^{172}-u^{171}+\cdots-23706u-7513)$ |
| $c_3$ | $(u^{44}-20u^{42}+\cdots+6u+1)(u^{172}-u^{171}+\cdots-565196u+6143)$ |
| $c_4$ | $(u^{44}+3u^{43}+\cdots+12u-1)(u^{172}-10u^{171}+\cdots-9148u+271)$ |
| $c_5$ | $(u^{44}-u^{43}+\cdots+2u+1)(u^{172}-4u^{171}+\cdots-1.17625\times10^{7}u-858173)$ |
| $c_6$ | $(u^{44}-12u^{42}+\cdots+4u+1)(u^{172}-u^{171}+\cdots-23706u-7513)$ |
| $c_7$ | $(u^{44}-4u^{43}+\cdots-16u^{2}+1)(u^{172}+7u^{171}+\cdots+30336u+1009)$ |
| $c_8$ | $(u^{44}+8u^{43}+\cdots-27u-11)$ $\cdot(u^{172}-5u^{171}+\cdots-21167440263u+1101672697)$ |
| $c_9$ | $(u^{44}-20u^{42}+\cdots-6u+1)(u^{172}-u^{171}+\cdots-565196u+6143)$ |
| $c_{10}$ | $(u^{44}-8u^{42}+\cdots+2u+1)(u^{172}+u^{171}+\cdots+1522u-41)$ |
| $c_{11}$ | $(u^{44}+4u^{43}+\cdots-16u^{2}+1)(u^{172}+7u^{171}+\cdots+30336u+1009)$ |
| $c_{12}$ | $(u^{44}-2u^{42}+\cdots-2u+1)(u^{172}+17u^{171}+\cdots+493972u+667)$ |

**IV. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $(y^{44}-4y^{43}+\cdots+16y+1)$ $\cdot(y^{172}+33y^{171}+\cdots-49226118750771920y+3186057103438561)$ |
| $c_2, c_6$ | $(y^{44}-24y^{43}+\cdots-20y+1)$ $\cdot(y^{172}-79y^{171}+\cdots-1449530204y+56445169)$ |
| $c_3, c_9$ | $(y^{44}-40y^{43}+\cdots-22y+1)$ $\cdot(y^{172}-127y^{171}+\cdots-334380335706y+37736449)$ |
| $c_4$ | $(y^{44}-3y^{43}+\cdots-42y+1)(y^{172}-10y^{171}+\cdots-2951210y+73441)$ |
| $c_5$ | $(y^{44}+y^{43}+\cdots-14y+1)$ $\cdot(y^{172}+46y^{171}+\cdots+307627127926670y+736460897929)$ |
| $c_7, c_{11}$ | $(y^{44}-24y^{43}+\cdots-32y+1)$ $\cdot(y^{172}-99y^{171}+\cdots-261670344y+1018081)$ |
| $c_8$ | $(y^{44}-4y^{43}+\cdots-1609y+121)$ $\cdot(y^{172}-43y^{171}+\cdots-9.57\times10^{19}y+1.21\times10^{18})$ |
| $c_{10}$ | $(y^{44}-16y^{43}+\cdots+12y+1)(y^{172}-23y^{171}+\cdots-3429060y+1681)$ |
| $c_{12}$ | $(y^{44}-4y^{43}+\cdots+8y+1)$ $\cdot(y^{172}+29y^{171}+\cdots-234106980580y+444889)$ |