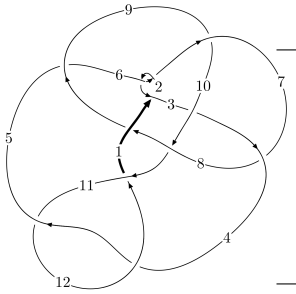
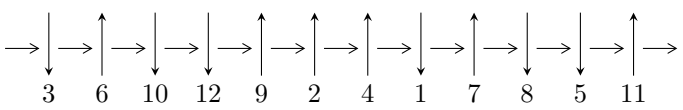
## $12a_{0458}$ $(K12a_{0458})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle -2.50272 \times 10^{508} u^{183} + 4.81379 \times 10^{508} u^{182} + \cdots + 5.05629 \times 10^{507} b + 4.40651 \times 10^{508},$$
$$4.37784 \times 10^{508} u^{183} - 1.28883 \times 10^{509} u^{182} + \cdots + 5.05629 \times 10^{507} a - 1.21040 \times 10^{509},\ u^{184} - u^{183} + \cdots + 5$$
$$I_2^u = \langle 4318092 u^{35} + 4278394 u^{34} + \cdots + 627059 b + 4485498,$$
$$-2296428 u^{35} - 6821624 u^{34} + \cdots + 627059 a - 828341,\ u^{36} + u^{35} + \cdots - 2u + 1\rangle$$
$$I_3^u = \langle -u^2 + b + u,\ -u^3 + u^2 + a,\ u^4 - u^3 + u^2 - u + 1\rangle$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 224 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.** $\boldsymbol{I_1^u = \langle -2.50 \times 10^{508} u^{183} + 4.81 \times 10^{508} u^{182} + \cdots + 5.06 \times 10^{507} b + 4.41 \times 10^{508},\ 4.38 \times 10^{508} u^{183} - 1.29 \times 10^{509} u^{182} + \cdots + 5.06 \times 10^{507} a - 1.21 \times 10^{509},\ u^{184} - u^{183} + \cdots + 5u + 1 \rangle}$

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

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

$$a_8 = \begin{pmatrix} -8.65822u^{183} + 25.4895u^{182} + \cdots + 204.609u + 23.9386 \\ 4.94971u^{183} - 9.52040u^{182} + \cdots - 61.9664u - 8.71491 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0.687710u^{183} + 11.7257u^{182} + \cdots + 124.941u + 5.27965 \\ -4.07758u^{183} - 10.8828u^{182} + \cdots - 110.199u - 14.6867 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 8.59308u^{183} - 23.6383u^{182} + \cdots - 180.726u - 46.3702 \\ -6.10986u^{183} - 4.33107u^{182} + \cdots - 36.2462u - 4.36522 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 2.90959u^{183} + 7.18098u^{182} + \cdots + 94.9978u + 2.60094 \\ 3.37583u^{183} - 18.8275u^{182} + \cdots - 149.441u - 23.3118 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -10.5685u^{183} + 20.0248u^{182} + \cdots + 118.185u + 26.8545 \\ 23.1516u^{183} - 5.66655u^{182} + \cdots + 10.6861u - 1.74697 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -2.11007u^{183} + 24.7206u^{182} + \cdots + 206.052u + 48.7688 \\ 19.4953u^{183} + 1.85177u^{182} + \cdots + 82.3695u + 7.98087 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 17.3504u^{183} + 20.0924u^{182} + \cdots + 166.223u + 39.3952 \\ 40.7180u^{183} - 14.7779u^{182} + \cdots + 14.5445u - 10.5460 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 40.5446u^{183} - 51.3735u^{182} + \cdots - 251.843u - 67.3318$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{184}+83u^{183}+\cdots-5u+1$ |
| $c_2, c_6$ | $u^{184}-u^{183}+\cdots+5u+1$ |
| $c_3$ | $u^{184}+2u^{183}+\cdots+4095u+691$ |
| $c_4, c_{11}$ | $u^{184}+u^{183}+\cdots-5u+1$ |
| $c_5$ | $u^{184}+2u^{183}+\cdots+3708404u+1584839$ |
| $c_7$ | $u^{184}-2u^{183}+\cdots-4095u+691$ |
| $c_8$ | $u^{184}-2u^{183}+\cdots-3708404u+1584839$ |
| $c_9$ | $u^{184}-11u^{183}+\cdots+8744u+257$ |
| $c_{10}$ | $u^{184}+11u^{183}+\cdots-8744u+257$ |
| $c_{12}$ | $u^{184}-83u^{183}+\cdots+5u+1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_{12}$ | $y^{184} + 47y^{183} + \cdots - 2797y + 1$ |
| $c_2, c_4, c_6$ $c_{11}$ | $y^{184} + 83y^{183} + \cdots - 5y + 1$ |
| $c_3, c_7$ | $y^{184} + 2y^{183} + \cdots - 20009815y + 477481$ |
| $c_5, c_8$ | $y^{184} - 18y^{183} + \cdots - 530431543575720y + 2511714655921$ |
| $c_9, c_{10}$ | $y^{184} - 23y^{183} + \cdots + 38603420y + 66049$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.894854+0.445183I$<br>$a=\ 1.130450+0.587646I$<br>$b=\ 0.870846+0.629086I$ | $1.42713-4.91064I$ | 0 |
| $u=-0.894854-0.445183I$<br>$a=\ 1.130450-0.587646I$<br>$b=\ 0.870846-0.629086I$ | $1.42713+4.91064I$ | 0 |
| $u=-0.505930+0.869761I$<br>$a=-1.11752-1.42800I$<br>$b=-0.943800+0.915800I$ | $-2.46244+5.69178I$ | 0 |
| $u=-0.505930-0.869761I$<br>$a=-1.11752+1.42800I$<br>$b=-0.943800-0.915800I$ | $-2.46244-5.69178I$ | 0 |
| $u=\ 0.711964+0.692118I$<br>$a=-0.94076+1.54269I$<br>$b=-1.42433+0.63907I$ | $-4.26633-0.73149I$ | 0 |
| $u=\ 0.711964-0.692118I$<br>$a=-0.94076-1.54269I$<br>$b=-1.42433-0.63907I$ | $-4.26633+0.73149I$ | 0 |
| $u=-0.911661+0.428389I$<br>$a=\ 1.24757+0.81419I$<br>$b=\ 1.21961+0.85454I$ | $-9.45857I$ | 0 |
| $u=-0.911661-0.428389I$<br>$a=\ 1.24757-0.81419I$<br>$b=\ 1.21961-0.85454I$ | $9.45857I$ | 0 |
| $u=\ 0.912513+0.427584I$<br>$a=\ 1.34384-0.71854I$<br>$b=\ 1.259440-0.641346I$ | $-6.16241+6.57875I$ | 0 |
| $u=\ 0.912513-0.427584I$<br>$a=\ 1.34384+0.71854I$<br>$b=\ 1.259440+0.641346I$ | $-6.16241-6.57875I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.913042 + 0.429711I$<br>$a = 1.27214 - 0.86579I$<br>$b = 1.30328 - 0.90182I$ | $-2.1765 + 15.2001I$ | 0 |
| $u = 0.913042 - 0.429711I$<br>$a = 1.27214 + 0.86579I$<br>$b = 1.30328 + 0.90182I$ | $-2.1765 - 15.2001I$ | 0 |
| $u = -0.480224 + 0.863743I$<br>$a = -0.758550 - 0.515933I$<br>$b = -1.34440 - 0.80705I$ | $-2.51303 - 1.69167I$ | 0 |
| $u = -0.480224 - 0.863743I$<br>$a = -0.758550 + 0.515933I$<br>$b = -1.34440 + 0.80705I$ | $-2.51303 + 1.69167I$ | 0 |
| $u = -0.823126 + 0.594241I$<br>$a = -0.616204 - 1.118430I$<br>$b = -1.10371 - 0.91332I$ | $-2.93943 - 1.39204I$ | 0 |
| $u = -0.823126 - 0.594241I$<br>$a = -0.616204 + 1.118430I$<br>$b = -1.10371 + 0.91332I$ | $-2.93943 + 1.39204I$ | 0 |
| $u = 0.696281 + 0.684139I$<br>$a = 1.50341 + 0.43910I$<br>$b = 0.665119 - 0.261921I$ | $-0.510482 + 0.490371I$ | 0 |
| $u = 0.696281 - 0.684139I$<br>$a = 1.50341 - 0.43910I$<br>$b = 0.665119 + 0.261921I$ | $-0.510482 - 0.490371I$ | 0 |
| $u = 0.152840 + 0.963831I$<br>$a = 1.166230 - 0.182836I$<br>$b = -0.463762 + 0.579118I$ | $-0.16328 - 1.51231I$ | 0 |
| $u = 0.152840 - 0.963831I$<br>$a = 1.166230 + 0.182836I$<br>$b = -0.463762 - 0.579118I$ | $-0.16328 + 1.51231I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.381338 + 0.953885I$<br>$a = 1.53715 - 0.34005I$<br>$b = 0.504853 + 0.770017I$ | $0.16328 - 1.51231I$ | 0 |
| $u = 0.381338 - 0.953885I$<br>$a = 1.53715 + 0.34005I$<br>$b = 0.504853 - 0.770017I$ | $0.16328 + 1.51231I$ | 0 |
| $u = 0.843737 + 0.481906I$<br>$a = 1.036830 - 0.436222I$<br>$b = 0.636621 - 0.450084I$ | $0.606146 - 1.140740I$ | 0 |
| $u = 0.843737 - 0.481906I$<br>$a = 1.036830 + 0.436222I$<br>$b = 0.636621 + 0.450084I$ | $0.606146 + 1.140740I$ | 0 |
| $u = 0.793686 + 0.656060I$<br>$a = -0.67850 + 1.38327I$<br>$b = -1.32553 + 0.93427I$ | $-3.89040 + 5.00488I$ | 0 |
| $u = 0.793686 - 0.656060I$<br>$a = -0.67850 - 1.38327I$<br>$b = -1.32553 - 0.93427I$ | $-3.89040 - 5.00488I$ | 0 |
| $u = 0.487021 + 0.908990I$<br>$a = -1.382000 - 0.167841I$<br>$b = -0.933256 + 0.346925I$ | $0.67186 - 2.31975I$ | 0 |
| $u = 0.487021 - 0.908990I$<br>$a = -1.382000 + 0.167841I$<br>$b = -0.933256 - 0.346925I$ | $0.67186 + 2.31975I$ | 0 |
| $u = -0.258634 + 1.001010I$<br>$a = 1.026540 + 0.626638I$<br>$b = -0.608734 - 1.144460I$ | $1.179990 - 0.430240I$ | 0 |
| $u = -0.258634 - 1.001010I$<br>$a = 1.026540 - 0.626638I$<br>$b = -0.608734 + 1.144460I$ | $1.179990 + 0.430240I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.377689 + 0.965511I$<br>$a = 2.36112 - 0.96293I$<br>$b = 1.33765 + 1.31026I$ | $2.95745 + 5.07220I$ | 0 |
| $u = 0.377689 - 0.965511I$<br>$a = 2.36112 + 0.96293I$<br>$b = 1.33765 - 1.31026I$ | $2.95745 - 5.07220I$ | 0 |
| $u = 0.200530 + 1.018050I$<br>$a = 1.186000 - 0.505365I$<br>$b = -0.710658 + 0.984129I$ | $0.36441 + 4.08864I$ | 0 |
| $u = 0.200530 - 1.018050I$<br>$a = 1.186000 + 0.505365I$<br>$b = -0.710658 - 0.984129I$ | $0.36441 - 4.08864I$ | 0 |
| $u = -0.373627 + 0.969972I$<br>$a = 2.00297 + 1.12039I$<br>$b = 1.36042 - 0.96472I$ | $4.76977 - 0.02280I$ | 0 |
| $u = -0.373627 - 0.969972I$<br>$a = 2.00297 - 1.12039I$<br>$b = 1.36042 + 0.96472I$ | $4.76977 + 0.02280I$ | 0 |
| $u = -0.536403 + 0.906961I$<br>$a = -1.74681 - 0.53934I$<br>$b = -1.42395 + 0.11348I$ | $-2.99007 + 5.88748I$ | 0 |
| $u = -0.536403 - 0.906961I$<br>$a = -1.74681 + 0.53934I$<br>$b = -1.42395 - 0.11348I$ | $-2.99007 - 5.88748I$ | 0 |
| $u = -0.713873 + 0.612272I$<br>$a = 1.213510 - 0.492034I$<br>$b = 0.798352 + 0.374709I$ | $-2.75046 - 6.50723I$ | 0 |
| $u = -0.713873 - 0.612272I$<br>$a = 1.213510 + 0.492034I$<br>$b = 0.798352 - 0.374709I$ | $-2.75046 + 6.50723I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.463990 + 0.816495I$<br>$a = -0.73359 + 1.81235I$<br>$b = -0.541609 - 0.530760I$ | $0.33646 - 1.58880I$ | 0 |
| $u = 0.463990 - 0.816495I$<br>$a = -0.73359 - 1.81235I$<br>$b = -0.541609 + 0.530760I$ | $0.33646 + 1.58880I$ | 0 |
| $u = -0.549717 + 0.760668I$<br>$a = -1.20472 - 1.75793I$<br>$b = -1.051140 + 0.039586I$ | $-3.43015 - 1.51038I$ | 0 |
| $u = -0.549717 - 0.760668I$<br>$a = -1.20472 + 1.75793I$<br>$b = -1.051140 - 0.039586I$ | $-3.43015 + 1.51038I$ | 0 |
| $u = -0.840506 + 0.652157I$<br>$a = 1.053580 - 0.135131I$<br>$b = 0.905372 + 0.023325I$ | $-7.61513 + 2.24725I$ | 0 |
| $u = -0.840506 - 0.652157I$<br>$a = 1.053580 + 0.135131I$<br>$b = 0.905372 - 0.023325I$ | $-7.61513 - 2.24725I$ | 0 |
| $u = -0.356964 + 1.003780I$<br>$a = 1.10995 + 1.34623I$<br>$b = 1.363320 - 0.196047I$ | $4.71361 + 2.34843I$ | 0 |
| $u = -0.356964 - 1.003780I$<br>$a = 1.10995 - 1.34623I$<br>$b = 1.363320 + 0.196047I$ | $4.71361 - 2.34843I$ | 0 |
| $u = 0.414228 + 0.981909I$<br>$a = 0.354458 - 1.062160I$<br>$b = -0.371091 + 1.052520I$ | $4.26633 - 0.73149I$ | 0 |
| $u = 0.414228 - 0.981909I$<br>$a = 0.354458 + 1.062160I$<br>$b = -0.371091 - 1.052520I$ | $4.26633 + 0.73149I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.129488+0.915164I$<br>$a=\ \ 0.960675+0.426662I$<br>$b=-0.296636-0.987355I$ | $1.82416-1.29895I$ | 0 |
| $u=-0.129488-0.915164I$<br>$a=\ \ 0.960675-0.426662I$<br>$b=-0.296636+0.987355I$ | $1.82416+1.29895I$ | 0 |
| $u=-0.383178+1.005400I$<br>$a=\ \ 0.618638+1.012630I$<br>$b=-0.393790-1.184510I$ | $3.42616-4.42719I$ | 0 |
| $u=-0.383178-1.005400I$<br>$a=\ \ 0.618638-1.012630I$<br>$b=-0.393790+1.184510I$ | $3.42616+4.42719I$ | 0 |
| $u=\ \ 0.321449+1.031970I$<br>$a=\ \ 0.62025-1.47461I$<br>$b=\ \ 1.41421-0.14004I$ | $2.71913-7.28797I$ | 0 |
| $u=\ \ 0.321449-1.031970I$<br>$a=\ \ 0.62025+1.47461I$<br>$b=\ \ 1.41421+0.14004I$ | $2.71913+7.28797I$ | 0 |
| $u=\ \ 0.481357+0.968112I$<br>$a=-1.053720-0.021626I$<br>$b=\ \ 0.07893-1.73838I$ | $-0.36441-4.08864I$ | 0 |
| $u=\ \ 0.481357-0.968112I$<br>$a=-1.053720+0.021626I$<br>$b=\ \ 0.07893+1.73838I$ | $-0.36441+4.08864I$ | 0 |
| $u=\ \ 0.477961+0.978704I$<br>$a=-2.55928+0.63156I$<br>$b=-0.540892-0.552874I$ | $3.89040-5.00488I$ | 0 |
| $u=\ \ 0.477961-0.978704I$<br>$a=-2.55928-0.63156I$<br>$b=-0.540892+0.552874I$ | $3.89040+5.00488I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.288183 + 1.051500I$<br>$a = 0.451947 + 0.568551I$<br>$b = -0.168159 - 0.824343I$ | $3.43015 - 1.51038I$ | 0 |
| $u = 0.288183 - 1.051500I$<br>$a = 0.451947 - 0.568551I$<br>$b = -0.168159 + 0.824343I$ | $3.43015 + 1.51038I$ | 0 |
| $u = 0.997685 + 0.442110I$<br>$a = -0.260668 + 0.432401I$<br>$b = -0.503103 + 0.532034I$ | $0.510482 + 0.490371I$ | 0 |
| $u = 0.997685 - 0.442110I$<br>$a = -0.260668 - 0.432401I$<br>$b = -0.503103 - 0.532034I$ | $0.510482 - 0.490371I$ | 0 |
| $u = -0.965634 + 0.515995I$<br>$a = -0.226054 - 0.635251I$<br>$b = -0.543836 - 0.760332I$ | $-0.39103 - 5.61584I$ | 0 |
| $u = -0.965634 - 0.515995I$<br>$a = -0.226054 + 0.635251I$<br>$b = -0.543836 + 0.760332I$ | $-0.39103 + 5.61584I$ | 0 |
| $u = -0.899610 + 0.655284I$<br>$a = 0.891423 - 0.168943I$<br>$b = 0.942689 - 0.215527I$ | $-3.50746 + 10.61500I$ | 0 |
| $u = -0.899610 - 0.655284I$<br>$a = 0.891423 + 0.168943I$<br>$b = 0.942689 + 0.215527I$ | $-3.50746 - 10.61500I$ | 0 |
| $u = 0.508993 + 0.990974I$<br>$a = -1.19790 - 0.86056I$<br>$b = 0.77945 - 2.15645I$ | $2.08454 - 10.78560I$ | 0 |
| $u = 0.508993 - 0.990974I$<br>$a = -1.19790 + 0.86056I$<br>$b = 0.77945 + 2.15645I$ | $2.08454 + 10.78560I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.483626+1.004630I$<br>$a=-2.46022-0.80412I$<br>$b=-0.550966+0.771385I$ | $2.80619+10.52050I$ | 0 |
| $u=-0.483626-1.004630I$<br>$a=-2.46022+0.80412I$<br>$b=-0.550966-0.771385I$ | $2.80619-10.52050I$ | 0 |
| $u=\ 0.887503+0.675169I$<br>$a=\ 0.889093+0.104858I$<br>$b=\ 0.856581+0.175152I$ | $-1.42713-4.91064I$ | 0 |
| $u=\ 0.887503-0.675169I$<br>$a=\ 0.889093-0.104858I$<br>$b=\ 0.856581-0.175152I$ | $-1.42713+4.91064I$ | 0 |
| $u=-0.686763+0.553968I$<br>$a=-1.15225-1.14999I$<br>$b=-1.155710-0.749097I$ | $-2.63356-2.12680I$ | 0 |
| $u=-0.686763-0.553968I$<br>$a=-1.15225+1.14999I$<br>$b=-1.155710+0.749097I$ | $-2.63356+2.12680I$ | 0 |
| $u=-0.499533+1.001820I$<br>$a=-0.859826+0.800973I$<br>$b=\ 0.83318+1.81298I$ | $3.92280+5.88359I$ | 0 |
| $u=-0.499533-1.001820I$<br>$a=-0.859826-0.800973I$<br>$b=\ 0.83318-1.81298I$ | $3.92280-5.88359I$ | 0 |
| $u=\ 0.381904+0.774779I$<br>$a=\ 0.963184+0.422425I$<br>$b=-0.59196+1.67135I$ | $-1.179990+0.430240I$ | 0 |
| $u=\ 0.381904-0.774779I$<br>$a=\ 0.963184-0.422425I$<br>$b=-0.59196-1.67135I$ | $-1.179990-0.430240I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.727245 + 0.460284I$<br>$a = -1.33174 + 0.72097I$<br>$b = -1.47714 + 0.71726I$ | $-4.76977 + 0.02280I$ | 0 |
| $u = 0.727245 - 0.460284I$<br>$a = -1.33174 - 0.72097I$<br>$b = -1.47714 - 0.71726I$ | $-4.76977 - 0.02280I$ | 0 |
| $u = -0.471708 + 1.045510I$<br>$a = -0.057598 + 0.754177I$<br>$b = 0.962909 + 0.998986I$ | $3.94857 + 4.14341I$ | 0 |
| $u = -0.471708 - 1.045510I$<br>$a = -0.057598 - 0.754177I$<br>$b = 0.962909 - 0.998986I$ | $3.94857 - 4.14341I$ | 0 |
| $u = -0.337591 + 1.098550I$<br>$a = 0.591677 - 0.468827I$<br>$b = -0.236721 + 0.673392I$ | $2.99007 + 5.88748I$ | 0 |
| $u = -0.337591 - 1.098550I$<br>$a = 0.591677 + 0.468827I$<br>$b = -0.236721 - 0.673392I$ | $2.99007 - 5.88748I$ | 0 |
| $u = 0.631075 + 0.965174I$<br>$a = -1.92745 + 0.64474I$<br>$b = -1.55707 - 1.01380I$ | $-3.42616 - 4.42719I$ | 0 |
| $u = 0.631075 - 0.965174I$<br>$a = -1.92745 - 0.64474I$<br>$b = -1.55707 + 1.01380I$ | $-3.42616 + 4.42719I$ | 0 |
| $u = 0.629650 + 0.976191I$<br>$a = 1.23250 - 1.48669I$<br>$b = 0.528126 + 0.382461I$ | $0.39103 - 5.61584I$ | 0 |
| $u = 0.629650 - 0.976191I$<br>$a = 1.23250 + 1.48669I$<br>$b = 0.528126 - 0.382461I$ | $0.39103 + 5.61584I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.352055 + 0.754820I$<br>$a = -2.00994 + 2.12921I$<br>$b = -0.146379 + 0.209850I$ | $2.93943 + 1.39204I$ | 0 |
| $u = 0.352055 - 0.754820I$<br>$a = -2.00994 - 2.12921I$<br>$b = -0.146379 - 0.209850I$ | $2.93943 - 1.39204I$ | 0 |
| $u = -0.708371 + 0.431036I$<br>$a = -1.293870 - 0.230762I$<br>$b = -1.41656 - 0.14464I$ | $-4.71361 - 2.34843I$ | 0 |
| $u = -0.708371 - 0.431036I$<br>$a = -1.293870 + 0.230762I$<br>$b = -1.41656 + 0.14464I$ | $-4.71361 + 2.34843I$ | 0 |
| $u = 0.455227 + 1.089340I$<br>$a = 0.974536 - 0.050067I$<br>$b = 0.0693944 - 0.0112381I$ | $2.46244 - 5.69178I$ | 0 |
| $u = 0.455227 - 1.089340I$<br>$a = 0.974536 + 0.050067I$<br>$b = 0.0693944 + 0.0112381I$ | $2.46244 + 5.69178I$ | 0 |
| $u = 0.688567 + 0.441057I$<br>$a = -1.40211 + 0.89740I$<br>$b = -1.30493 + 1.02462I$ | $-3.92280 + 5.88359I$ | 0 |
| $u = 0.688567 - 0.441057I$<br>$a = -1.40211 - 0.89740I$<br>$b = -1.30493 - 1.02462I$ | $-3.92280 - 5.88359I$ | 0 |
| $u = -0.419510 + 1.107550I$<br>$a = 0.856484 - 0.171836I$<br>$b = -0.130336 + 0.242419I$ | $2.51303 + 1.69167I$ | 0 |
| $u = -0.419510 - 1.107550I$<br>$a = 0.856484 + 0.171836I$<br>$b = -0.130336 - 0.242419I$ | $2.51303 - 1.69167I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.626190+1.006950I$<br>$a=\ \ 0.98225+1.52642I$<br>$b=\ \ 0.596201-0.476832I$ | $-1.56303+11.65710I$ | 0 |
| $u=-0.626190-1.006950I$<br>$a=\ \ 0.98225-1.52642I$<br>$b=\ \ 0.596201+0.476832I$ | $-1.56303-11.65710I$ | 0 |
| $u=-0.639333+0.496386I$<br>$a=-1.37503-1.08086I$<br>$b=-1.082360-0.869374I$ | $-2.56168-2.03706I$ | 0 |
| $u=-0.639333-0.496386I$<br>$a=-1.37503+1.08086I$<br>$b=-1.082360+0.869374I$ | $-2.56168+2.03706I$ | 0 |
| $u=\ \ 0.381601+0.713137I$<br>$a=\ \ 1.096170-0.184203I$<br>$b=\ \ 0.159797+0.195526I$ | $-1.68467I$ | 0 |
| $u=\ \ 0.381601-0.713137I$<br>$a=\ \ 1.096170+0.184203I$<br>$b=\ \ 0.159797-0.195526I$ | $1.68467I$ | 0 |
| $u=-0.571186+1.051590I$<br>$a=-1.93792-1.06331I$<br>$b=-1.16702+1.19477I$ | $-0.91389+6.81255I$ | 0 |
| $u=-0.571186-1.051590I$<br>$a=-1.93792+1.06331I$<br>$b=-1.16702-1.19477I$ | $-0.91389-6.81255I$ | 0 |
| $u=-0.611075+1.029990I$<br>$a=-1.77487-0.80064I$<br>$b=-1.27397+1.09185I$ | $-1.22565+7.16377I$ | 0 |
| $u=-0.611075-1.029990I$<br>$a=-1.77487+0.80064I$<br>$b=-1.27397-1.09185I$ | $-1.22565-7.16377I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.466709 + 1.107420I$<br>$a = 0.335162 - 0.964918I$<br>$b = 1.262510 - 0.540668I$ | $1.71729 + 0.12884I$ | 0 |
| $u = 0.466709 - 1.107420I$<br>$a = 0.335162 + 0.964918I$<br>$b = 1.262510 + 0.540668I$ | $1.71729 - 0.12884I$ | 0 |
| $u = 0.671010 + 1.006380I$<br>$a = -1.81191 + 0.52143I$<br>$b = -1.41030 - 1.30320I$ | $-2.80619 - 10.52050I$ | 0 |
| $u = 0.671010 - 1.006380I$<br>$a = -1.81191 - 0.52143I$<br>$b = -1.41030 + 1.30320I$ | $-2.80619 + 10.52050I$ | 0 |
| $u = 0.771291 + 0.937193I$<br>$a = 0.686302 - 0.575965I$<br>$b = 0.616297 + 0.140686I$ | $-0.606146 - 1.140740I$ | 0 |
| $u = 0.771291 - 0.937193I$<br>$a = 0.686302 + 0.575965I$<br>$b = 0.616297 - 0.140686I$ | $-0.606146 + 1.140740I$ | 0 |
| $u = -0.698063 + 0.995619I$<br>$a = 0.841382 + 1.013130I$<br>$b = 0.695453 - 0.262974I$ | $-6.56925 + 3.46231I$ | 0 |
| $u = -0.698063 - 0.995619I$<br>$a = 0.841382 - 1.013130I$<br>$b = 0.695453 + 0.262974I$ | $-6.56925 - 3.46231I$ | 0 |
| $u = 0.578191 + 1.071130I$<br>$a = -1.86866 + 1.25531I$<br>$b = -1.30169 - 1.31275I$ | $-2.08454 - 10.78560I$ | 0 |
| $u = 0.578191 - 1.071130I$<br>$a = -1.86866 - 1.25531I$<br>$b = -1.30169 + 1.31275I$ | $-2.08454 + 10.78560I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \quad 0.592842 + 1.073840I$<br>$a = -1.54460 + 1.30495I$<br>$b = -1.47667 - 1.10479I$ | $-2.95745 - 5.07220I$ | 0 |
| $u = \quad 0.592842 - 1.073840I$<br>$a = -1.54460 - 1.30495I$<br>$b = -1.47667 + 1.10479I$ | $-2.95745 + 5.07220I$ | 0 |
| $u = -0.765303 + 0.050024I$<br>$a = \quad 0.363568 + 0.066459I$<br>$b = -0.605791 + 0.141338I$ | $-0.67186 + 2.31975I$ | 0 |
| $u = -0.765303 - 0.050024I$<br>$a = \quad 0.363568 - 0.066459I$<br>$b = -0.605791 - 0.141338I$ | $-0.67186 - 2.31975I$ | 0 |
| $u = -0.482768 + 1.135080I$<br>$a = \quad 0.023930 - 1.119440I$<br>$b = -1.078560 - 0.200178I$ | $-1.71729 + 0.12884I$ | 0 |
| $u = -0.482768 - 1.135080I$<br>$a = \quad 0.023930 + 1.119440I$<br>$b = -1.078560 + 0.200178I$ | $-1.71729 - 0.12884I$ | 0 |
| $u = -0.273788 + 0.715112I$<br>$a = -2.07465 - 1.93480I$<br>$b = -0.030393 - 0.433848I$ | $1.51032 - 6.94428I$ | 0 |
| $u = -0.273788 - 0.715112I$<br>$a = -2.07465 + 1.93480I$<br>$b = -0.030393 + 0.433848I$ | $1.51032 + 6.94428I$ | 0 |
| $u = \quad 0.043452 + 1.233880I$<br>$a = \quad 0.180099 + 0.343279I$<br>$b = \quad 0.206814 - 0.906510I$ | $6.56925 - 3.46231I$ | 0 |
| $u = \quad 0.043452 - 1.233880I$<br>$a = \quad 0.180099 - 0.343279I$<br>$b = \quad 0.206814 + 0.906510I$ | $6.56925 + 3.46231I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.574543+1.100800I$<br>$a=-0.87193-1.23367I$<br>$b=-1.38106+0.55995I$ | $-2.71913+7.28797I$ | 0 |
| $u=-0.574543-1.100800I$<br>$a=-0.87193+1.23367I$<br>$b=-1.38106-0.55995I$ | $-2.71913-7.28797I$ | 0 |
| $u=-0.658091+1.053900I$<br>$a=-1.57184-0.57018I$<br>$b=-1.17515+1.21312I$ | $-1.51032+6.94428I$ | 0 |
| $u=-0.658091-1.053900I$<br>$a=-1.57184+0.57018I$<br>$b=-1.17515-1.21312I$ | $-1.51032-6.94428I$ | 0 |
| $u=0.393787+0.643476I$<br>$a=1.87357+0.29863I$<br>$b=0.14001+1.89231I$ | $0.91389+6.81255I$ | 0 |
| $u=0.393787-0.643476I$<br>$a=1.87357-0.29863I$<br>$b=0.14001-1.89231I$ | $0.91389-6.81255I$ | 0 |
| $u=0.705100+0.214218I$<br>$a=1.97229-0.17443I$<br>$b=1.122970+0.284605I$ | $-0.95485-4.47973I$ | 0 |
| $u=0.705100-0.214218I$<br>$a=1.97229+0.17443I$<br>$b=1.122970-0.284605I$ | $-0.95485+4.47973I$ | 0 |
| $u=-0.789536+0.995518I$<br>$a=0.499761+0.691261I$<br>$b=0.670421-0.086046I$ | $-2.48531-4.47355I$ | 0 |
| $u=-0.789536-0.995518I$<br>$a=0.499761-0.691261I$<br>$b=0.670421+0.086046I$ | $-2.48531+4.47355I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.719646 + 0.108469I$<br>$a = 0.460682 - 0.104655I$<br>$b = -0.432315 - 0.228355I$ | $-0.33646 + 1.58880I$ | 0 |
| $u = 0.719646 - 0.108469I$<br>$a = 0.460682 + 0.104655I$<br>$b = -0.432315 + 0.228355I$ | $-0.33646 - 1.58880I$ | 0 |
| $u = -0.042466 + 1.272000I$<br>$a = 0.062952 - 0.240469I$<br>$b = 0.382049 + 0.836649I$ | $7.61513 - 2.24725I$ | 0 |
| $u = -0.042466 - 1.272000I$<br>$a = 0.062952 + 0.240469I$<br>$b = 0.382049 - 0.836649I$ | $7.61513 + 2.24725I$ | 0 |
| $u = 0.670465 + 0.278263I$<br>$a = -0.769817 - 0.284459I$<br>$b = -0.880367 - 0.143193I$ | $-1.75718 - 0.31487I$ | 0 |
| $u = 0.670465 - 0.278263I$<br>$a = -0.769817 + 0.284459I$<br>$b = -0.880367 + 0.143193I$ | $-1.75718 + 0.31487I$ | 0 |
| $u = -0.891440 + 0.913128I$<br>$a = 1.333200 + 0.349456I$<br>$b = 0.815105 - 0.053938I$ | $-8.03800 + 3.27961I$ | 0 |
| $u = -0.891440 - 0.913128I$<br>$a = 1.333200 - 0.349456I$<br>$b = 0.815105 + 0.053938I$ | $-8.03800 - 3.27961I$ | 0 |
| $u = 0.072964 + 1.286100I$<br>$a = -0.328203 + 0.088997I$<br>$b = 0.861394 - 0.890160I$ | $3.98637 + 12.32940I$ | 0 |
| $u = 0.072964 - 1.286100I$<br>$a = -0.328203 - 0.088997I$<br>$b = 0.861394 + 0.890160I$ | $3.98637 - 12.32940I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.658651 + 1.109470I$<br>$a = 1.40526 - 0.61472I$<br>$b = 0.847148 + 0.649948I$ | $2.48531 - 4.47355I$ | 0 |
| $u = 0.658651 - 1.109470I$<br>$a = 1.40526 + 0.61472I$<br>$b = 0.847148 - 0.649948I$ | $2.48531 + 4.47355I$ | 0 |
| $u = -0.072007 + 1.289600I$<br>$a = -0.244543 - 0.105047I$<br>$b = 0.780553 + 0.864479I$ | $6.16241 - 6.57875I$ | 0 |
| $u = -0.072007 - 1.289600I$<br>$a = -0.244543 + 0.105047I$<br>$b = 0.780553 - 0.864479I$ | $6.16241 + 6.57875I$ | 0 |
| $u = -0.583473 + 0.398241I$<br>$a = -1.42999 + 0.51046I$<br>$b = -1.227490 + 0.489496I$ | $-3.94857 + 4.14341I$ | 0 |
| $u = -0.583473 - 0.398241I$<br>$a = -1.42999 - 0.51046I$<br>$b = -1.227490 - 0.489496I$ | $-3.94857 - 4.14341I$ | 0 |
| $u = 0.552376 + 1.183780I$<br>$a = -0.377343 + 0.758983I$<br>$b = -0.847109 - 0.240602I$ | $0.95485 - 4.47973I$ | 0 |
| $u = 0.552376 - 1.183780I$<br>$a = -0.377343 - 0.758983I$<br>$b = -0.847109 + 0.240602I$ | $0.95485 + 4.47973I$ | 0 |
| $u = -0.654889 + 1.131880I$<br>$a = 1.47794 + 0.71162I$<br>$b = 1.007870 - 0.807047I$ | $3.50746 + 10.61500I$ | 0 |
| $u = -0.654889 - 1.131880I$<br>$a = 1.47794 - 0.71162I$<br>$b = 1.007870 + 0.807047I$ | $3.50746 - 10.61500I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.084335 + 1.306830I$<br>$a = -0.1227610 - 0.0657099I$<br>$b = 0.786767 - 0.649293I$ | $3.62376I$ | 0 |
| $u = 0.084335 - 1.306830I$<br>$a = -0.1227610 + 0.0657099I$<br>$b = 0.786767 + 0.649293I$ | $-3.62376I$ | 0 |
| $u = -0.653521 + 1.144520I$<br>$a = 1.60117 + 0.89022I$<br>$b = 1.29751 - 1.04509I$ | $2.1765 + 15.2001I$ | 0 |
| $u = -0.653521 - 1.144520I$<br>$a = 1.60117 - 0.89022I$<br>$b = 1.29751 + 1.04509I$ | $2.1765 - 15.2001I$ | 0 |
| $u = 0.654293 + 1.145280I$<br>$a = 1.63202 - 0.93496I$<br>$b = 1.37220 + 1.10031I$ | $-20.9496I$ | 0 |
| $u = 0.654293 - 1.145280I$<br>$a = 1.63202 + 0.93496I$<br>$b = 1.37220 - 1.10031I$ | $20.9496I$ | 0 |
| $u = 0.655460 + 1.144730I$<br>$a = 1.47891 - 0.91836I$<br>$b = 1.35520 + 0.84393I$ | $-3.98637 - 12.32940I$ | 0 |
| $u = 0.655460 - 1.144730I$<br>$a = 1.47891 + 0.91836I$<br>$b = 1.35520 - 0.84393I$ | $-3.98637 + 12.32940I$ | 0 |
| $u = -0.691727 + 1.137220I$<br>$a = -1.072790 - 0.230467I$<br>$b = -0.611869 + 1.073120I$ | $1.56303 + 11.65710I$ | 0 |
| $u = -0.691727 - 1.137220I$<br>$a = -1.072790 + 0.230467I$<br>$b = -0.611869 - 1.073120I$ | $1.56303 - 11.65710I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.300160+0.589936I$<br>$a=1.84979+0.16496I$<br>$b=0.17460-1.47213I$ | $2.56168-2.03706I$ | 0 |
| $u=-0.300160-0.589936I$<br>$a=1.84979-0.16496I$<br>$b=0.17460+1.47213I$ | $2.56168+2.03706I$ | 0 |
| $u=0.673480+1.160280I$<br>$a=-0.899680+0.305205I$<br>$b=-0.598617-0.873033I$ | $2.75046-6.50723I$ | 0 |
| $u=0.673480-1.160280I$<br>$a=-0.899680-0.305205I$<br>$b=-0.598617+0.873033I$ | $2.75046+6.50723I$ | 0 |
| $u=-0.503663+0.164702I$<br>$a=2.10891-0.10121I$<br>$b=0.663909-0.473720I$ | $1.75718-0.31487I$ | $4.85874+0.69141I$ |
| $u=-0.503663-0.164702I$<br>$a=2.10891+0.10121I$<br>$b=0.663909+0.473720I$ | $1.75718+0.31487I$ | $4.85874-0.69141I$ |
| $u=0.10156+1.61260I$<br>$a=0.1043490+0.0324267I$<br>$b=0.0071572+0.0438190I$ | $8.03800-3.27961I$ | 0 |
| $u=0.10156-1.61260I$<br>$a=0.1043490-0.0324267I$<br>$b=0.0071572-0.0438190I$ | $8.03800+3.27961I$ | 0 |
| $u=0.313148+0.174770I$<br>$a=-0.12867-2.44491I$<br>$b=-0.303311-0.750052I$ | $-1.82416-1.29895I$ | $-6.39100+3.91546I$ |
| $u=0.313148-0.174770I$<br>$a=-0.12867+2.44491I$<br>$b=-0.303311+0.750052I$ | $-1.82416+1.29895I$ | $-6.39100-3.91546I$ |

| | Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|---|
| $u=$ | $0.045217+0.207422I$ | | |
| $a=$ | $2.59304+3.75458I$ | $2.63356-2.12680I$ | $3.26407+2.56553I$ |
| $b=$ | $0.120451-1.038080I$ | | |
| $u=$ | $0.045217-0.207422I$ | | |
| $a=$ | $2.59304-3.75458I$ | $2.63356+2.12680I$ | $3.26407-2.56553I$ |
| $b=$ | $0.120451+1.038080I$ | | |
| $u=$ | $-0.169545+0.014842I$ | | |
| $a=$ | $-3.88240-4.02767I$ | $1.22565+7.16377I$ | $-0.18012-7.55527I$ |
| $b=$ | $0.011450+1.116910I$ | | |
| $u=$ | $-0.169545-0.014842I$ | | |
| $a=$ | $-3.88240+4.02767I$ | $1.22565-7.16377I$ | $-0.18012+7.55527I$ |
| $b=$ | $0.011450-1.116910I$ | | |

**II.**

$\boldsymbol{I_2^u = \langle 4.32\times 10^6 u^{35} + 4.28\times 10^6 u^{34} + \cdots + 6.27\times 10^5 b + 4.49\times 10^6,\ -2.30\times 10^6 u^{35} - 6.82\times 10^6 u^{34} + \cdots + 6.27\times 10^5 a - 8.28\times 10^5,\ u^{36} + u^{35} + \cdots - 2u + 1\rangle}$

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

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

$$a_8 = \begin{pmatrix} 3.66222u^{35} + 10.8788u^{34} + \cdots + 3.26928u + 1.32099 \\ -6.88626u^{35} - 6.82295u^{34} + \cdots + 1.75798u - 7.15323 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 3.66222u^{35} + 9.87876u^{34} + \cdots + 5.26928u + 1.32099 \\ -6.88626u^{35} - 7.82295u^{34} + \cdots + 1.75798u - 7.15323 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 4.54050u^{35} - 3.56480u^{34} + \cdots + 15.1947u - 6.72077 \\ 4.89493u^{35} - 0.428559u^{34} + \cdots + 13.6672u - 1.27951 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u \\ u^3+u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1.21474u^{35} + 9.38756u^{34} + \cdots + 1.18940u - 0.750177 \\ -9.61950u^{35} - 12.3039u^{34} + \cdots + 4.03814u - 10.1807 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 5.53474u^{35} - 6.59347u^{34} + \cdots + 32.4088u - 7.62500 \\ 4.61633u^{35} + 6.06683u^{34} + \cdots - 9.66456u + 3.24553 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1.35537u^{35} + 1.33182u^{34} + \cdots - 22.5959u + 8.94503 \\ 0.144138u^{35} + 0.635297u^{34} + \cdots + 9.83686u + 0.194845 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 13.8338u^{35} + 16.4789u^{34} + \cdots - 19.8380u + 20.7300 \\ 3.31813u^{35} + 9.23511u^{34} + \cdots - 0.315557u + 4.39888 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= \frac{27488728}{627059}u^{35} + \frac{14925233}{627059}u^{34} + \cdots + \frac{36240697}{627059}u - \frac{2539348}{627059}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_{12}$ | $u^{36} - 21u^{35} + \cdots - 22u + 1$ |
| $c_2, c_4$ | $u^{36} - u^{35} + \cdots + 2u + 1$ |
| $c_3$ | $u^{36} + 6u^{34} + \cdots + 6u^2 + 1$ |
| $c_5$ | $u^{36} - 2u^{35} + \cdots - 7u + 1$ |
| $c_6, c_{11}$ | $u^{36} + u^{35} + \cdots - 2u + 1$ |
| $c_7$ | $u^{36} + 6u^{34} + \cdots + 6u^2 + 1$ |
| $c_8$ | $u^{36} + 2u^{35} + \cdots + 7u + 1$ |
| $c_9$ | $u^{36} - 18u^{35} + \cdots - 21u + 1$ |
| $c_{10}$ | $u^{36} + 18u^{35} + \cdots + 21u + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_{12}$ | $y^{36} + y^{35} + \cdots - 38y + 1$ |
| $c_2, c_4, c_6$ $c_{11}$ | $y^{36} + 21y^{35} + \cdots + 22y + 1$ |
| $c_3, c_7$ | $y^{36} + 12y^{35} + \cdots + 12y + 1$ |
| $c_5, c_8$ | $y^{36} + 8y^{35} + \cdots - 5y + 1$ |
| $c_9, c_{10}$ | $y^{36} + 4y^{35} + \cdots - 31y + 1$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.356759 + 0.951607I$<br>$a = 0.914331 - 0.965264I$<br>$b = 0.479126 - 0.692848I$ | $3.79170 - 3.65299I$ | $5.12688 + 4.63537I$ |
| $u = 0.356759 - 0.951607I$<br>$a = 0.914331 + 0.965264I$<br>$b = 0.479126 + 0.692848I$ | $3.79170 + 3.65299I$ | $5.12688 - 4.63537I$ |
| $u = -0.168805 + 0.968564I$<br>$a = -0.190175 + 0.324188I$<br>$b = -0.231683 + 0.977267I$ | $-0.27034 + 2.03072I$ | $-1.37413 - 3.54155I$ |
| $u = -0.168805 - 0.968564I$<br>$a = -0.190175 - 0.324188I$<br>$b = -0.231683 - 0.977267I$ | $-0.27034 - 2.03072I$ | $-1.37413 + 3.54155I$ |
| $u = -0.328701 + 0.921262I$<br>$a = 0.41300 + 1.42504I$<br>$b = 0.576857 + 1.040110I$ | $2.17546 + 8.59712I$ | $1.74361 - 10.55765I$ |
| $u = -0.328701 - 0.921262I$<br>$a = 0.41300 - 1.42504I$<br>$b = 0.576857 - 1.040110I$ | $2.17546 - 8.59712I$ | $1.74361 + 10.55765I$ |
| $u = -0.814995 + 0.636107I$<br>$a = -0.363443 - 0.522456I$<br>$b = -0.493974 - 0.752653I$ | $-1.18883 - 5.41822I$ | $-3.24773 + 6.10728I$ |
| $u = -0.814995 - 0.636107I$<br>$a = -0.363443 + 0.522456I$<br>$b = -0.493974 + 0.752653I$ | $-1.18883 + 5.41822I$ | $-3.24773 - 6.10728I$ |
| $u = -0.349182 + 0.897849I$<br>$a = 2.30551 + 1.09645I$<br>$b = 0.32685 - 1.41797I$ | $2.12597 - 5.76800I$ | $2.04602 + 5.29647I$ |
| $u = -0.349182 - 0.897849I$<br>$a = 2.30551 - 1.09645I$<br>$b = 0.32685 + 1.41797I$ | $2.12597 + 5.76800I$ | $2.04602 - 5.29647I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.200589 + 1.038470I$<br>$a = 0.506535 + 0.199478I$<br>$b = -0.768317 + 0.977267I$ | $0.27034 + 2.03072I$ | $1.37413 - 3.54155I$ |
| $u = 0.200589 - 1.038470I$<br>$a = 0.506535 - 0.199478I$<br>$b = -0.768317 - 0.977267I$ | $0.27034 - 2.03072I$ | $1.37413 + 3.54155I$ |
| $u = 0.346855 + 0.870417I$<br>$a = 1.88560 - 1.51011I$<br>$b = 0.227687 + 1.020110I$ | $3.49419 + 0.74030I$ | $6.39310 + 1.20566I$ |
| $u = 0.346855 - 0.870417I$<br>$a = 1.88560 + 1.51011I$<br>$b = 0.227687 - 1.020110I$ | $3.49419 - 0.74030I$ | $6.39310 - 1.20566I$ |
| $u = -0.706790 + 0.591629I$<br>$a = -0.79057 - 1.32948I$<br>$b = -1.22769 - 1.02011I$ | $-3.49419 - 0.74030I$ | $-6.39310 - 1.20566I$ |
| $u = -0.706790 - 0.591629I$<br>$a = -0.79057 + 1.32948I$<br>$b = -1.22769 + 1.02011I$ | $-3.49419 + 0.74030I$ | $-6.39310 + 1.20566I$ |
| $u = 0.675614 + 0.524353I$<br>$a = -1.28892 + 1.33374I$<br>$b = -1.47913 + 0.69285I$ | $-3.79170 + 3.65299I$ | $-5.12688 - 4.63537I$ |
| $u = 0.675614 - 0.524353I$<br>$a = -1.28892 - 1.33374I$<br>$b = -1.47913 - 0.69285I$ | $-3.79170 - 3.65299I$ | $-5.12688 + 4.63537I$ |
| $u = 0.442727 + 1.088630I$<br>$a = 0.381092 + 0.198242I$<br>$b = 0.103714 - 0.465023I$ | $2.48966 - 3.63792I$ | $3.42962 + 4.01261I$ |
| $u = 0.442727 - 1.088630I$<br>$a = 0.381092 - 0.198242I$<br>$b = 0.103714 + 0.465023I$ | $2.48966 + 3.63792I$ | $3.42962 - 4.01261I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.626367+1.013070I$<br>$a=-1.54592-0.41097I$<br>$b=-0.500000+1.211640I$ | $10.7799I$ | $0.-10.33735I$ |
| $u=-0.626367-1.013070I$<br>$a=-1.54592+0.41097I$<br>$b=-0.500000-1.211640I$ | $-10.7799I$ | $0.+10.33735I$ |
| $u=0.643817+1.004750I$<br>$a=-1.38327+0.63511I$<br>$b=-0.506026-0.752653I$ | $1.18883-5.41822I$ | $3.24773+6.10728I$ |
| $u=0.643817-1.004750I$<br>$a=-1.38327-0.63511I$<br>$b=-0.506026+0.752653I$ | $1.18883+5.41822I$ | $3.24773-6.10728I$ |
| $u=-0.597688+1.033090I$<br>$a=-1.92399-0.85913I$<br>$b=-1.32685+1.41797I$ | $-2.12597+5.76800I$ | $-2.04602-5.29647I$ |
| $u=-0.597688-1.033090I$<br>$a=-1.92399+0.85913I$<br>$b=-1.32685-1.41797I$ | $-2.12597-5.76800I$ | $-2.04602+5.29647I$ |
| $u=0.589877+1.057630I$<br>$a=-1.69470+1.11132I$<br>$b=-1.57686-1.04011I$ | $-2.17546-8.59712I$ | $-1.74361+10.55765I$ |
| $u=0.589877-1.057630I$<br>$a=-1.69470-1.11132I$<br>$b=-1.57686+1.04011I$ | $-2.17546+8.59712I$ | $-1.74361-10.55765I$ |
| $u=-0.900597+0.911872I$<br>$a=-1.323740-0.331610I$<br>$b=-0.801899+0.061698I$ | $-8.00014+3.30429I$ | $75.1029-50.7555I$ |
| $u=-0.900597-0.911872I$<br>$a=-1.323740+0.331610I$<br>$b=-0.801899-0.061698I$ | $-8.00014-3.30429I$ | $75.1029+50.7555I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \ 0.556811 + 0.339720I$<br>$a = \ 0.179003 - 0.837618I$<br>$b = -0.500000 + 0.202005I$ | $-0.232158I$ | $-60.10 + 0.405410I$ |
| $u = \ 0.556811 - 0.339720I$<br>$a = \ 0.179003 + 0.837618I$<br>$b = -0.500000 - 0.202005I$ | $0.232158I$ | $-60.10 - 0.405410I$ |
| $u = \ 0.085789 + 0.390964I$<br>$a = -1.56881 + 2.35602I$<br>$b = -1.103710 - 0.465023I$ | $-2.48966 - 3.63792I$ | $-3.42962 + 4.01261I$ |
| $u = \ 0.085789 - 0.390964I$<br>$a = -1.56881 - 2.35602I$<br>$b = -1.103710 + 0.465023I$ | $-2.48966 + 3.63792I$ | $-3.42962 - 4.01261I$ |
| $u = \ 0.09429 + 1.62517I$<br>$a = -0.0115273 - 0.0094239I$<br>$b = -0.198101 - 0.061698I$ | $8.00014 - 3.30429I$ | $0$ |
| $u = \ 0.09429 - 1.62517I$<br>$a = -0.0115273 + 0.0094239I$<br>$b = -0.198101 + 0.061698I$ | $8.00014 + 3.30429I$ | $0$ |

**III. $I_3^u = \langle -u^2 + b + u,\ -u^3 + u^2 + a,\ u^4 - u^3 + u^2 - u + 1 \rangle$**

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

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

$$a_8 = \begin{pmatrix} u^3 - u^2 \\ u^2 - u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u + 1 \\ -u^3 + 2u^2 - u + 1 \end{pmatrix}$$

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

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

$$a_2 = \begin{pmatrix} 2u^2 - u \\ u - 2 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 0$

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

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

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

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

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

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.309017+0.951057I$<br>$a=\ \ 1.61803$<br>$b=-0.50000-1.53884I$ | 0 | 0 |
| $u=-0.309017-0.951057I$<br>$a=\ \ 1.61803$<br>$b=-0.50000+1.53884I$ | 0 | 0 |
| $u=\ \ 0.809017+0.587785I$<br>$a=-0.618034$<br>$b=-0.500000+0.363271I$ | 0 | 0 |
| $u=\ \ 0.809017-0.587785I$<br>$a=-0.618034$<br>$b=-0.500000-0.363271I$ | 0 | 0 |

**IV. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u^4-u^3+u^2-u+1)(u^{36}-21u^{35}+\cdots-22u+1)$ $\cdot(u^{184}+83u^{183}+\cdots-5u+1)$ |
| $c_2$ | $(u^4+u^3+u^2+u+1)(u^{36}-u^{35}+\cdots+2u+1)(u^{184}-u^{183}+\cdots+5u+1)$ |
| $c_3$ | $(u^4-u^3+u^2-u+1)(u^{36}+6u^{34}+\cdots+6u^2+1)$ $\cdot(u^{184}+2u^{183}+\cdots+4095u+691)$ |
| $c_4$ | $(u^4+u^3+u^2+u+1)(u^{36}-u^{35}+\cdots+2u+1)(u^{184}+u^{183}+\cdots-5u+1)$ |
| $c_5$ | $(u^4+u^3+u^2+u+1)(u^{36}-2u^{35}+\cdots-7u+1)$ $\cdot(u^{184}+2u^{183}+\cdots+3708404u+1584839)$ |
| $c_6$ | $(u^4-u^3+u^2-u+1)(u^{36}+u^{35}+\cdots-2u+1)(u^{184}-u^{183}+\cdots+5u+1)$ |
| $c_7$ | $(u^4+u^3+u^2+u+1)(u^{36}+6u^{34}+\cdots+6u^2+1)$ $\cdot(u^{184}-2u^{183}+\cdots-4095u+691)$ |
| $c_8$ | $(u^4-u^3+u^2-u+1)(u^{36}+2u^{35}+\cdots+7u+1)$ $\cdot(u^{184}-2u^{183}+\cdots-3708404u+1584839)$ |
| $c_9$ | $(u^4-2u^3+4u^2-3u+1)(u^{36}-18u^{35}+\cdots-21u+1)$ $\cdot(u^{184}-11u^{183}+\cdots+8744u+257)$ |
| $c_{10}$ | $(u^4+2u^3+4u^2+3u+1)(u^{36}+18u^{35}+\cdots+21u+1)$ $\cdot(u^{184}+11u^{183}+\cdots-8744u+257)$ |
| $c_{11}$ | $(u^4-u^3+u^2-u+1)(u^{36}+u^{35}+\cdots-2u+1)(u^{184}+u^{183}+\cdots-5u+1)$ |
| $c_{12}$ | $(u^4-u^3+u^2-u+1)(u^{36}-21u^{35}+\cdots-22u+1)$ $\cdot(u^{184}-83u^{183}+\cdots+5u+1)$ |

**V. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_{12}$ | $(y^4+y^3+y^2+y+1)(y^{36}+y^{35}+\cdots-38y+1)$ $\cdot(y^{184}+47y^{183}+\cdots-2797y+1)$ |
| $c_2, c_4, c_6$ $c_{11}$ | $(y^4+y^3+y^2+y+1)(y^{36}+21y^{35}+\cdots+22y+1)$ $\cdot(y^{184}+83y^{183}+\cdots-5y+1)$ |
| $c_3, c_7$ | $(y^4+y^3+y^2+y+1)(y^{36}+12y^{35}+\cdots+12y+1)$ $\cdot(y^{184}+2y^{183}+\cdots-20009815y+477481)$ |
| $c_5, c_8$ | $(y^4+y^3+y^2+y+1)(y^{36}+8y^{35}+\cdots-5y+1)$ $\cdot(y^{184}-18y^{183}+\cdots-530431543575720y+2511714655921)$ |
| $c_9, c_{10}$ | $(y^4+4y^3+6y^2-y+1)(y^{36}+4y^{35}+\cdots-31y+1)$ $\cdot(y^{184}-23y^{183}+\cdots+38603420y+66049)$ |