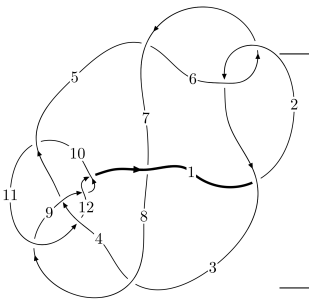
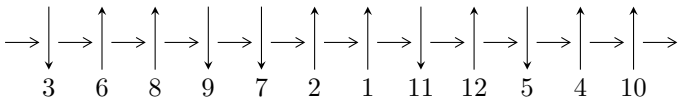
## $12a_{0283}$ $(K12a_{0283})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$\begin{aligned} I_1^u = \langle & -7.90119 \times 10^{36} u^{112} - 1.11419 \times 10^{37} u^{111} + \cdots + 3.32893 \times 10^{36} b - 5.90383 \times 10^{36}, \\ & - 1.73556 \times 10^{37} u^{112} - 1.93532 \times 10^{37} u^{111} + \cdots + 3.32893 \times 10^{36} a - 1.78658 \times 10^{37}, \\ & u^{113} + 2u^{112} + \cdots + 5u + 1 \rangle \\ I_2^u = \langle & b + 1,\ a - 2u + 2,\ u^2 - u + 1 \rangle \end{aligned}$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 115 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.** $\boldsymbol{I_1^u = \langle -7.90 \times 10^{36} u^{112} - 1.11 \times 10^{37} u^{111} + \cdots + 3.33 \times 10^{36} b - 5.90 \times 10^{36},\ -1.74 \times 10^{37} u^{112} - 1.94 \times 10^{37} u^{111} + \cdots + 3.33 \times 10^{36} a - 1.79 \times 10^{37},\ u^{113} + 2u^{112} + \cdots + 5u + 1 \rangle}$

**(i) Arc colorings**

$$a_2 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^3 \\ u^5 + u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u^8 - u^6 - u^4 + 1 \\ -u^{10} - 2u^8 - 3u^6 - 2u^4 - u^2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u^{15} - 2u^{13} - 4u^{11} - 4u^9 - 2u^7 + 2u^3 + 2u \\ -u^{17} - 3u^{15} - 7u^{13} - 10u^{11} - 11u^9 - 8u^7 - 4u^5 + u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u^2 + 1 \\ u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 5.21357u^{112} + 5.81366u^{111} + \cdots + 18.2825u + 5.36683 \\ 2.37349u^{112} + 3.34698u^{111} + \cdots + 10.5007u + 1.77349 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 2.57332u^{112} + 3.57332u^{111} + \cdots + 12.2084u + 4.96666 \\ 0.133325u^{112} + 0.0666489u^{111} + \cdots + 1.69996u - 0.0666762 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 5.11321u^{112} + 5.91317u^{111} + \cdots + 17.5894u + 5.71659 \\ 2.47326u^{112} + 3.54651u^{111} + \cdots + 11.6496u + 1.87326 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.233210u^{112} - 0.633170u^{111} + \cdots - 0.666853u - 1.11658 \\ -0.833251u^{112} - 1.66650u^{111} + \cdots - 4.04963u - 0.833250 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 11.7807u^{112} + 18.4014u^{111} + \cdots + 41.3370u + 11.9807$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $u^{113} + 36u^{112} + \cdots - 5u - 1$ |
| $c_2, c_6$ | $u^{113} - 2u^{112} + \cdots + 5u - 1$ |
| $c_3$ | $u^{113} - 34u^{111} + \cdots - 426005u - 37025$ |
| $c_4$ | $u^{113} + 4u^{112} + \cdots + u + 1$ |
| $c_7$ | $u^{113} + 5u^{112} + \cdots - 28640u - 6976$ |
| $c_8$ | $u^{113} - 19u^{112} + \cdots - 12u + 4$ |
| $c_9, c_{12}$ | $u^{113} + 3u^{112} + \cdots + 2u - 1$ |
| $c_{10}$ | $u^{113} - 2u^{112} + \cdots + 459991u + 41101$ |
| $c_{11}$ | $u^{113} - 4u^{112} + \cdots - 58837u + 9439$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $y^{113} + 84y^{112} + \cdots - 257y - 1$ |
| $c_2, c_6$ | $y^{113} + 36y^{112} + \cdots - 5y - 1$ |
| $c_3$ | $y^{113} - 68y^{112} + \cdots + 209188214975y - 1370850625$ |
| $c_4$ | $y^{113} + 20y^{112} + \cdots - 5y - 1$ |
| $c_7$ | $y^{113} - 17y^{112} + \cdots - 533582720y - 48664576$ |
| $c_8$ | $y^{113} + 15y^{112} + \cdots - 280y - 16$ |
| $c_9, c_{12}$ | $y^{113} - 83y^{112} + \cdots + 26y - 1$ |
| $c_{10}$ | $y^{113} - 68y^{112} + \cdots - 308333217253y - 1689292201$ |
| $c_{11}$ | $y^{113} - 136y^{112} + \cdots + 1552528283y - 89094721$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.189604 + 0.989106I$<br>$a = 0.732820 + 0.284224I$<br>$b = -1.91009 + 0.59078I$ | $2.22230 + 4.51942I$ | 0 |
| $u = 0.189604 - 0.989106I$<br>$a = 0.732820 - 0.284224I$<br>$b = -1.91009 - 0.59078I$ | $2.22230 - 4.51942I$ | 0 |
| $u = 0.026076 + 1.011230I$<br>$a = -0.862472 - 0.519253I$<br>$b = 1.60460 + 0.26158I$ | $-5.26942 - 0.99049I$ | 0 |
| $u = 0.026076 - 1.011230I$<br>$a = -0.862472 + 0.519253I$<br>$b = 1.60460 - 0.26158I$ | $-5.26942 + 0.99049I$ | 0 |
| $u = -0.144566 + 1.004840I$<br>$a = -0.170892 - 0.681801I$<br>$b = 0.398767 + 0.551773I$ | $-1.95648 - 2.79535I$ | 0 |
| $u = -0.144566 - 1.004840I$<br>$a = -0.170892 + 0.681801I$<br>$b = 0.398767 - 0.551773I$ | $-1.95648 + 2.79535I$ | 0 |
| $u = -0.161120 + 0.967489I$<br>$a = -2.92000 + 2.19375I$<br>$b = 3.14464 - 1.06906I$ | $0.16594 - 2.30056I$ | 0 |
| $u = -0.161120 - 0.967489I$<br>$a = -2.92000 - 2.19375I$<br>$b = 3.14464 + 1.06906I$ | $0.16594 + 2.30056I$ | 0 |
| $u = -0.675887 + 0.690929I$<br>$a = 1.48016 - 0.54011I$<br>$b = 0.786677 - 0.431007I$ | $-0.242700 - 0.820844I$ | 0 |
| $u = -0.675887 - 0.690929I$<br>$a = 1.48016 + 0.54011I$<br>$b = 0.786677 + 0.431007I$ | $-0.242700 + 0.820844I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.662797 + 0.797671I$<br>$a = 0.33518 + 2.73691I$<br>$b = -1.26294 + 1.81134I$ | $3.48900 - 0.36060I$ | 0 |
| $u = 0.662797 - 0.797671I$<br>$a = 0.33518 - 2.73691I$<br>$b = -1.26294 - 1.81134I$ | $3.48900 + 0.36060I$ | 0 |
| $u = 0.170034 + 1.023370I$<br>$a = 0.576812 - 0.188643I$<br>$b = -1.44988 - 0.25305I$ | $-2.23668 + 7.07465I$ | 0 |
| $u = 0.170034 - 1.023370I$<br>$a = 0.576812 + 0.188643I$<br>$b = -1.44988 + 0.25305I$ | $-2.23668 - 7.07465I$ | 0 |
| $u = 0.205935 + 0.940229I$<br>$a = 0.083619 + 1.367930I$<br>$b = -0.599757 + 0.498152I$ | $2.58224 + 0.70114I$ | 0 |
| $u = 0.205935 - 0.940229I$<br>$a = 0.083619 - 1.367930I$<br>$b = -0.599757 - 0.498152I$ | $2.58224 - 0.70114I$ | 0 |
| $u = 0.375783 + 0.967245I$<br>$a = 0.50682 - 1.95144I$<br>$b = 0.852029 + 0.071099I$ | $3.49202 - 6.70621I$ | 0 |
| $u = 0.375783 - 0.967245I$<br>$a = 0.50682 + 1.95144I$<br>$b = 0.852029 - 0.071099I$ | $3.49202 + 6.70621I$ | 0 |
| $u = -0.630738 + 0.848947I$<br>$a = -1.42954 + 4.92205I$<br>$b = 1.23780 + 2.16333I$ | $2.25355 - 2.08148I$ | 0 |
| $u = -0.630738 - 0.848947I$<br>$a = -1.42954 - 4.92205I$<br>$b = 1.23780 - 2.16333I$ | $2.25355 + 2.08148I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.586086+0.884873I$<br>$a=\ \ 0.496140+0.240299I$<br>$b=\ \ 0.0768557+0.0195798I$ | $0.18011-2.30125I$ | 0 |
| $u=-0.586086-0.884873I$<br>$a=\ \ 0.496140-0.240299I$<br>$b=\ \ 0.0768557-0.0195798I$ | $0.18011+2.30125I$ | 0 |
| $u=-0.026671+1.069690I$<br>$a=\ \ 0.529521+0.341317I$<br>$b=-0.90525-1.22531I$ | $-2.88023-5.15805I$ | 0 |
| $u=-0.026671-1.069690I$<br>$a=\ \ 0.529521-0.341317I$<br>$b=-0.90525+1.22531I$ | $-2.88023+5.15805I$ | 0 |
| $u=\ \ 0.186610+1.057550I$<br>$a=-1.166760+0.054768I$<br>$b=\ \ 1.97199-0.92146I$ | $2.31195+12.95770I$ | 0 |
| $u=\ \ 0.186610-1.057550I$<br>$a=-1.166760-0.054768I$<br>$b=\ \ 1.97199+0.92146I$ | $2.31195-12.95770I$ | 0 |
| $u=\ \ 0.804411+0.716895I$<br>$a=\ \ 0.735745+0.907695I$<br>$b=\ \ 0.33930+1.41948I$ | $4.35773-2.32723I$ | 0 |
| $u=\ \ 0.804411-0.716895I$<br>$a=\ \ 0.735745-0.907695I$<br>$b=\ \ 0.33930-1.41948I$ | $4.35773+2.32723I$ | 0 |
| $u=-0.102129+0.914705I$<br>$a=\ \ 1.154070-0.332979I$<br>$b=-0.843195+1.117950I$ | $-0.90049-1.52806I$ | 0 |
| $u=-0.102129-0.914705I$<br>$a=\ \ 1.154070+0.332979I$<br>$b=-0.843195-1.117950I$ | $-0.90049+1.52806I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.819096+0.714745I$<br>$a=-2.15580-0.09456I$<br>$b=-1.93234+1.04877I$ | $4.33771+6.65572I$ | 0 |
| $u=-0.819096-0.714745I$<br>$a=-2.15580+0.09456I$<br>$b=-1.93234-1.04877I$ | $4.33771-6.65572I$ | 0 |
| $u=\ \ 0.804336+0.735844I$<br>$a=\ \ 3.49496-0.99406I$<br>$b=\ \ 3.91616-0.62862I$ | $6.48008-1.48579I$ | 0 |
| $u=\ \ 0.804336-0.735844I$<br>$a=\ \ 3.49496+0.99406I$<br>$b=\ \ 3.91616+0.62862I$ | $6.48008+1.48579I$ | 0 |
| $u=\ \ 0.789668+0.751601I$<br>$a=-1.54050+0.39634I$<br>$b=-1.88394-0.46765I$ | $4.99982-0.39403I$ | 0 |
| $u=\ \ 0.789668-0.751601I$<br>$a=-1.54050-0.39634I$<br>$b=-1.88394+0.46765I$ | $4.99982+0.39403I$ | 0 |
| $u=-0.401772+1.017800I$<br>$a=-0.591734-0.890779I$<br>$b=-0.716621+0.195724I$ | $2.46164-2.16481I$ | 0 |
| $u=-0.401772-1.017800I$<br>$a=-0.591734+0.890779I$<br>$b=-0.716621-0.195724I$ | $2.46164+2.16481I$ | 0 |
| $u=-0.198122+1.076290I$<br>$a=\ \ 0.611926-0.129141I$<br>$b=-1.114960-0.661410I$ | $1.26696-4.49664I$ | 0 |
| $u=-0.198122-1.076290I$<br>$a=\ \ 0.611926+0.129141I$<br>$b=-1.114960+0.661410I$ | $1.26696+4.49664I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.839364+0.705527I$<br>$a=\ \ 2.43675-1.34274I$<br>$b=\ \ 1.90827-1.96991I$ | $9.1807+12.7383I$ | 0 |
| $u=-0.839364-0.705527I$<br>$a=\ \ 2.43675+1.34274I$<br>$b=\ \ 1.90827+1.96991I$ | $9.1807-12.7383I$ | 0 |
| $u=-0.817248+0.732933I$<br>$a=-2.47219+1.33611I$<br>$b=-1.43792+1.92631I$ | $8.80037+3.76825I$ | 0 |
| $u=-0.817248-0.732933I$<br>$a=-2.47219-1.33611I$<br>$b=-1.43792-1.92631I$ | $8.80037-3.76825I$ | 0 |
| $u=\ \ 0.701871+0.564677I$<br>$a=-0.49909-1.83088I$<br>$b=-0.249255-1.199190I$ | $2.51246-6.05594I$ | 0 |
| $u=\ \ 0.701871-0.564677I$<br>$a=-0.49909+1.83088I$<br>$b=-0.249255+1.199190I$ | $2.51246+6.05594I$ | 0 |
| $u=\ \ 0.849309+0.703940I$<br>$a=-1.44363-1.05383I$<br>$b=-1.02819-1.27379I$ | $8.30024-4.35385I$ | 0 |
| $u=\ \ 0.849309-0.703940I$<br>$a=-1.44363+1.05383I$<br>$b=-1.02819+1.27379I$ | $8.30024+4.35385I$ | 0 |
| $u=\ \ 0.686961+0.864297I$<br>$a=-0.575551+0.948996I$<br>$b=-1.65465-0.21237I$ | $4.86859+2.64754I$ | 0 |
| $u=\ \ 0.686961-0.864297I$<br>$a=-0.575551-0.948996I$<br>$b=-1.65465+0.21237I$ | $4.86859-2.64754I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.812046+0.748463I$<br>$a=-0.201771+0.950170I$<br>$b=\ \ 0.572463+0.018516I$ | $9.08614-0.40058I$ | 0 |
| $u=-0.812046-0.748463I$<br>$a=-0.201771-0.950170I$<br>$b=\ \ 0.572463-0.018516I$ | $9.08614+0.40058I$ | 0 |
| $u=-0.644754+0.896793I$<br>$a=\ \ 2.72070-3.11928I$<br>$b=\ \ 0.37701-2.38093I$ | $2.08561-2.89593I$ | 0 |
| $u=-0.644754-0.896793I$<br>$a=\ \ 2.72070+3.11928I$<br>$b=\ \ 0.37701+2.38093I$ | $2.08561+2.89593I$ | 0 |
| $u=-0.799673+0.768477I$<br>$a=\ \ 1.47725+0.34620I$<br>$b=\ \ 1.28181-0.95862I$ | $5.32160-3.46023I$ | 0 |
| $u=-0.799673-0.768477I$<br>$a=\ \ 1.47725-0.34620I$<br>$b=\ \ 1.28181+0.95862I$ | $5.32160+3.46023I$ | 0 |
| $u=\ \ 0.676390+0.918048I$<br>$a=-2.32133-1.14228I$<br>$b=-0.75684-2.25603I$ | $3.11538+5.56594I$ | 0 |
| $u=\ \ 0.676390-0.918048I$<br>$a=-2.32133+1.14228I$<br>$b=-0.75684+2.25603I$ | $3.11538-5.56594I$ | 0 |
| $u=-0.825041+0.795140I$<br>$a=\ \ 0.0359918+0.0423536I$<br>$b=-0.358265+0.924552I$ | $10.78520-8.74874I$ | 0 |
| $u=-0.825041-0.795140I$<br>$a=\ \ 0.0359918-0.0423536I$<br>$b=-0.358265-0.924552I$ | $10.78520+8.74874I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.634049 + 0.959454I$<br>$a = -0.64721 - 2.33021I$<br>$b = 1.34193 - 1.32305I$ | $-1.71577 + 6.42867I$ | 0 |
| $u = 0.634049 - 0.959454I$<br>$a = -0.64721 + 2.33021I$<br>$b = 1.34193 + 1.32305I$ | $-1.71577 - 6.42867I$ | 0 |
| $u = 0.477211 + 0.699293I$<br>$a = 1.11525 + 0.93560I$<br>$b = 0.594232 + 0.916168I$ | $-0.91883 - 1.63359I$ | 0 |
| $u = 0.477211 - 0.699293I$<br>$a = 1.11525 - 0.93560I$<br>$b = 0.594232 - 0.916168I$ | $-0.91883 + 1.63359I$ | 0 |
| $u = 0.830935 + 0.807266I$<br>$a = -0.460954 - 0.115699I$<br>$b = 0.148646 + 0.211422I$ | $10.18150 + 0.03828I$ | 0 |
| $u = 0.830935 - 0.807266I$<br>$a = -0.460954 + 0.115699I$<br>$b = 0.148646 - 0.211422I$ | $10.18150 - 0.03828I$ | 0 |
| $u = -0.602752 + 1.009100I$<br>$a = -1.27531 - 0.68721I$<br>$b = -1.048330 + 0.609756I$ | $0.615565 - 1.062850I$ | 0 |
| $u = -0.602752 - 1.009100I$<br>$a = -1.27531 + 0.68721I$<br>$b = -1.048330 - 0.609756I$ | $0.615565 + 1.062850I$ | 0 |
| $u = 0.361501 + 0.737362I$<br>$a = 0.848717 + 0.806251I$<br>$b = 0.481917 + 0.741929I$ | $-0.91881 - 1.62689I$ | $0. + 2.38205I$ |
| $u = 0.361501 - 0.737362I$<br>$a = 0.848717 - 0.806251I$<br>$b = 0.481917 - 0.741929I$ | $-0.91881 + 1.62689I$ | $0. - 2.38205I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.673061+0.469584I$<br>$a=-0.92029-1.20880I$<br>$b=-0.743094-0.713671I$ | $2.10101-3.80196I$ | $6.48289+8.14563I$ |
| $u=-0.673061-0.469584I$<br>$a=-0.92029+1.20880I$<br>$b=-0.743094+0.713671I$ | $2.10101+3.80196I$ | $6.48289-8.14563I$ |
| $u=-0.669832+0.975779I$<br>$a=\ \ 0.34691+2.02425I$<br>$b=\ \ 1.200410+0.680396I$ | $-1.08624-4.42004I$ | 0 |
| $u=-0.669832-0.975779I$<br>$a=\ \ 0.34691-2.02425I$<br>$b=\ \ 1.200410-0.680396I$ | $-1.08624+4.42004I$ | 0 |
| $u=\ \ 0.648914+1.007590I$<br>$a=\ \ 1.60848+1.60199I$<br>$b=-0.25294+1.62779I$ | $1.27121+11.23550I$ | 0 |
| $u=\ \ 0.648914-1.007590I$<br>$a=\ \ 1.60848-1.60199I$<br>$b=-0.25294-1.62779I$ | $1.27121-11.23550I$ | 0 |
| $u=\ \ 0.730788+0.973951I$<br>$a=-0.91332+1.98011I$<br>$b=-2.18585+0.12251I$ | $4.31836+6.13109I$ | 0 |
| $u=\ \ 0.730788-0.973951I$<br>$a=-0.91332-1.98011I$<br>$b=-2.18585-0.12251I$ | $4.31836-6.13109I$ | 0 |
| $u=-0.742360+0.966006I$<br>$a=\ \ 0.53593+1.31805I$<br>$b=\ \ 1.68644+0.65147I$ | $4.71397-2.34203I$ | 0 |
| $u=-0.742360-0.966006I$<br>$a=\ \ 0.53593-1.31805I$<br>$b=\ \ 1.68644-0.65147I$ | $4.71397+2.34203I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.734409 + 0.987664I$<br>$a = 3.15400 - 4.10583I$<br>$b = 3.98743 + 0.81248I$ | $5.70971 + 7.27585I$ | 0 |
| $u = 0.734409 - 0.987664I$<br>$a = 3.15400 + 4.10583I$<br>$b = 3.98743 - 0.81248I$ | $5.70971 - 7.27585I$ | 0 |
| $u = -0.772019 + 0.958567I$<br>$a = 0.801468 - 0.220647I$<br>$b = -0.537447 - 0.643819I$ | $10.28110 + 2.77769I$ | 0 |
| $u = -0.772019 - 0.958567I$<br>$a = 0.801468 + 0.220647I$<br>$b = -0.537447 + 0.643819I$ | $10.28110 - 2.77769I$ | 0 |
| $u = 0.781509 + 0.952187I$<br>$a = -0.510637 + 0.169893I$<br>$b = 0.167483 + 0.015866I$ | $9.73329 + 5.97959I$ | 0 |
| $u = 0.781509 - 0.952187I$<br>$a = -0.510637 - 0.169893I$<br>$b = 0.167483 - 0.015866I$ | $9.73329 - 5.97959I$ | 0 |
| $u = -0.743165 + 0.983061I$<br>$a = 0.203530 - 0.401051I$<br>$b = 0.647902 - 0.399445I$ | $8.36627 - 5.43992I$ | 0 |
| $u = -0.743165 - 0.983061I$<br>$a = 0.203530 + 0.401051I$<br>$b = 0.647902 + 0.399445I$ | $8.36627 + 5.43992I$ | 0 |
| $u = -0.051258 + 0.765506I$<br>$a = 0.751880 - 0.146149I$<br>$b = 0.185019 + 0.767687I$ | $-0.78417 - 1.51958I$ | $-0.51049 + 4.81030I$ |
| $u = -0.051258 - 0.765506I$<br>$a = 0.751880 + 0.146149I$<br>$b = 0.185019 - 0.767687I$ | $-0.78417 + 1.51958I$ | $-0.51049 - 4.81030I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \ 0.727955 + 0.997623I$<br>$a = -0.95083 - 1.14500I$<br>$b = \ 0.64302 - 1.37924I$ | $3.50172 + 8.09550I$ | 0 |
| $u = \ 0.727955 - 0.997623I$<br>$a = -0.95083 + 1.14500I$<br>$b = \ 0.64302 + 1.37924I$ | $3.50172 - 8.09550I$ | 0 |
| $u = -0.740370 + 0.993682I$<br>$a = \ 0.32291 - 3.06621I$<br>$b = -1.86488 - 2.03732I$ | $8.00165 - 9.61390I$ | 0 |
| $u = -0.740370 - 0.993682I$<br>$a = \ 0.32291 + 3.06621I$<br>$b = -1.86488 + 2.03732I$ | $8.00165 + 9.61390I$ | 0 |
| $u = -0.734600 + 1.003670I$<br>$a = -0.64261 - 2.29387I$<br>$b = -2.34628 - 0.84720I$ | $3.45497 - 12.48640I$ | 0 |
| $u = -0.734600 - 1.003670I$<br>$a = -0.64261 + 2.29387I$<br>$b = -2.34628 + 0.84720I$ | $3.45497 + 12.48640I$ | 0 |
| $u = -0.740492 + 1.015850I$<br>$a = -0.47297 + 3.32479I$<br>$b = \ 2.25196 + 1.98268I$ | $8.2295 - 18.6443I$ | 0 |
| $u = -0.740492 - 1.015850I$<br>$a = -0.47297 - 3.32479I$<br>$b = \ 2.25196 - 1.98268I$ | $8.2295 + 18.6443I$ | 0 |
| $u = \ 0.744745 + 1.020400I$<br>$a = \ 0.39036 + 2.07419I$<br>$b = -1.24450 + 1.30855I$ | $7.32868 + 10.30150I$ | 0 |
| $u = \ 0.744745 - 1.020400I$<br>$a = \ 0.39036 - 2.07419I$<br>$b = -1.24450 - 1.30855I$ | $7.32868 - 10.30150I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.707737+0.123386I$<br>$a=-1.142620-0.447129I$<br>$b=-0.658841-0.611972I$ | $5.20254-1.62878I$ | $14.3386+4.2186I$ |
| $u=-0.707737-0.123386I$<br>$a=-1.142620+0.447129I$<br>$b=-0.658841+0.611972I$ | $5.20254+1.62878I$ | $14.3386-4.2186I$ |
| $u=\ 0.673521+0.113711I$<br>$a=\ 1.67635-0.23442I$<br>$b=\ 1.09292-0.98112I$ | $6.12000+10.24010I$ | $8.20778-6.69743I$ |
| $u=\ 0.673521-0.113711I$<br>$a=\ 1.67635+0.23442I$<br>$b=\ 1.09292+0.98112I$ | $6.12000-10.24010I$ | $8.20778+6.69743I$ |
| $u=\ 0.601565+0.096262I$<br>$a=-0.629950-1.085550I$<br>$b=-0.445017+0.310717I$ | $1.31817+4.63185I$ | $6.37577-6.86199I$ |
| $u=\ 0.601565-0.096262I$<br>$a=-0.629950+1.085550I$<br>$b=-0.445017-0.310717I$ | $1.31817-4.63185I$ | $6.37577+6.86199I$ |
| $u=\ 0.597956+0.028270I$<br>$a=-1.92039-0.38491I$<br>$b=-0.810690+0.491190I$ | $5.43024+1.96351I$ | $13.41312-3.71413I$ |
| $u=\ 0.597956-0.028270I$<br>$a=-1.92039+0.38491I$<br>$b=-0.810690-0.491190I$ | $5.43024-1.96351I$ | $13.41312+3.71413I$ |
| $u=-0.548711$<br>$a=\ 2.10233$<br>$b=\ 3.19430$ | $3.16762$ | $-20.5050$ |
| $u=-0.536498+0.081266I$<br>$a=\ 0.244010-0.063088I$<br>$b=-0.344932+0.530147I$ | $1.44156-0.64172I$ | $6.80204+0.19839I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.536498-0.081266I$<br>$a=\ \ 0.244010+0.063088I$<br>$b=-0.344932-0.530147I$ | $1.44156+0.64172I$ | $6.80204-0.19839I$ |
| $u=-0.202031+0.200826I$<br>$a=\ \ 2.87891+2.43797I$<br>$b=-0.407955+0.755269I$ | $1.91728-0.70497I$ | $4.91663-1.79667I$ |
| $u=-0.202031-0.200826I$<br>$a=\ \ 2.87891-2.43797I$<br>$b=-0.407955-0.755269I$ | $1.91728+0.70497I$ | $4.91663+1.79667I$ |

**II. $I_2^u = \langle b+1,\ a-2u+2,\ u^2-u+1 \rangle$**

**(i) Arc colorings**

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

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

**(iii) Cusp Shapes** $= -4u+5$

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

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

**(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>$c_{10}, c_{11}$ | $y^2 + y + 1$ |
| $c_7, c_8$ | $y^2$ |
| $c_9, c_{12}$ | $(y-1)^2$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \quad 0.500000 + 0.866025I$<br>$a = -1.00000 + 1.73205I$<br>$b = -1.00000$ | $1.64493 + 2.02988I$ | $3.00000 - 3.46410I$ |
| $u = \quad 0.500000 - 0.866025I$<br>$a = -1.00000 - 1.73205I$<br>$b = -1.00000$ | $1.64493 - 2.02988I$ | $3.00000 + 3.46410I$ |

**III. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $(u^2-u+1)(u^{113}+36u^{112}+\cdots-5u-1)$ |
| $c_2$ | $(u^2+u+1)(u^{113}-2u^{112}+\cdots+5u-1)$ |
| $c_3$ | $(u^2-u+1)(u^{113}-34u^{111}+\cdots-426005u-37025)$ |
| $c_4$ | $(u^2-u+1)(u^{113}+4u^{112}+\cdots+u+1)$ |
| $c_6$ | $(u^2-u+1)(u^{113}-2u^{112}+\cdots+5u-1)$ |
| $c_7$ | $u^2(u^{113}+5u^{112}+\cdots-28640u-6976)$ |
| $c_8$ | $u^2(u^{113}-19u^{112}+\cdots-12u+4)$ |
| $c_9$ | $((u+1)^2)(u^{113}+3u^{112}+\cdots+2u-1)$ |
| $c_{10}$ | $(u^2+u+1)(u^{113}-2u^{112}+\cdots+459991u+41101)$ |
| $c_{11}$ | $(u^2+u+1)(u^{113}-4u^{112}+\cdots-58837u+9439)$ |
| $c_{12}$ | $((u-1)^2)(u^{113}+3u^{112}+\cdots+2u-1)$ |

**IV. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $(y^2+y+1)(y^{113}+84y^{112}+\cdots-257y-1)$ |
| $c_2, c_6$ | $(y^2+y+1)(y^{113}+36y^{112}+\cdots-5y-1)$ |
| $c_3$ | $(y^2+y+1)(y^{113}-68y^{112}+\cdots+2.09188\times10^{11}y-1.37085\times10^{9})$ |
| $c_4$ | $(y^2+y+1)(y^{113}+20y^{112}+\cdots-5y-1)$ |
| $c_7$ | $y^2(y^{113}-17y^{112}+\cdots-5.33583\times10^{8}y-4.86646\times10^{7})$ |
| $c_8$ | $y^2(y^{113}+15y^{112}+\cdots-280y-16)$ |
| $c_9, c_{12}$ | $((y-1)^2)(y^{113}-83y^{112}+\cdots+26y-1)$ |
| $c_{10}$ | $(y^2+y+1)(y^{113}-68y^{112}+\cdots-3.08333\times10^{11}y-1.68929\times10^{9})$ |
| $c_{11}$ | $(y^2+y+1)(y^{113}-136y^{112}+\cdots+1.55253\times10^{9}y-8.90947\times10^{7})$ |