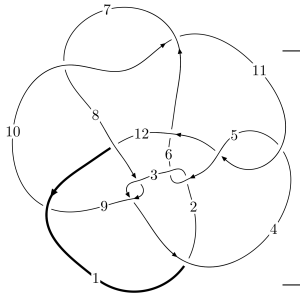
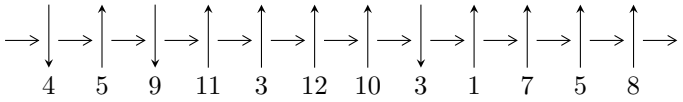
## $12n_{0771}$ $(K12n_{0771})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle -2.43466 \times 10^{230} u^{78} - 1.85125 \times 10^{230} u^{77} + \cdots + 1.68670 \times 10^{226} b + 1.01353 \times 10^{231},$$
$$3.16642 \times 10^{230} u^{78} + 2.47552 \times 10^{230} u^{77} + \cdots + 1.68670 \times 10^{226} a - 1.45278 \times 10^{231},\ u^{79} + u^{78} + \cdots - 23u$$
$$I_2^u = \langle 30853 u^{27} + 13876 u^{26} + \cdots + 4193 b + 6194,\ -17745 u^{27} - 2238 u^{26} + \cdots + 599 a - 7171,$$
$$u^{28} - 9u^{26} + \cdots - u + 1 \rangle$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 107 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.** $\boldsymbol{I_1^u = \langle -2.43 \times 10^{230} u^{78} - 1.85 \times 10^{230} u^{77} + \cdots + 1.69 \times 10^{226} b + 1.01 \times 10^{231},\ 3.17 \times 10^{230} u^{78} + 2.48 \times 10^{230} u^{77} + \cdots + 1.69 \times 10^{226} a - 1.45 \times 10^{231},\ u^{79} + u^{78} + \cdots - 23u - 1 \rangle}$

**(i) Arc colorings**

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_9 = \begin{pmatrix} -18772.9u^{78} - 14676.7u^{77} + \cdots + 1.58492 \times 10^6 u + 86131.4 \\ 14434.5u^{78} + 10975.6u^{77} + \cdots - 1.13259 \times 10^6 u - 60089.5 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 39059.0u^{78} + 30576.8u^{77} + \cdots - 3.30373 \times 10^6 u - 179312. \\ 21479.6u^{78} + 16581.0u^{77} + \cdots - 1.75206 \times 10^6 u - 94065.2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -56717.2u^{78} - 43448.4u^{77} + \cdots + 4.52978 \times 10^6 u + 241512. \\ -41302.3u^{78} - 31601.6u^{77} + \cdots + 3.29433 \times 10^6 u + 175706. \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -56068.0u^{78} - 42943.8u^{77} + \cdots + 4.47650 \times 10^6 u + 238660. \\ -40684.3u^{78} - 31121.8u^{77} + \cdots + 3.24373 \times 10^6 u + 172999. \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 15741.6u^{78} + 12555.8u^{77} + \cdots - 1.39564 \times 10^6 u - 76764.3 \\ 22681.4u^{78} + 17510.4u^{77} + \cdots - 1.85056 \times 10^6 u - 99361.6 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 38423.1u^{78} + 30066.2u^{77} + \cdots - 3.24620 \times 10^6 u - 176126. \\ 22681.4u^{78} + 17510.4u^{77} + \cdots - 1.85056 \times 10^6 u - 99361.6 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 52534.4u^{78} + 39819.5u^{77} + \cdots - 4.08761 \times 10^6 u - 216260. \\ 28302.2u^{78} + 21431.7u^{77} + \cdots - 2.19862 \times 10^6 u - 116334. \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 51542.3u^{78} + 39402.9u^{77} + \cdots - 4.09266 \times 10^6 u - 217740. \\ 27877.0u^{78} + 21157.7u^{77} + \cdots - 2.17777 \times 10^6 u - 115419. \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -293314.u^{78} - 224420.u^{77} + \cdots + 2.33906 \times 10^7 u + 1.24743 \times 10^6$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{79} - 6u^{78} + \cdots - 4390196u + 145732$ |
| $c_2, c_5$ | $u^{79} + 6u^{78} + \cdots - 318766u + 63403$ |
| $c_3, c_8$ | $u^{79} + u^{78} + \cdots - 6u - 1$ |
| $c_4, c_{11}$ | $u^{79} + u^{78} + \cdots - 23u - 1$ |
| $c_6$ | $u^{79} - u^{78} + \cdots - 3836986393u + 691687687$ |
| $c_7, c_{10}$ | $u^{79} + 3u^{78} + \cdots + 4u + 4$ |
| $c_9$ | $u^{79} + u^{78} + \cdots - 56386u + 5447$ |
| $c_{12}$ | $u^{79} + u^{78} + \cdots - 74772u + 31151$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{79} - 82y^{78} + \cdots + 5209547957600y - 21237815824$ |
| $c_2, c_5$ | $y^{79} + 82y^{78} + \cdots + 185670572514y - 4019940409$ |
| $c_3, c_8$ | $y^{79} - 59y^{78} + \cdots + 140y - 1$ |
| $c_4, c_{11}$ | $y^{79} - 19y^{78} + \cdots + 101y - 1$ |
| $c_6$ | $y^{79} + 83y^{78} + \cdots - 1.11 \times 10^{19}y - 4.78 \times 10^{17}$ |
| $c_7, c_{10}$ | $y^{79} + 59y^{78} + \cdots + 1152y - 16$ |
| $c_9$ | $y^{79} + 27y^{78} + \cdots + 2658310082y - 29669809$ |
| $c_{12}$ | $y^{79} + 27y^{78} + \cdots - 24342580030y - 970384801$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.876343+0.418237I$<br>$a=-0.98814+1.09797I$<br>$b=-1.086020-0.390878I$ | $-3.99440-3.41625I$ | 0 |
| $u=-0.876343-0.418237I$<br>$a=-0.98814-1.09797I$<br>$b=-1.086020+0.390878I$ | $-3.99440+3.41625I$ | 0 |
| $u=0.107309+1.030380I$<br>$a=1.62128-0.02467I$<br>$b=1.288120-0.276909I$ | $-7.18782-0.25504I$ | 0 |
| $u=0.107309-1.030380I$<br>$a=1.62128+0.02467I$<br>$b=1.288120+0.276909I$ | $-7.18782+0.25504I$ | 0 |
| $u=1.031440+0.237452I$<br>$a=0.70026-1.45707I$<br>$b=-1.194000+0.073259I$ | $-3.76520-3.47263I$ | 0 |
| $u=1.031440-0.237452I$<br>$a=0.70026+1.45707I$<br>$b=-1.194000-0.073259I$ | $-3.76520+3.47263I$ | 0 |
| $u=-0.710505+0.791863I$<br>$a=-0.351388+0.386497I$<br>$b=0.070718+0.224537I$ | $-6.38277-1.11124I$ | 0 |
| $u=-0.710505-0.791863I$<br>$a=-0.351388-0.386497I$<br>$b=0.070718-0.224537I$ | $-6.38277+1.11124I$ | 0 |
| $u=-0.893200+0.104272I$<br>$a=0.508013-0.510710I$<br>$b=1.115270+0.582110I$ | $-3.07398-5.47491I$ | 0 |
| $u=-0.893200-0.104272I$<br>$a=0.508013+0.510710I$<br>$b=1.115270-0.582110I$ | $-3.07398+5.47491I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.898671$<br>$a = -0.570936$<br>$b = 0.677206$ | $1.34236$ | 0 |
| $u = -0.881127 + 0.684545I$<br>$a = -0.122129 - 0.303526I$<br>$b = -0.1263670 - 0.0356777I$ | $-2.33613 - 2.65326I$ | 0 |
| $u = -0.881127 - 0.684545I$<br>$a = -0.122129 + 0.303526I$<br>$b = -0.1263670 + 0.0356777I$ | $-2.33613 + 2.65326I$ | 0 |
| $u = 0.834574 + 0.197888I$<br>$a = 0.143773 + 0.431583I$<br>$b = 0.177668 - 0.801514I$ | $-0.355058 - 0.356466I$ | 0 |
| $u = 0.834574 - 0.197888I$<br>$a = 0.143773 - 0.431583I$<br>$b = 0.177668 + 0.801514I$ | $-0.355058 + 0.356466I$ | 0 |
| $u = 0.509087 + 0.677360I$<br>$a = 1.87014 + 0.09189I$<br>$b = 1.49340 - 0.27656I$ | $-5.90433 + 7.16462I$ | 0 |
| $u = 0.509087 - 0.677360I$<br>$a = 1.87014 - 0.09189I$<br>$b = 1.49340 + 0.27656I$ | $-5.90433 - 7.16462I$ | 0 |
| $u = -0.740627 + 0.409243I$<br>$a = 0.39635 - 1.67689I$<br>$b = 1.013890 + 0.493574I$ | $-0.63566 - 4.72962I$ | 0 |
| $u = -0.740627 - 0.409243I$<br>$a = 0.39635 + 1.67689I$<br>$b = 1.013890 - 0.493574I$ | $-0.63566 + 4.72962I$ | 0 |
| $u = -1.18358$<br>$a = 1.49313$<br>$b = 0.316458$ | $5.25090$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.183450+0.177352I$<br>$a=-1.239580-0.395337I$<br>$b=-0.320172+0.018633I$ | $1.36097-5.26145I$ | 0 |
| $u=-1.183450-0.177352I$<br>$a=-1.239580+0.395337I$<br>$b=-0.320172-0.018633I$ | $1.36097+5.26145I$ | 0 |
| $u=0.292091+0.747069I$<br>$a=-1.74758-0.01781I$<br>$b=-1.39008+0.36679I$ | $-2.83896+3.00420I$ | 0 |
| $u=0.292091-0.747069I$<br>$a=-1.74758+0.01781I$<br>$b=-1.39008-0.36679I$ | $-2.83896-3.00420I$ | 0 |
| $u=-0.610818+0.485146I$<br>$a=-0.16218+2.43434I$<br>$b=-1.031020-0.463539I$ | $-4.58288-7.29246I$ | 0 |
| $u=-0.610818-0.485146I$<br>$a=-0.16218-2.43434I$<br>$b=-1.031020+0.463539I$ | $-4.58288+7.29246I$ | 0 |
| $u=0.861534+0.877415I$<br>$a=-1.86321-0.56614I$<br>$b=-1.403680+0.103231I$ | $-10.91540+5.27509I$ | 0 |
| $u=0.861534-0.877415I$<br>$a=-1.86321+0.56614I$<br>$b=-1.403680-0.103231I$ | $-10.91540-5.27509I$ | 0 |
| $u=-0.990925+0.780469I$<br>$a=0.401539+0.092462I$<br>$b=0.148306-0.099772I$ | $-5.60018-4.78135I$ | 0 |
| $u=-0.990925-0.780469I$<br>$a=0.401539-0.092462I$<br>$b=0.148306+0.099772I$ | $-5.60018+4.78135I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.993541 + 0.817452I$<br>$a = 1.54937 + 1.15032I$<br>$b = 1.324470 - 0.054745I$ | $-10.49360 + 1.06249I$ | 0 |
| $u = 0.993541 - 0.817452I$<br>$a = 1.54937 - 1.15032I$<br>$b = 1.324470 + 0.054745I$ | $-10.49360 - 1.06249I$ | 0 |
| $u = 0.809292 + 1.039090I$<br>$a = 1.60729 + 0.43751I$<br>$b = 1.356460 - 0.150002I$ | $-7.25736 + 3.90884I$ | 0 |
| $u = 0.809292 - 1.039090I$<br>$a = 1.60729 - 0.43751I$<br>$b = 1.356460 + 0.150002I$ | $-7.25736 - 3.90884I$ | 0 |
| $u = 1.328100 + 0.137659I$<br>$a = -0.201563 + 0.611752I$<br>$b = 1.269440 - 0.166800I$ | $1.033330 + 0.782949I$ | 0 |
| $u = 1.328100 - 0.137659I$<br>$a = -0.201563 - 0.611752I$<br>$b = 1.269440 + 0.166800I$ | $1.033330 - 0.782949I$ | 0 |
| $u = -1.325470 + 0.228083I$<br>$a = 0.36485 - 1.74089I$<br>$b = 0.453543 + 1.148540I$ | $4.82710 - 4.04790I$ | 0 |
| $u = -1.325470 - 0.228083I$<br>$a = 0.36485 + 1.74089I$<br>$b = 0.453543 - 1.148540I$ | $4.82710 + 4.04790I$ | 0 |
| $u = 0.217070 + 0.610175I$<br>$a = 1.066590 - 0.064309I$<br>$b = -0.286678 - 0.599720I$ | $-2.62047 + 3.15905I$ | 0 |
| $u = 0.217070 - 0.610175I$<br>$a = 1.066590 + 0.064309I$<br>$b = -0.286678 + 0.599720I$ | $-2.62047 - 3.15905I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.611637+0.124694I$<br>$a=\ \ 0.330543+0.344795I$<br>$b=-0.957604-0.615381I$ | $-0.97782-3.18704I$ | 0 |
| $u=-0.611637-0.124694I$<br>$a=\ \ 0.330543-0.344795I$<br>$b=-0.957604+0.615381I$ | $-0.97782+3.18704I$ | 0 |
| $u=\ \ 0.983833+0.979662I$<br>$a=\ \ 0.537912+0.047191I$<br>$b=\ \ 0.017508-1.337210I$ | $-8.04470+9.99314I$ | 0 |
| $u=\ \ 0.983833-0.979662I$<br>$a=\ \ 0.537912-0.047191I$<br>$b=\ \ 0.017508+1.337210I$ | $-8.04470-9.99314I$ | 0 |
| $u=-0.784345+1.145680I$<br>$a=\ \ 1.002190-0.273503I$<br>$b=\ \ 1.60552-0.59569I$ | $-13.07230-2.79558I$ | 0 |
| $u=-0.784345-1.145680I$<br>$a=\ \ 1.002190+0.273503I$<br>$b=\ \ 1.60552+0.59569I$ | $-13.07230+2.79558I$ | 0 |
| $u=\ \ 0.361058+0.488552I$<br>$a=-0.921454-0.696855I$<br>$b=-0.669008+0.782264I$ | $0.17362+2.13315I$ | 0 |
| $u=\ \ 0.361058-0.488552I$<br>$a=-0.921454+0.696855I$<br>$b=-0.669008-0.782264I$ | $0.17362-2.13315I$ | 0 |
| $u=\ \ 1.008820+0.976571I$<br>$a=\ \ 0.568830+0.028624I$<br>$b=-0.277407-1.304630I$ | $-7.98302-2.79382I$ | 0 |
| $u=\ \ 1.008820-0.976571I$<br>$a=\ \ 0.568830-0.028624I$<br>$b=-0.277407+1.304630I$ | $-7.98302+2.79382I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.531319 + 0.254208I$<br>$a = -0.764712 - 0.499735I$<br>$b = 0.413560 + 0.543062I$ | $1.055930 + 0.468133I$ | 0 |
| $u = 0.531319 - 0.254208I$<br>$a = -0.764712 + 0.499735I$<br>$b = 0.413560 - 0.543062I$ | $1.055930 - 0.468133I$ | 0 |
| $u = 0.99618 + 1.02534I$<br>$a = -0.559912 - 0.038895I$<br>$b = 0.10002 + 1.47274I$ | $-3.23697 + 3.73023I$ | 0 |
| $u = 0.99618 - 1.02534I$<br>$a = -0.559912 + 0.038895I$<br>$b = 0.10002 - 1.47274I$ | $-3.23697 - 3.73023I$ | 0 |
| $u = -0.81627 + 1.20218I$<br>$a = -1.047240 + 0.299529I$<br>$b = -1.60684 + 0.48551I$ | $-9.14876 + 3.35329I$ | 0 |
| $u = -0.81627 - 1.20218I$<br>$a = -1.047240 - 0.299529I$<br>$b = -1.60684 - 0.48551I$ | $-9.14876 - 3.35329I$ | 0 |
| $u = 1.13111 + 0.92779I$<br>$a = -1.25926 - 0.81035I$<br>$b = -1.306360 + 0.089703I$ | $-6.27013 + 3.29120I$ | 0 |
| $u = 1.13111 - 0.92779I$<br>$a = -1.25926 + 0.81035I$<br>$b = -1.306360 - 0.089703I$ | $-6.27013 - 3.29120I$ | 0 |
| $u = -0.85049 + 1.21862I$<br>$a = 1.080010 - 0.274442I$<br>$b = 1.53645 - 0.46171I$ | $-13.8996 + 8.9563I$ | 0 |
| $u = -0.85049 - 1.21862I$<br>$a = 1.080010 + 0.274442I$<br>$b = 1.53645 + 0.46171I$ | $-13.8996 - 8.9563I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.439096+0.241787I$<br>$a=-2.48467-0.16848I$<br>$b=\ \ 0.817333+0.425600I$ | $-6.30949-1.87842I$ | $0.+3.28089I$ |
| $u=-0.439096-0.241787I$<br>$a=-2.48467+0.16848I$<br>$b=\ \ 0.817333-0.425600I$ | $-6.30949+1.87842I$ | $0.-3.28089I$ |
| $u=-1.20607+0.92056I$<br>$a=-1.08447+1.12933I$<br>$b=-1.48840-0.74155I$ | $-11.71210-4.71803I$ | 0 |
| $u=-1.20607-0.92056I$<br>$a=-1.08447-1.12933I$<br>$b=-1.48840+0.74155I$ | $-11.71210+4.71803I$ | 0 |
| $u=-1.17728+0.96277I$<br>$a=-1.24134+1.03090I$<br>$b=-1.46917-0.60570I$ | $-12.7672-16.7760I$ | 0 |
| $u=-1.17728-0.96277I$<br>$a=-1.24134-1.03090I$<br>$b=-1.46917+0.60570I$ | $-12.7672+16.7760I$ | 0 |
| $u=-1.18703+0.95708I$<br>$a=\ \ 1.16866-1.03328I$<br>$b=\ \ 1.50856+0.63733I$ | $-7.92089-11.10750I$ | 0 |
| $u=-1.18703-0.95708I$<br>$a=\ \ 1.16866+1.03328I$<br>$b=\ \ 1.50856-0.63733I$ | $-7.92089+11.10750I$ | 0 |
| $u=\ \ 1.51003+0.36636I$<br>$a=-0.299045-0.591632I$<br>$b=-1.293010+0.090598I$ | $-2.23461+5.90245I$ | 0 |
| $u=\ \ 1.51003-0.36636I$<br>$a=-0.299045+0.591632I$<br>$b=-1.293010-0.090598I$ | $-2.23461-5.90245I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.79204 + 1.35981I$<br>$a = -1.40007 - 0.29591I$<br>$b = -1.301060 + 0.173804I$ | $-10.67170 + 2.96611I$ | 0 |
| $u = 0.79204 - 1.35981I$<br>$a = -1.40007 + 0.29591I$<br>$b = -1.301060 - 0.173804I$ | $-10.67170 - 2.96611I$ | 0 |
| $u = 1.24583 + 1.16094I$<br>$a = 1.176150 + 0.530089I$<br>$b = 1.286220 - 0.113435I$ | $-9.34277 + 5.87011I$ | 0 |
| $u = 1.24583 - 1.16094I$<br>$a = 1.176150 - 0.530089I$<br>$b = 1.286220 + 0.113435I$ | $-9.34277 - 5.87011I$ | 0 |
| $u = -0.271329 + 0.031654I$<br>$a = -8.02705 + 3.97881I$<br>$b = -0.749966 + 0.052776I$ | $-2.06804 - 3.78913I$ | $-2.03961 + 6.55169I$ |
| $u = -0.271329 - 0.031654I$<br>$a = -8.02705 - 3.97881I$<br>$b = -0.749966 - 0.052776I$ | $-2.06804 + 3.78913I$ | $-2.03961 - 6.55169I$ |
| $u = -0.234685 + 0.005537I$<br>$a = 0.13366 + 1.71141I$<br>$b = -0.396879 + 1.158900I$ | $0.89026 + 2.40339I$ | $-0.5139 - 16.4120I$ |
| $u = -0.234685 - 0.005537I$<br>$a = 0.13366 - 1.71141I$<br>$b = -0.396879 - 1.158900I$ | $0.89026 - 2.40339I$ | $-0.5139 + 16.4120I$ |
| $u = -0.222199$<br>$a = 9.15297$<br>$b = 0.720846$ | 1.95313 | 2.25730 |

**II. $I_2^u = \langle 30853u^{27} + 13876u^{26} + \cdots + 4193b + 6194,\ -17745u^{27} - 2238u^{26} + \cdots + 599a - 7171,\ u^{28} - 9u^{26} + \cdots - u + 1 \rangle$**

**(i) Arc colorings**

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_9 = \begin{pmatrix} 29.6244u^{27} + 3.73623u^{26} + \cdots - 69.0184u + 11.9716 \\ -7.35822u^{27} - 3.30933u^{26} + \cdots + 12.9685u - 1.47722 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -1.13809u^{27} - 18.3236u^{26} + \cdots - 50.6220u + 61.0258 \\ -1.73718u^{27} + 5.35345u^{26} + \cdots + 29.1855u - 17.3236 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 42.7021u^{27} + 1.87527u^{26} + \cdots - 129.214u - 8.26568 \\ -11.9702u^{27} + 0.798712u^{26} + \cdots + 38.8269u - 10.1247 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 29.7319u^{27} + 1.67398u^{26} + \cdots - 88.3871u - 7.39041 \\ -21.0835u^{27} + 0.163606u^{26} + \cdots + 66.8848u - 9.45075 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.138087u^{27} - 18.3236u^{26} + \cdots - 62.6220u + 60.0258 \\ -1.73718u^{27} + 5.35345u^{26} + \cdots + 30.1855u - 17.3236 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -1.87527u^{27} - 12.9702u^{26} + \cdots - 32.4364u + 42.7021 \\ -1.73718u^{27} + 5.35345u^{26} + \cdots + 30.1855u - 17.3236 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 8.52278u^{27} + 11.3582u^{26} + \cdots + 4.71572u - 25.4913 \\ 8.31600u^{27} - 7.33365u^{26} + \cdots - 52.6353u + 10.2778 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 16.5900u^{27} + 17.5521u^{26} + \cdots + 20.1171u - 48.1567 \\ -17.1283u^{27} + 3.03434u^{26} + \cdots + 38.6172u - 20.0072 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -\frac{14948}{4193}u^{27} - \frac{188690}{4193}u^{26} + \cdots - \frac{332851}{4193}u + \frac{609209}{4193}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{28} - 11u^{27} + \cdots - 72u - 4$ |
| $c_2$ | $u^{28} + u^{27} + \cdots + 8u^2 - 1$ |
| $c_3$ | $u^{28} - 7u^{26} + \cdots + 9u^2 - 1$ |
| $c_4$ | $u^{28} - 9u^{26} + \cdots - u + 1$ |
| $c_5$ | $u^{28} - u^{27} + \cdots + 8u^2 - 1$ |
| $c_6$ | $u^{28} + 8u^{26} + \cdots + 57u - 107$ |
| $c_7$ | $u^{28} + 4u^{27} + \cdots + 8u + 4$ |
| $c_8$ | $u^{28} - 7u^{26} + \cdots + 9u^2 - 1$ |
| $c_9$ | $u^{28} + 4u^{25} + \cdots - 4u - 1$ |
| $c_{10}$ | $u^{28} - 4u^{27} + \cdots - 8u + 4$ |
| $c_{11}$ | $u^{28} - 9u^{26} + \cdots + u + 1$ |
| $c_{12}$ | $u^{28} - 2u^{26} + \cdots - 12u^2 - 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{28} - 25y^{27} + \cdots - 3120y + 16$ |
| $c_2, c_5$ | $y^{28} + 11y^{27} + \cdots - 16y + 1$ |
| $c_3, c_8$ | $y^{28} - 14y^{27} + \cdots - 18y + 1$ |
| $c_4, c_{11}$ | $y^{28} - 18y^{27} + \cdots - 27y + 1$ |
| $c_6$ | $y^{28} + 16y^{27} + \cdots - 141921y + 11449$ |
| $c_7, c_{10}$ | $y^{28} + 20y^{27} + \cdots + 80y + 16$ |
| $c_9$ | $y^{28} + 24y^{26} + \cdots + 16y + 1$ |
| $c_{12}$ | $y^{28} - 4y^{27} + \cdots + 24y + 1$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.852125+0.601245I$<br>$a=-0.832108-0.231328I$<br>$b=\ \ 0.747853-0.466030I$ | $-6.71180+0.04614I$ | $-0.064629-0.987396I$ |
| $u=-0.852125-0.601245I$<br>$a=-0.832108+0.231328I$<br>$b=\ \ 0.747853+0.466030I$ | $-6.71180-0.04614I$ | $-0.064629+0.987396I$ |
| $u=-0.854084+0.782815I$<br>$a=\ \ 0.436404-0.146646I$<br>$b=\ \ 0.155074+0.739479I$ | $-1.77839-2.94686I$ | $9.10140+4.88751I$ |
| $u=-0.854084-0.782815I$<br>$a=\ \ 0.436404+0.146646I$<br>$b=\ \ 0.155074-0.739479I$ | $-1.77839+2.94686I$ | $9.10140-4.88751I$ |
| $u=-0.971333+0.742339I$<br>$a=-0.197178+0.525278I$<br>$b=-0.699311-0.194741I$ | $-6.17700-5.22730I$ | $-3.13585+7.30911I$ |
| $u=-0.971333-0.742339I$<br>$a=-0.197178-0.525278I$<br>$b=-0.699311+0.194741I$ | $-6.17700+5.22730I$ | $-3.13585-7.30911I$ |
| $u=\ \ 1.22488$<br>$a=-1.38709$<br>$b=-0.689063$ | 4.80480 | 3.24890 |
| $u=\ \ 1.232920+0.196608I$<br>$a=\ \ 1.290190-0.099792I$<br>$b=\ \ 0.741690+0.131648I$ | $0.83876+4.91408I$ | $1.44350-1.61325I$ |
| $u=\ \ 1.232920-0.196608I$<br>$a=\ \ 1.290190+0.099792I$<br>$b=\ \ 0.741690-0.131648I$ | $0.83876-4.91408I$ | $1.44350+1.61325I$ |
| $u=-0.655111+0.359817I$<br>$a=\ \ 0.659090-0.948985I$<br>$b=\ \ 1.048160+0.626210I$ | $-1.19938-3.96368I$ | $5.40589+6.56623I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.655111-0.359817I$<br>$a=\ 0.659090+0.948985I$<br>$b=\ 1.048160-0.626210I$ | $-1.19938+3.96368I$ | $5.40589-6.56623I$ |
| $u=-1.263940+0.151253I$<br>$a=\ 0.368613-0.364180I$<br>$b=-1.236920+0.502499I$ | $1.20025+1.95116I$ | $6.65433-3.75191I$ |
| $u=-1.263940-0.151253I$<br>$a=\ 0.368613+0.364180I$<br>$b=-1.236920-0.502499I$ | $1.20025-1.95116I$ | $6.65433+3.75191I$ |
| $u=-1.301720+0.177857I$<br>$a=-0.033564-0.438214I$<br>$b=\ 1.132780+0.311775I$ | $-0.95254-6.85547I$ | $6.26006+7.50495I$ |
| $u=-1.301720-0.177857I$<br>$a=-0.033564+0.438214I$<br>$b=\ 1.132780-0.311775I$ | $-0.95254+6.85547I$ | $6.26006-7.50495I$ |
| $u=\ 0.661543$<br>$a=-2.96465$<br>$b=\ 0.557034$ | 2.52967 | 18.0280 |
| $u=\ 0.632952+0.113297I$<br>$a=\ 2.91957-3.06599I$<br>$b=-0.637106+0.134427I$ | $-1.64115-3.51490I$ | $12.07415-1.40885I$ |
| $u=\ 0.632952-0.113297I$<br>$a=\ 2.91957+3.06599I$<br>$b=-0.637106-0.134427I$ | $-1.64115+3.51490I$ | $12.07415+1.40885I$ |
| $u=\ 0.905198+1.014880I$<br>$a=\ 1.58689+0.69818I$<br>$b=\ 1.315490-0.237768I$ | $-9.20708+3.02208I$ | $0.86618-2.28131I$ |
| $u=\ 0.905198-1.014880I$<br>$a=\ 1.58689-0.69818I$<br>$b=\ 1.315490+0.237768I$ | $-9.20708-3.02208I$ | $0.86618+2.28131I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.358480 + 0.221950I$<br>$a = -0.29847 - 1.70421I$<br>$b = -0.427126 + 1.219380I$ | $4.68108 + 4.11341I$ | $-14.1729 - 14.5736I$ |
| $u = 1.358480 - 0.221950I$<br>$a = -0.29847 + 1.70421I$<br>$b = -0.427126 - 1.219380I$ | $4.68108 - 4.11341I$ | $-14.1729 + 14.5736I$ |
| $u = -0.565004 + 0.040165I$<br>$a = -0.26511 + 2.40588I$<br>$b = -1.181360 - 0.443555I$ | $-4.21817 - 6.13927I$ | $2.12135 + 6.27361I$ |
| $u = -0.565004 - 0.040165I$<br>$a = -0.26511 - 2.40588I$<br>$b = -1.181360 + 0.443555I$ | $-4.21817 + 6.13927I$ | $2.12135 - 6.27361I$ |
| $u = 0.93379 + 1.09566I$<br>$a = -1.43251 - 0.41148I$<br>$b = -1.334820 + 0.045448I$ | $-9.12029 + 4.54261I$ | $0. - 2.64613I$ |
| $u = 0.93379 - 1.09566I$<br>$a = -1.43251 + 0.41148I$<br>$b = -1.334820 - 0.045448I$ | $-9.12029 - 4.54261I$ | $0. + 2.64613I$ |
| $u = 0.456757 + 0.180125I$<br>$a = 0.474060 + 0.395975I$<br>$b = 0.441601 + 1.138690I$ | $1.00966 - 2.17421I$ | $13.7438 - 10.2319I$ |
| $u = 0.456757 - 0.180125I$<br>$a = 0.474060 - 0.395975I$<br>$b = 0.441601 - 1.138690I$ | $1.00966 + 2.17421I$ | $13.7438 + 10.2319I$ |

**III. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u^{28}-11u^{27}+\cdots-72u-4)(u^{79}-6u^{78}+\cdots-4390196u+145732)$ |
| $c_2$ | $(u^{28}+u^{27}+\cdots+8u^2-1)(u^{79}+6u^{78}+\cdots-318766u+63403)$ |
| $c_3$ | $(u^{28}-7u^{26}+\cdots+9u^2-1)(u^{79}+u^{78}+\cdots-6u-1)$ |
| $c_4$ | $(u^{28}-9u^{26}+\cdots-u+1)(u^{79}+u^{78}+\cdots-23u-1)$ |
| $c_5$ | $(u^{28}-u^{27}+\cdots+8u^2-1)(u^{79}+6u^{78}+\cdots-318766u+63403)$ |
| $c_6$ | $(u^{28}+8u^{26}+\cdots+57u-107)$ $\cdot(u^{79}-u^{78}+\cdots-3836986393u+691687687)$ |
| $c_7$ | $(u^{28}+4u^{27}+\cdots+8u+4)(u^{79}+3u^{78}+\cdots+4u+4)$ |
| $c_8$ | $(u^{28}-7u^{26}+\cdots+9u^2-1)(u^{79}+u^{78}+\cdots-6u-1)$ |
| $c_9$ | $(u^{28}+4u^{25}+\cdots-4u-1)(u^{79}+u^{78}+\cdots-56386u+5447)$ |
| $c_{10}$ | $(u^{28}-4u^{27}+\cdots-8u+4)(u^{79}+3u^{78}+\cdots+4u+4)$ |
| $c_{11}$ | $(u^{28}-9u^{26}+\cdots+u+1)(u^{79}+u^{78}+\cdots-23u-1)$ |
| $c_{12}$ | $(u^{28}-2u^{26}+\cdots-12u^2-1)(u^{79}+u^{78}+\cdots-74772u+31151)$ |

**IV. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $(y^{28} - 25y^{27} + \cdots - 3120y + 16)$ $\cdot (y^{79} - 82y^{78} + \cdots + 5209547957600y - 21237815824)$ |
| $c_2, c_5$ | $(y^{28} + 11y^{27} + \cdots - 16y + 1)$ $\cdot (y^{79} + 82y^{78} + \cdots + 185670572514y - 4019940409)$ |
| $c_3, c_8$ | $(y^{28} - 14y^{27} + \cdots - 18y + 1)(y^{79} - 59y^{78} + \cdots + 140y - 1)$ |
| $c_4, c_{11}$ | $(y^{28} - 18y^{27} + \cdots - 27y + 1)(y^{79} - 19y^{78} + \cdots + 101y - 1)$ |
| $c_6$ | $(y^{28} + 16y^{27} + \cdots - 141921y + 11449)$ $\cdot (y^{79} + 83y^{78} + \cdots - 1.11 \times 10^{19}y - 4.78 \times 10^{17})$ |
| $c_7, c_{10}$ | $(y^{28} + 20y^{27} + \cdots + 80y + 16)(y^{79} + 59y^{78} + \cdots + 1152y - 16)$ |
| $c_9$ | $(y^{28} + 24y^{26} + \cdots + 16y + 1)$ $\cdot (y^{79} + 27y^{78} + \cdots + 2658310082y - 29669809)$ |
| $c_{12}$ | $(y^{28} - 4y^{27} + \cdots + 24y + 1)$ $\cdot (y^{79} + 27y^{78} + \cdots - 24342580030y - 970384801)$ |