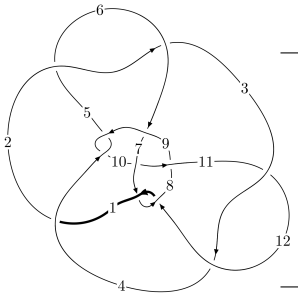
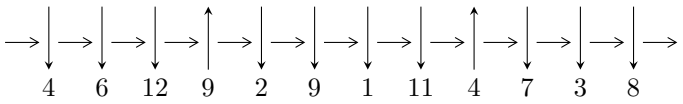
## $12n_{0836}$ $(K12n_{0836})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$\begin{aligned}
I_1^u &= \langle -2.01141 \times 10^{178} u^{79} - 1.53427 \times 10^{179} u^{78} + \cdots + 8.20723 \times 10^{178} b + 1.11833 \times 10^{181}, \\
&\quad - 8.82110 \times 10^{179} u^{79} - 1.86815 \times 10^{180} u^{78} + \cdots + 4.33810 \times 10^{179} a - 1.20564 \times 10^{182}, \\
&\quad u^{80} + 3u^{79} + \cdots - 692u - 148 \rangle \\
I_2^u &= \langle -419743649 u^{22} + 600334478 u^{21} + \cdots + 939590426 b + 1322008284, \\
&\quad 544158953 u^{22} - 1664036159 u^{21} + \cdots + 1879180852 a - 3189273440,\ u^{23} - u^{22} + \cdots + 8u + 4 \rangle \\
I_3^u &= \langle b + 1,\ a + 1,\ u - 1 \rangle
\end{aligned}$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 104 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.** $\boldsymbol{I_1^u = \langle -2.01 \times 10^{178} u^{79} - 1.53 \times 10^{179} u^{78} + \cdots + 8.21 \times 10^{178} b + 1.12 \times 10^{181},\ -8.82 \times 10^{179} u^{79} - 1.87 \times 10^{180} u^{78} + \cdots + 4.34 \times 10^{179} a - 1.21 \times 10^{182},\ u^{80} + 3u^{79} + \cdots - 692u - 148 \rangle}$

**(i) Arc colorings**

$$a_8 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} 2.03340u^{79} + 4.30637u^{78} + \cdots + 1080.35u + 277.919 \\ 0.245078u^{79} + 1.86942u^{78} + \cdots - 692.484u - 136.261 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 2.27848u^{79} + 6.17578u^{78} + \cdots + 387.869u + 141.658 \\ 0.245078u^{79} + 1.86942u^{78} + \cdots - 692.484u - 136.261 \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} -0.261711u^{79} - 0.131889u^{78} + \cdots - 408.221u - 92.9224 \\ -0.447967u^{79} - 2.59603u^{78} + \cdots + 801.323u + 153.979 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0.937727u^{79} + 2.63334u^{78} + \cdots + 85.3324u + 42.4994 \\ -0.149265u^{79} - 0.548385u^{78} + \cdots + 52.3634u + 9.08703 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 10.1203u^{79} + 29.8622u^{78} + \cdots + 201.630u + 315.128 \\ 0.0269954u^{79} + 2.97414u^{78} + \cdots - 1810.20u - 372.735 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -2.15415u^{79} - 4.52646u^{78} + \cdots - 1317.07u - 333.037 \\ 0.0899931u^{79} - 0.186489u^{78} + \cdots + 277.477u + 59.4733 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.980754u^{79} - 4.52806u^{78} + \cdots + 1187.82u + 218.399 \\ 0.419539u^{79} + 0.305039u^{78} + \cdots + 544.761u + 128.017 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.135237u^{79} + 2.49572u^{78} + \cdots - 1315.46u - 271.021 \\ -0.303249u^{79} - 2.42157u^{78} + \cdots + 947.070u + 188.521 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 4.02688u^{79} + 13.5179u^{78} + \cdots - 913.018u - 91.2459$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{80}+u^{79}+\cdots+121816053u+10935405$ |
| $c_2, c_5$ | $u^{80}+5u^{79}+\cdots-9u+1$ |
| $c_3, c_{11}$ | $u^{80}+2u^{79}+\cdots-488u-91$ |
| $c_4, c_9$ | $u^{80}-4u^{79}+\cdots+22580u+3676$ |
| $c_6$ | $u^{80}-8u^{79}+\cdots+11892000u+986616$ |
| $c_7, c_{12}$ | $u^{80}+3u^{79}+\cdots-692u-148$ |
| $c_8$ | $u^{80}-11u^{79}+\cdots+258u-11$ |
| $c_{10}$ | $u^{80}-4u^{79}+\cdots+9331040u+665887$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{80}+59y^{79}+\cdots+3158025656114421y+119583082514025$ |
| $c_2, c_5$ | $y^{80}-21y^{79}+\cdots-63y+1$ |
| $c_3, c_{11}$ | $y^{80}-46y^{79}+\cdots-130946y+8281$ |
| $c_4, c_9$ | $y^{80}-80y^{79}+\cdots-1476835552y+13512976$ |
| $c_6$ | $y^{80}+58y^{79}+\cdots-53110665152640y+973411131456$ |
| $c_7, c_{12}$ | $y^{80}+57y^{79}+\cdots+262912y+21904$ |
| $c_8$ | $y^{80}+3y^{79}+\cdots-8880y+121$ |
| $c_{10}$ | $y^{80}+46y^{79}+\cdots-72020481186584y+443405496769$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.046801 + 1.002510I$<br>$a = 0.98336 + 1.75820I$<br>$b = -0.573536 - 0.982987I$ | $-0.176447 - 0.015979I$ | 0 |
| $u = 0.046801 - 1.002510I$<br>$a = 0.98336 - 1.75820I$<br>$b = -0.573536 + 0.982987I$ | $-0.176447 + 0.015979I$ | 0 |
| $u = 0.822278 + 0.475094I$<br>$a = 0.732335 - 0.357721I$<br>$b = 0.957847 - 0.349248I$ | $-2.53039 + 3.09745I$ | 0 |
| $u = 0.822278 - 0.475094I$<br>$a = 0.732335 + 0.357721I$<br>$b = 0.957847 + 0.349248I$ | $-2.53039 - 3.09745I$ | 0 |
| $u = 0.091622 + 1.055600I$<br>$a = 0.24639 + 2.94466I$<br>$b = 0.822173 - 0.286394I$ | $6.28320 - 3.62041I$ | 0 |
| $u = 0.091622 - 1.055600I$<br>$a = 0.24639 - 2.94466I$<br>$b = 0.822173 + 0.286394I$ | $6.28320 + 3.62041I$ | 0 |
| $u = 0.279779 + 1.030260I$<br>$a = -0.01582 + 2.20267I$<br>$b = -1.160090 - 0.565372I$ | $-2.43822 - 5.49446I$ | 0 |
| $u = 0.279779 - 1.030260I$<br>$a = -0.01582 - 2.20267I$<br>$b = -1.160090 + 0.565372I$ | $-2.43822 + 5.49446I$ | 0 |
| $u = -0.255565 + 0.885376I$<br>$a = 1.192220 - 0.536184I$<br>$b = -1.74649 + 0.21439I$ | $1.24011 + 5.04477I$ | 0 |
| $u = -0.255565 - 0.885376I$<br>$a = 1.192220 + 0.536184I$<br>$b = -1.74649 - 0.21439I$ | $1.24011 - 5.04477I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.105049 + 1.089820I$<br>$a = 0.41716 - 2.72556I$<br>$b = -0.757713 + 0.316934I$ | $6.31846 + 2.49469I$ | 0 |
| $u = 0.105049 - 1.089820I$<br>$a = 0.41716 + 2.72556I$<br>$b = -0.757713 - 0.316934I$ | $6.31846 - 2.49469I$ | 0 |
| $u = 0.081923 + 1.111640I$<br>$a = -0.93761 - 1.73433I$<br>$b = 1.45583 + 1.02764I$ | $3.16613 - 5.16687I$ | 0 |
| $u = 0.081923 - 1.111640I$<br>$a = -0.93761 + 1.73433I$<br>$b = 1.45583 - 1.02764I$ | $3.16613 + 5.16687I$ | 0 |
| $u = 0.306815 + 0.809611I$<br>$a = -0.59543 + 1.62433I$<br>$b = 0.680031 - 1.128500I$ | $-1.13568 - 1.39327I$ | $0. + 6.02870I$ |
| $u = 0.306815 - 0.809611I$<br>$a = -0.59543 - 1.62433I$<br>$b = 0.680031 + 1.128500I$ | $-1.13568 + 1.39327I$ | $0. - 6.02870I$ |
| $u = 0.850618 + 0.141619I$<br>$a = -0.603834 - 0.644927I$<br>$b = -0.082168 + 0.834234I$ | $4.31948 - 6.02401I$ | $-8.00000 + 4.76540I$ |
| $u = 0.850618 - 0.141619I$<br>$a = -0.603834 + 0.644927I$<br>$b = -0.082168 - 0.834234I$ | $4.31948 + 6.02401I$ | $-8.00000 - 4.76540I$ |
| $u = -0.393225 + 1.082950I$<br>$a = 0.149783 - 1.328200I$<br>$b = -1.077820 + 0.560087I$ | $1.63816 + 3.25672I$ | 0 |
| $u = -0.393225 - 1.082950I$<br>$a = 0.149783 + 1.328200I$<br>$b = -1.077820 - 0.560087I$ | $1.63816 - 3.25672I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.010130 + 0.814360I$<br>$a = 0.298622 + 1.013230I$<br>$b = 1.011000 - 0.400621I$ | $-0.745254 - 0.723458I$ | $-9.33301 + 2.88959I$ |
| $u = 0.010130 - 0.814360I$<br>$a = 0.298622 - 1.013230I$<br>$b = 1.011000 + 0.400621I$ | $-0.745254 + 0.723458I$ | $-9.33301 - 2.88959I$ |
| $u = 0.765524 + 0.242345I$<br>$a = 0.829280 + 0.521861I$<br>$b = 0.120637 - 0.711335I$ | $5.10844 + 0.82388I$ | $-5.14125 - 0.25076I$ |
| $u = 0.765524 - 0.242345I$<br>$a = 0.829280 - 0.521861I$<br>$b = 0.120637 + 0.711335I$ | $5.10844 - 0.82388I$ | $-5.14125 + 0.25076I$ |
| $u = 0.540193 + 0.561625I$<br>$a = 0.470096 - 0.502904I$<br>$b = 1.121930 - 0.386740I$ | $-3.79395 + 2.22531I$ | $-15.1723 + 3.2449I$ |
| $u = 0.540193 - 0.561625I$<br>$a = 0.470096 + 0.502904I$<br>$b = 1.121930 + 0.386740I$ | $-3.79395 - 2.22531I$ | $-15.1723 - 3.2449I$ |
| $u = 0.491737 + 1.117400I$<br>$a = -0.54139 + 1.52861I$<br>$b = -1.131240 - 0.476408I$ | $-0.42712 - 8.03019I$ | $0$ |
| $u = 0.491737 - 1.117400I$<br>$a = -0.54139 - 1.52861I$<br>$b = -1.131240 + 0.476408I$ | $-0.42712 + 8.03019I$ | $0$ |
| $u = -1.224740 + 0.000179I$<br>$a = 0.246321 + 0.350162I$<br>$b = 1.144690 - 0.486456I$ | $2.22985 + 3.62423I$ | $0$ |
| $u = -1.224740 - 0.000179I$<br>$a = 0.246321 - 0.350162I$<br>$b = 1.144690 + 0.486456I$ | $2.22985 - 3.62423I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.306758+1.193560I$<br>$a=\ \ 0.435738+0.477747I$<br>$b=-0.212987-0.588066I$ | $2.19021+3.79104I$ | 0 |
| $u=-0.306758-1.193560I$<br>$a=\ \ 0.435738-0.477747I$<br>$b=-0.212987+0.588066I$ | $2.19021-3.79104I$ | 0 |
| $u=-1.235680+0.050440I$<br>$a=-0.272628-0.464013I$<br>$b=-1.206980+0.505362I$ | $1.01408+10.86440I$ | 0 |
| $u=-1.235680-0.050440I$<br>$a=-0.272628+0.464013I$<br>$b=-1.206980-0.505362I$ | $1.01408-10.86440I$ | 0 |
| $u=\ \ 1.23866$<br>$a=-0.818757$<br>$b=-0.903518$ | $-4.96766$ | 0 |
| $u=\ \ 0.287804+1.205310I$<br>$a=-0.07226-1.48666I$<br>$b=\ \ 1.35004+0.46853I$ | $-1.05609-7.02185I$ | 0 |
| $u=\ \ 0.287804-1.205310I$<br>$a=-0.07226+1.48666I$<br>$b=\ \ 1.35004-0.46853I$ | $-1.05609+7.02185I$ | 0 |
| $u=-0.037339+1.249590I$<br>$a=\ \ 0.008119-1.158290I$<br>$b=-0.278270+0.933238I$ | $3.92396+2.10466I$ | 0 |
| $u=-0.037339-1.249590I$<br>$a=\ \ 0.008119+1.158290I$<br>$b=-0.278270-0.933238I$ | $3.92396-2.10466I$ | 0 |
| $u=-0.717179+0.064230I$<br>$a=\ \ 0.389771-0.052663I$<br>$b=\ \ 0.500055-0.258503I$ | $-1.354540-0.079357I$ | $-5.49507-1.06068I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.717179-0.064230I$<br>$a=\ \ 0.389771+0.052663I$<br>$b=\ \ 0.500055+0.258503I$ | $-1.354540+0.079357I$ | $-5.49507+1.06068I$ |
| $u=-0.548102+0.419477I$<br>$a=-0.34153+1.63307I$<br>$b=\ \ 1.310210-0.401158I$ | $0.18162-1.54489I$ | $-11.98300+1.73737I$ |
| $u=-0.548102-0.419477I$<br>$a=-0.34153-1.63307I$<br>$b=\ \ 1.310210+0.401158I$ | $0.18162+1.54489I$ | $-11.98300-1.73737I$ |
| $u=-0.128278+1.308850I$<br>$a=\ \ 0.334243-1.179070I$<br>$b=-0.661054+0.678245I$ | $3.31548+2.64034I$ | 0 |
| $u=-0.128278-1.308850I$<br>$a=\ \ 0.334243+1.179070I$<br>$b=-0.661054-0.678245I$ | $3.31548-2.64034I$ | 0 |
| $u=\ \ 0.418017+1.260320I$<br>$a=\ \ 0.254230-1.347270I$<br>$b=\ \ 1.153920+0.328092I$ | $-1.18466-4.83399I$ | 0 |
| $u=\ \ 0.418017-1.260320I$<br>$a=\ \ 0.254230+1.347270I$<br>$b=\ \ 1.153920-0.328092I$ | $-1.18466+4.83399I$ | 0 |
| $u=-0.148559+1.327950I$<br>$a=-1.80054+1.36603I$<br>$b=\ \ 0.897881-0.303281I$ | $6.00828+6.28936I$ | 0 |
| $u=-0.148559-1.327950I$<br>$a=-1.80054-1.36603I$<br>$b=\ \ 0.897881+0.303281I$ | $6.00828-6.28936I$ | 0 |
| $u=-1.276820+0.458507I$<br>$a=\ \ 0.0642039+0.1102510I$<br>$b=-1.137630-0.262063I$ | $-6.57602-0.89051I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.276820-0.458507I$<br>$a=\ \ 0.0642039-0.1102510I$<br>$b=-1.137630+0.262063I$ | $-6.57602+0.89051I$ | 0 |
| $u=\ \ 0.375344+1.305330I$<br>$a=\ \ 0.45582-1.38696I$<br>$b=-0.316427+1.215260I$ | $9.73007-3.25378I$ | 0 |
| $u=\ \ 0.375344-1.305330I$<br>$a=\ \ 0.45582+1.38696I$<br>$b=-0.316427-1.215260I$ | $9.73007+3.25378I$ | 0 |
| $u=-0.156318+1.363940I$<br>$a=\ \ 1.34534-1.61897I$<br>$b=-0.905799+0.399198I$ | $5.74714+0.69667I$ | 0 |
| $u=-0.156318-1.363940I$<br>$a=\ \ 1.34534+1.61897I$<br>$b=-0.905799-0.399198I$ | $5.74714-0.69667I$ | 0 |
| $u=\ \ 0.419691+1.331690I$<br>$a=-0.51408+1.35772I$<br>$b=\ \ 0.280095-1.188640I$ | $8.83649-10.61630I$ | 0 |
| $u=\ \ 0.419691-1.331690I$<br>$a=-0.51408-1.35772I$<br>$b=\ \ 0.280095+1.188640I$ | $8.83649+10.61630I$ | 0 |
| $u=-0.127688+1.402740I$<br>$a=-1.017010-0.198866I$<br>$b=\ \ 0.712556-0.016753I$ | $1.28019+3.07152I$ | 0 |
| $u=-0.127688-1.402740I$<br>$a=-1.017010+0.198866I$<br>$b=\ \ 0.712556+0.016753I$ | $1.28019-3.07152I$ | 0 |
| $u=-0.69061+1.25085I$<br>$a=-0.287373+1.369720I$<br>$b=\ \ 1.233370-0.610545I$ | $-3.79073+7.70099I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.69061-1.25085I$<br>$a=-0.287373-1.369720I$<br>$b=\ \ 1.233370+0.610545I$ | $-3.79073-7.70099I$ | 0 |
| $u=\ \ 0.509923+0.167049I$<br>$a=-1.18077+1.18242I$<br>$b=-1.183380+0.287450I$ | $-4.27418+3.88356I$ | $-16.0855-8.1336I$ |
| $u=\ \ 0.509923-0.167049I$<br>$a=-1.18077-1.18242I$<br>$b=-1.183380-0.287450I$ | $-4.27418-3.88356I$ | $-16.0855+8.1336I$ |
| $u=\ \ 0.73780+1.26578I$<br>$a=-0.619671+0.951801I$<br>$b=-0.805392-0.449705I$ | $7.29022-6.62158I$ | 0 |
| $u=\ \ 0.73780-1.26578I$<br>$a=-0.619671-0.951801I$<br>$b=-0.805392+0.449705I$ | $7.29022+6.62158I$ | 0 |
| $u=\ \ 0.81373+1.23958I$<br>$a=\ \ 0.665630-0.811391I$<br>$b=\ \ 0.683396+0.362604I$ | $6.67626+0.49264I$ | 0 |
| $u=\ \ 0.81373-1.23958I$<br>$a=\ \ 0.665630+0.811391I$<br>$b=\ \ 0.683396-0.362604I$ | $6.67626-0.49264I$ | 0 |
| $u=-0.55706+1.40052I$<br>$a=\ \ 0.15830-1.53976I$<br>$b=-1.26779+0.67703I$ | $6.69796+9.82224I$ | 0 |
| $u=-0.55706-1.40052I$<br>$a=\ \ 0.15830+1.53976I$<br>$b=-1.26779-0.67703I$ | $6.69796-9.82224I$ | 0 |
| $u=-0.55658+1.41662I$<br>$a=-0.14783+1.60393I$<br>$b=\ \ 1.28529-0.66239I$ | $5.6492+17.0935I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.55658-1.41662I$<br>$a=-0.14783-1.60393I$<br>$b=\ \ 1.28529+0.66239I$ | $5.6492-17.0935I$ | 0 |
| $u=-0.324715+0.300358I$<br>$a=\ \ 0.982844-0.479573I$<br>$b=\ \ 0.024182-0.478711I$ | $-0.850668+1.089870I$ | $-8.28515-6.20149I$ |
| $u=-0.324715-0.300358I$<br>$a=\ \ 0.982844+0.479573I$<br>$b=\ \ 0.024182+0.478711I$ | $-0.850668-1.089870I$ | $-8.28515+6.20149I$ |
| $u=-0.47290+1.51406I$<br>$a=\ \ 0.473897+0.321956I$<br>$b=-0.796617-0.473267I$ | $7.30475+2.76610I$ | 0 |
| $u=-0.47290-1.51406I$<br>$a=\ \ 0.473897-0.321956I$<br>$b=-0.796617+0.473267I$ | $7.30475-2.76610I$ | 0 |
| $u=-0.379685$<br>$a=\ \ 1.02008$<br>$b=\ \ 0.736668$ | $-0.972157$ | $-10.3410$ |
| $u=-0.170182+0.315443I$<br>$a=\ \ 2.15961-1.70448I$<br>$b=-1.293230+0.398588I$ | $1.08478+4.75218I$ | $-10.44225-3.54394I$ |
| $u=-0.170182-0.315443I$<br>$a=\ \ 2.15961+1.70448I$<br>$b=-1.293230-0.398588I$ | $1.08478-4.75218I$ | $-10.44225+3.54394I$ |
| $u=-0.55597+1.61236I$<br>$a=-0.432708-0.309730I$<br>$b=\ \ 0.932914+0.420052I$ | $5.84863-3.93774I$ | 0 |
| $u=-0.55597-1.61236I$<br>$a=-0.432708+0.309730I$<br>$b=\ \ 0.932914-0.420052I$ | $5.84863+3.93774I$ | 0 |

**II.**

$\boldsymbol{I_2^u = \langle -4.20\times 10^8 u^{22} + 6.00\times 10^8 u^{21} + \cdots + 9.40\times 10^8 b + 1.32\times 10^9,\ 5.44\times 10^8 u^{22} - 1.66\times 10^9 u^{21} + \cdots + 1.88\times 10^9 a - 3.19\times 10^9,\ u^{23} - u^{22} + \cdots + 8u + 4\rangle}$

**(i) Arc colorings**

$$a_8 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} -0.289572u^{22} + 0.885511u^{21} + \cdots + 2.14028u + 1.69716 \\ 0.446730u^{22} - 0.638932u^{21} + \cdots - 1.35067u - 1.40700 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0.157158u^{22} + 0.246579u^{21} + \cdots + 0.789609u + 0.290157 \\ 0.446730u^{22} - 0.638932u^{21} + \cdots - 1.35067u - 1.40700 \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} 0.276363u^{22} - 0.173920u^{21} + \cdots + 2.11044u + 1.48875 \\ 0.765290u^{22} - 0.962834u^{21} + \cdots + 0.685442u - 0.921020 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.167152u^{22} - 0.278332u^{21} + \cdots - 3.22268u - 0.798647 \\ -0.132267u^{22} - 0.326350u^{21} + \cdots - 2.03671u - 1.02647 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -0.574730u^{22} + 1.11722u^{21} + \cdots + 5.10114u + 3.51895 \\ 0.571145u^{22} + 0.408285u^{21} + \cdots + 9.08167u + 2.72101 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -0.487679u^{22} + 0.809537u^{21} + \cdots + 3.24767u + 1.15810 \\ 0.269230u^{22} + 0.475192u^{21} + \cdots + 6.03127u + 1.81567 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.378803u^{22} + 0.704466u^{21} + \cdots - 2.22326u + 0.615635 \\ -0.221457u^{22} - 0.0125231u^{21} + \cdots - 1.12963u - 0.278927 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -0.723637u^{22} + 0.826080u^{21} + \cdots - 0.889562u + 1.48875 \\ 0.765290u^{22} - 0.962834u^{21} + \cdots + 1.68544u - 0.921020 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -\frac{1916934295}{469795213}u^{22} + \frac{3433733587}{469795213}u^{21} + \cdots + \frac{4938247538}{469795213}u - \frac{1506429838}{469795213}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{23} - 2u^{22} + \cdots + 311u - 97$ |
| $c_2$ | $u^{23} + u^{22} + \cdots - 3u - 1$ |
| $c_3$ | $u^{23} - 8u^{21} + \cdots + 2u - 1$ |
| $c_4$ | $u^{23} - 5u^{21} + \cdots - 8u - 4$ |
| $c_5$ | $u^{23} - u^{22} + \cdots - 3u + 1$ |
| $c_6$ | $u^{23} - u^{22} + \cdots + 112u - 8$ |
| $c_7$ | $u^{23} + u^{22} + \cdots + 8u - 4$ |
| $c_8$ | $u^{23} - 7u^{22} + \cdots - 4u + 1$ |
| $c_9$ | $u^{23} - 5u^{21} + \cdots - 8u + 4$ |
| $c_{10}$ | $u^{23} + 2u^{22} + \cdots + 8u + 1$ |
| $c_{11}$ | $u^{23} - 8u^{21} + \cdots + 2u + 1$ |
| $c_{12}$ | $u^{23} - u^{22} + \cdots + 8u + 4$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{23} + 14y^{22} + \cdots + 102929y - 9409$ |
| $c_2, c_5$ | $y^{23} - 15y^{22} + \cdots + 21y - 1$ |
| $c_3, c_{11}$ | $y^{23} - 16y^{22} + \cdots + 20y - 1$ |
| $c_4, c_9$ | $y^{23} - 10y^{22} + \cdots - 336y - 16$ |
| $c_6$ | $y^{23} + 9y^{22} + \cdots + 224y - 64$ |
| $c_7, c_{12}$ | $y^{23} + 15y^{22} + \cdots - 16y - 16$ |
| $c_8$ | $y^{23} - 3y^{22} + \cdots + 38y - 1$ |
| $c_{10}$ | $y^{23} + 4y^{22} + \cdots + 10y - 1$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.195695 + 0.905353I$<br>$a = 0.663809 + 1.111290I$<br>$b = -1.58112 - 0.64190I$ | $1.80593 - 5.30609I$ | $-4.19368 + 10.52796I$ |
| $u = 0.195695 - 0.905353I$<br>$a = 0.663809 - 1.111290I$<br>$b = -1.58112 + 0.64190I$ | $1.80593 + 5.30609I$ | $-4.19368 - 10.52796I$ |
| $u = -0.249720 + 0.815143I$<br>$a = -0.74167 - 1.92054I$<br>$b = 0.65124 + 1.31322I$ | $-1.43107 + 1.29521I$ | $-23.7677 + 0.8270I$ |
| $u = -0.249720 - 0.815143I$<br>$a = -0.74167 + 1.92054I$<br>$b = 0.65124 - 1.31322I$ | $-1.43107 - 1.29521I$ | $-23.7677 - 0.8270I$ |
| $u = 0.311236 + 1.186810I$<br>$a = -0.17688 + 1.72983I$<br>$b = -1.224100 - 0.449665I$ | $-1.34450 - 6.20497I$ | $-10.76093 + 5.12215I$ |
| $u = 0.311236 - 1.186810I$<br>$a = -0.17688 - 1.72983I$<br>$b = -1.224100 + 0.449665I$ | $-1.34450 + 6.20497I$ | $-10.76093 - 5.12215I$ |
| $u = 0.525423 + 0.535300I$<br>$a = 0.488288 - 1.047180I$<br>$b = 1.076500 - 0.325826I$ | $-3.66567 + 2.95631I$ | $-13.7337 - 5.1643I$ |
| $u = 0.525423 - 0.535300I$<br>$a = 0.488288 + 1.047180I$<br>$b = 1.076500 + 0.325826I$ | $-3.66567 - 2.95631I$ | $-13.7337 + 5.1643I$ |
| $u = -0.325767 + 1.238460I$<br>$a = 0.55023 - 1.85887I$<br>$b = -0.698035 + 0.081331I$ | $6.29166 + 4.98444I$ | $-6.04423 - 4.91486I$ |
| $u = -0.325767 - 1.238460I$<br>$a = 0.55023 + 1.85887I$<br>$b = -0.698035 - 0.081331I$ | $6.29166 - 4.98444I$ | $-6.04423 + 4.91486I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.063849 + 1.280080I$<br>$a = -0.765281 + 0.991836I$<br>$b = 1.030940 - 0.647555I$ | $3.41540 + 3.83887I$ | $-6.08616 - 5.69445I$ |
| $u = 0.063849 - 1.280080I$<br>$a = -0.765281 - 0.991836I$<br>$b = 1.030940 + 0.647555I$ | $3.41540 - 3.83887I$ | $-6.08616 + 5.69445I$ |
| $u = -0.466124 + 1.219360I$<br>$a = 0.30524 + 1.67930I$<br>$b = 0.753830 - 0.116296I$ | $5.78601 - 1.16137I$ | $-8.66700 + 0.78351I$ |
| $u = -0.466124 - 1.219360I$<br>$a = 0.30524 - 1.67930I$<br>$b = 0.753830 + 0.116296I$ | $5.78601 + 1.16137I$ | $-8.66700 - 0.78351I$ |
| $u = -0.208317 + 1.310250I$<br>$a = 0.888196 + 0.303119I$<br>$b = -0.338193 - 0.237729I$ | $1.87567 + 2.84881I$ | $-4.03264 + 0.76341I$ |
| $u = -0.208317 - 1.310250I$<br>$a = 0.888196 - 0.303119I$<br>$b = -0.338193 + 0.237729I$ | $1.87567 - 2.84881I$ | $-4.03264 - 0.76341I$ |
| $u = 1.187760 + 0.606265I$<br>$a = 0.0365848 - 0.0492523I$<br>$b = -1.163490 + 0.305211I$ | $-6.91288 + 1.35220I$ | $-16.3921 - 6.4530I$ |
| $u = 1.187760 - 0.606265I$<br>$a = 0.0365848 + 0.0492523I$<br>$b = -1.163490 - 0.305211I$ | $-6.91288 - 1.35220I$ | $-16.3921 + 6.4530I$ |
| $u = 0.618783 + 1.194600I$<br>$a = -0.24896 - 1.47907I$<br>$b = 1.264580 + 0.564204I$ | $-4.65670 - 7.69608I$ | $-15.2035 + 5.8609I$ |
| $u = 0.618783 - 1.194600I$<br>$a = -0.24896 + 1.47907I$<br>$b = 1.264580 - 0.564204I$ | $-4.65670 + 7.69608I$ | $-15.2035 - 5.8609I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.44339$<br>$a=-0.670422$<br>$b=-0.776001$ | $-4.63397$ | $4.55600$ |
| $u=-0.431125+0.126042I$<br>$a=-0.164338-1.136870I$<br>$b=\ \ 0.615858-0.308043I$ | $-2.13675-0.30581I$ | $-17.3964+1.2323I$ |
| $u=-0.431125-0.126042I$<br>$a=-0.164338+1.136870I$<br>$b=\ \ 0.615858+0.308043I$ | $-2.13675+0.30581I$ | $-17.3964-1.2323I$ |

### III. $I_3^u = \langle b+1,\ a+1,\ u-1 \rangle$

**(i) Arc colorings**

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

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

**(iii) Cusp Shapes** $= -18$

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

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

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

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

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

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \quad 1.00000$<br>$a = -1.00000$<br>$b = -1.00000$ | $-4.93480$ | $-18.0000$ |

**IV. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u(u^{23}-2u^{22}+\cdots+311u-97)$ $\cdot(u^{80}+u^{79}+\cdots+121816053u+10935405)$ |
| $c_2$ | $(u+1)(u^{23}+u^{22}+\cdots-3u-1)(u^{80}+5u^{79}+\cdots-9u+1)$ |
| $c_3$ | $(u-1)(u^{23}-8u^{21}+\cdots+2u-1)(u^{80}+2u^{79}+\cdots-488u-91)$ |
| $c_4$ | $(u+1)(u^{23}-5u^{21}+\cdots-8u-4)(u^{80}-4u^{79}+\cdots+22580u+3676)$ |
| $c_5$ | $(u+1)(u^{23}-u^{22}+\cdots-3u+1)(u^{80}+5u^{79}+\cdots-9u+1)$ |
| $c_6$ | $(u+2)(u^{23}-u^{22}+\cdots+112u-8)$ $\cdot(u^{80}-8u^{79}+\cdots+11892000u+986616)$ |
| $c_7$ | $(u-1)(u^{23}+u^{22}+\cdots+8u-4)(u^{80}+3u^{79}+\cdots-692u-148)$ |
| $c_8$ | $(u+1)(u^{23}-7u^{22}+\cdots-4u+1)(u^{80}-11u^{79}+\cdots+258u-11)$ |
| $c_9$ | $(u+1)(u^{23}-5u^{21}+\cdots-8u+4)(u^{80}-4u^{79}+\cdots+22580u+3676)$ |
| $c_{10}$ | $(u+1)(u^{23}+2u^{22}+\cdots+8u+1)$ $\cdot(u^{80}-4u^{79}+\cdots+9331040u+665887)$ |
| $c_{11}$ | $(u-1)(u^{23}-8u^{21}+\cdots+2u+1)(u^{80}+2u^{79}+\cdots-488u-91)$ |
| $c_{12}$ | $(u-1)(u^{23}-u^{22}+\cdots+8u+4)(u^{80}+3u^{79}+\cdots-692u-148)$ |

**V. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y(y^{23}+14y^{22}+\cdots+102929y-9409)$ $\cdot(y^{80}+59y^{79}+\cdots+3158025656114421y+119583082514025)$ |
| $c_2, c_5$ | $(y-1)(y^{23}-15y^{22}+\cdots+21y-1)(y^{80}-21y^{79}+\cdots-63y+1)$ |
| $c_3, c_{11}$ | $(y-1)(y^{23}-16y^{22}+\cdots+20y-1)$ $\cdot(y^{80}-46y^{79}+\cdots-130946y+8281)$ |
| $c_4, c_9$ | $(y-1)(y^{23}-10y^{22}+\cdots-336y-16)$ $\cdot(y^{80}-80y^{79}+\cdots-1476835552y+13512976)$ |
| $c_6$ | $(y-4)(y^{23}+9y^{22}+\cdots+224y-64)$ $\cdot(y^{80}+58y^{79}+\cdots-53110665152640y+973411131456)$ |
| $c_7, c_{12}$ | $(y-1)(y^{23}+15y^{22}+\cdots-16y-16)$ $\cdot(y^{80}+57y^{79}+\cdots+262912y+21904)$ |
| $c_8$ | $(y-1)(y^{23}-3y^{22}+\cdots+38y-1)(y^{80}+3y^{79}+\cdots-8880y+121)$ |
| $c_{10}$ | $(y-1)(y^{23}+4y^{22}+\cdots+10y-1)$ $\cdot(y^{80}+46y^{79}+\cdots-72020481186584y+443405496769)$ |