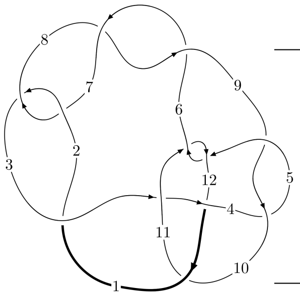
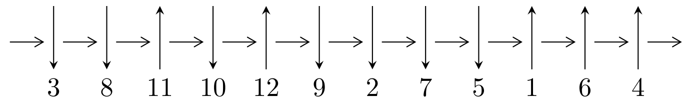
# $12a_{0786}$ $(K12a_{0786})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle 7.76879 \times 10^{80} u^{103} + 8.52236 \times 10^{80} u^{102} + \cdots + 3.56472 \times 10^{80} b - 4.99373 \times 10^{81},$$
$$- 6.43118 \times 10^{80} u^{103} - 4.09372 \times 10^{81} u^{102} + \cdots + 2.49530 \times 10^{81} a + 1.23254 \times 10^{82},\ u^{104} + u^{103} + \cdots - 7$$
$$I_2^u = \langle -2u^{19} + 5u^{17} + \cdots + b - 1,\ 2u^{19} - u^{18} + \cdots + a - 1,\ u^{20} - 3u^{18} + \cdots + u + 1 \rangle$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 124 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.** $\boldsymbol{I_1^u = \langle 7.77\times 10^{80}u^{103} + 8.52\times 10^{80}u^{102} + \cdots + 3.56\times 10^{80}b - 4.99\times 10^{81},\ -6.43\times 10^{80}u^{103} - 4.09\times 10^{81}u^{102} + \cdots + 2.50\times 10^{81}a + 1.23\times 10^{82},\ u^{104} + u^{103} + \cdots - 7u + 7\rangle}$

**(i) Arc colorings**

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

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

$$a_8 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} 0.257732u^{103} + 1.64057u^{102} + \cdots - 20.8766u - 4.93944 \\ -2.17936u^{103} - 2.39075u^{102} + \cdots + 25.2220u + 14.0088 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 4.54650u^{103} + 4.71983u^{102} + \cdots - 21.6024u - 22.5070 \\ 0.732669u^{103} + 0.154268u^{102} + \cdots + 7.64667u + 3.76015 \end{pmatrix}$$

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

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

$$a_6 = \begin{pmatrix} u^4 - u^2 + 1 \\ -u^4 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -1.07483u^{103} + 0.848416u^{102} + \cdots - 4.82910u - 1.91321 \\ -2.87953u^{103} - 3.09296u^{102} + \cdots + 28.4903u + 13.0462 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1.07670u^{103} + 1.40144u^{102} + \cdots + 0.0336515u - 10.1638 \\ -0.478154u^{103} - 0.659756u^{102} + \cdots + 20.1108u + 3.76858 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -0.224309u^{103} + 2.43305u^{102} + \cdots - 12.2602u - 13.0672 \\ -1.89620u^{103} - 2.01139u^{102} + \cdots + 26.0423u + 7.99311 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 4.36792u^{103} + 16.1678u^{102} + \cdots - 14.8053u - 125.030$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_6, c_8$ | $u^{104} + 25u^{103} + \cdots + 749u + 49$ |
| $c_2, c_7$ | $u^{104} + u^{103} + \cdots - 7u + 7$ |
| $c_3$ | $u^{104} - 10u^{102} + \cdots + 34258u + 3709$ |
| $c_4, c_9$ | $u^{104} - 2u^{103} + \cdots - 728u + 121$ |
| $c_5, c_{11}$ | $u^{104} - u^{103} + \cdots - u + 7$ |
| $c_{10}$ | $u^{104} + 11u^{103} + \cdots + 131198u + 14113$ |
| $c_{12}$ | $u^{104} + 7u^{103} + \cdots - u + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_6, c_8$ | $y^{104} + 115y^{103} + \cdots + 32487y + 2401$ |
| $c_2, c_7$ | $y^{104} - 25y^{103} + \cdots - 749y + 49$ |
| $c_3$ | $y^{104} - 20y^{103} + \cdots - 305407844y + 13756681$ |
| $c_4, c_9$ | $y^{104} + 76y^{103} + \cdots + 509890y + 14641$ |
| $c_5, c_{11}$ | $y^{104} + 57y^{103} + \cdots + 1693y + 49$ |
| $c_{10}$ | $y^{104} - 43y^{103} + \cdots - 10011615824y + 199176769$ |
| $c_{12}$ | $y^{104} - 5y^{103} + \cdots + 89y + 1$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.766662 + 0.632934I$<br>$a = 0.157630 + 0.376131I$<br>$b = 0.354923 + 0.313305I$ | $2.70022 - 2.40792I$ | 0 |
| $u = 0.766662 - 0.632934I$<br>$a = 0.157630 - 0.376131I$<br>$b = 0.354923 - 0.313305I$ | $2.70022 + 2.40792I$ | 0 |
| $u = 0.990161 + 0.226156I$<br>$a = 0.345510 + 0.630720I$<br>$b = 0.456131 - 0.442211I$ | $-0.06685 - 3.01354I$ | 0 |
| $u = 0.990161 - 0.226156I$<br>$a = 0.345510 - 0.630720I$<br>$b = 0.456131 + 0.442211I$ | $-0.06685 + 3.01354I$ | 0 |
| $u = -0.898218 + 0.484385I$<br>$a = -0.375200 + 1.107920I$<br>$b = 0.789176 - 1.165220I$ | $3.58702 + 6.98929I$ | 0 |
| $u = -0.898218 - 0.484385I$<br>$a = -0.375200 - 1.107920I$<br>$b = 0.789176 + 1.165220I$ | $3.58702 - 6.98929I$ | 0 |
| $u = 0.906841 + 0.328078I$<br>$a = 1.43990 + 0.82818I$<br>$b = -0.805047 - 0.092018I$ | $-1.74282 - 5.46943I$ | 0 |
| $u = 0.906841 - 0.328078I$<br>$a = 1.43990 - 0.82818I$<br>$b = -0.805047 + 0.092018I$ | $-1.74282 + 5.46943I$ | 0 |
| $u = 0.731510 + 0.614247I$<br>$a = -0.229128 + 0.377392I$<br>$b = 0.452360 + 0.444639I$ | $2.77148 - 2.27111I$ | 0 |
| $u = 0.731510 - 0.614247I$<br>$a = -0.229128 - 0.377392I$<br>$b = 0.452360 - 0.444639I$ | $2.77148 + 2.27111I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.946665 + 0.445873I$<br>$a = 1.110950 - 0.256330I$<br>$b = -0.172865 + 0.593087I$ | $-3.47387 + 7.06916I$ | 0 |
| $u = -0.946665 - 0.445873I$<br>$a = 1.110950 + 0.256330I$<br>$b = -0.172865 - 0.593087I$ | $-3.47387 - 7.06916I$ | 0 |
| $u = 0.429102 + 0.835909I$<br>$a = 0.621121 - 0.556923I$<br>$b = -0.449537 + 0.417666I$ | $3.48038 - 4.88988I$ | 0 |
| $u = 0.429102 - 0.835909I$<br>$a = 0.621121 + 0.556923I$<br>$b = -0.449537 - 0.417666I$ | $3.48038 + 4.88988I$ | 0 |
| $u = 0.933574 + 0.046772I$<br>$a = 0.268196 - 0.407068I$<br>$b = -0.577101 - 1.046790I$ | $-5.72348 + 1.88899I$ | 0 |
| $u = 0.933574 - 0.046772I$<br>$a = 0.268196 + 0.407068I$<br>$b = -0.577101 + 1.046790I$ | $-5.72348 - 1.88899I$ | 0 |
| $u = 0.855864 + 0.353216I$<br>$a = 0.512007 + 0.795136I$<br>$b = -0.105151 - 0.893329I$ | $-0.24953 - 3.56298I$ | 0 |
| $u = 0.855864 - 0.353216I$<br>$a = 0.512007 - 0.795136I$<br>$b = -0.105151 + 0.893329I$ | $-0.24953 + 3.56298I$ | 0 |
| $u = -0.901014 + 0.209728I$<br>$a = -0.667920 - 0.366820I$<br>$b = -0.404203 + 1.238470I$ | $-2.37554 - 0.53656I$ | 0 |
| $u = -0.901014 - 0.209728I$<br>$a = -0.667920 + 0.366820I$<br>$b = -0.404203 - 1.238470I$ | $-2.37554 + 0.53656I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.872757 + 0.636215I$<br>$a = -0.921173 - 0.839949I$<br>$b = 0.145920 + 0.925194I$ | $-2.23261 + 2.46085I$ | 0 |
| $u = -0.872757 - 0.636215I$<br>$a = -0.921173 + 0.839949I$<br>$b = 0.145920 - 0.925194I$ | $-2.23261 - 2.46085I$ | 0 |
| $u = -1.081480 + 0.026581I$<br>$a = -0.133652 - 0.172093I$<br>$b = 0.616078 - 0.692280I$ | $-2.16276 - 6.51848I$ | 0 |
| $u = -1.081480 - 0.026581I$<br>$a = -0.133652 + 0.172093I$<br>$b = 0.616078 + 0.692280I$ | $-2.16276 + 6.51848I$ | 0 |
| $u = -0.795173 + 0.379218I$<br>$a = -1.78364 - 0.31075I$<br>$b = 0.736381 + 0.569274I$ | $-2.74142 + 1.90360I$ | 0 |
| $u = -0.795173 - 0.379218I$<br>$a = -1.78364 + 0.31075I$<br>$b = 0.736381 - 0.569274I$ | $-2.74142 - 1.90360I$ | 0 |
| $u = -0.780756 + 0.394948I$<br>$a = 1.63110 - 0.64652I$<br>$b = 0.735324 - 0.701901I$ | $1.33892 + 4.93257I$ | 0 |
| $u = -0.780756 - 0.394948I$<br>$a = 1.63110 + 0.64652I$<br>$b = 0.735324 + 0.701901I$ | $1.33892 - 4.93257I$ | 0 |
| $u = -1.064430 + 0.374375I$<br>$a = -0.296034 + 0.425423I$<br>$b = -0.436153 - 0.006085I$ | $0.83535 + 3.47388I$ | 0 |
| $u = -1.064430 - 0.374375I$<br>$a = -0.296034 - 0.425423I$<br>$b = -0.436153 + 0.006085I$ | $0.83535 - 3.47388I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.032620 + 0.455050I$<br>$a = -0.868126 - 0.506848I$<br>$b = 0.136396 + 0.458095I$ | $0.43075 - 13.03650I$ | $0$ |
| $u = 1.032620 - 0.455050I$<br>$a = -0.868126 + 0.506848I$<br>$b = 0.136396 - 0.458095I$ | $0.43075 + 13.03650I$ | $0$ |
| $u = 0.300979 + 0.788432I$<br>$a = 0.941826 + 0.087842I$<br>$b = -0.158311 - 0.511357I$ | $2.84217 + 8.57300I$ | $0$ |
| $u = 0.300979 - 0.788432I$<br>$a = 0.941826 - 0.087842I$<br>$b = -0.158311 + 0.511357I$ | $2.84217 - 8.57300I$ | $0$ |
| $u = 0.895050 + 0.778119I$<br>$a = -0.0114617 + 0.1300560I$<br>$b = 0.458745 + 0.554629I$ | $3.11399 - 2.93489I$ | $0$ |
| $u = 0.895050 - 0.778119I$<br>$a = -0.0114617 - 0.1300560I$<br>$b = 0.458745 - 0.554629I$ | $3.11399 + 2.93489I$ | $0$ |
| $u = -0.468867 + 0.652301I$<br>$a = 1.67663 - 0.15872I$<br>$b = -0.769802 - 0.269370I$ | $4.96708 - 2.78599I$ | $5.45184 + 0.I$ |
| $u = -0.468867 - 0.652301I$<br>$a = 1.67663 + 0.15872I$<br>$b = -0.769802 + 0.269370I$ | $4.96708 + 2.78599I$ | $5.45184 + 0.I$ |
| $u = -0.837269 + 0.858305I$<br>$a = 1.71955 - 1.12101I$<br>$b = -2.47926 - 0.90809I$ | $6.98765 - 0.83385I$ | $0$ |
| $u = -0.837269 - 0.858305I$<br>$a = 1.71955 + 1.12101I$<br>$b = -2.47926 + 0.90809I$ | $6.98765 + 0.83385I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.857688 + 0.848054I$<br>$a = 1.34507 - 1.62875I$<br>$b = -3.28470 - 0.20003I$ | $5.55138 - 2.69728I$ | $0$ |
| $u = -0.857688 - 0.848054I$<br>$a = 1.34507 + 1.62875I$<br>$b = -3.28470 + 0.20003I$ | $5.55138 + 2.69728I$ | $0$ |
| $u = 0.727404 + 0.308828I$<br>$a = 1.55109 - 0.19015I$<br>$b = -0.07706 + 1.94742I$ | $-3.22727 - 1.25096I$ | $-2.00000 + 7.02823I$ |
| $u = 0.727404 - 0.308828I$<br>$a = 1.55109 + 0.19015I$<br>$b = -0.07706 - 1.94742I$ | $-3.22727 + 1.25096I$ | $-2.00000 - 7.02823I$ |
| $u = 1.078300 + 0.561549I$<br>$a = 0.288763 - 0.501283I$<br>$b = 0.140095 + 0.441770I$ | $1.39183 - 0.25582I$ | $0$ |
| $u = 1.078300 - 0.561549I$<br>$a = 0.288763 + 0.501283I$<br>$b = 0.140095 - 0.441770I$ | $1.39183 + 0.25582I$ | $0$ |
| $u = -0.757240 + 0.174967I$<br>$a = 0.039857 - 0.279716I$<br>$b = -0.536813 + 0.538199I$ | $-1.263330 + 0.418486I$ | $-7.09557 - 0.72347I$ |
| $u = -0.757240 - 0.174967I$<br>$a = 0.039857 + 0.279716I$<br>$b = -0.536813 - 0.538199I$ | $-1.263330 - 0.418486I$ | $-7.09557 + 0.72347I$ |
| $u = -0.890714 + 0.843520I$<br>$a = 1.90421 - 1.78407I$<br>$b = -3.15861 - 0.74730I$ | $6.78735 - 0.08301I$ | $0$ |
| $u = -0.890714 - 0.843520I$<br>$a = 1.90421 + 1.78407I$<br>$b = -3.15861 + 0.74730I$ | $6.78735 + 0.08301I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.890419 + 0.847639I$<br>$a = -0.66583 - 1.29156I$<br>$b = 2.37783 + 0.54118I$ | $4.51852 - 1.93015I$ | $0$ |
| $u = 0.890419 - 0.847639I$<br>$a = -0.66583 + 1.29156I$<br>$b = 2.37783 - 0.54118I$ | $4.51852 + 1.93015I$ | $0$ |
| $u = 0.818432 + 0.920455I$<br>$a = -1.46291 - 0.80542I$<br>$b = 2.13933 - 0.57457I$ | $9.65675 + 2.00371I$ | $0$ |
| $u = 0.818432 - 0.920455I$<br>$a = -1.46291 + 0.80542I$<br>$b = 2.13933 + 0.57457I$ | $9.65675 - 2.00371I$ | $0$ |
| $u = 0.717756 + 0.257429I$<br>$a = -2.47456 - 0.58230I$<br>$b = -0.198074 + 0.179300I$ | $0.59876 + 1.75726I$ | $-4.14188 + 1.37130I$ |
| $u = 0.717756 - 0.257429I$<br>$a = -2.47456 + 0.58230I$<br>$b = -0.198074 - 0.179300I$ | $0.59876 - 1.75726I$ | $-4.14188 - 1.37130I$ |
| $u = -0.908019 + 0.843254I$<br>$a = 0.037172 + 0.239025I$<br>$b = -0.474318 + 0.556665I$ | $3.46367 + 3.13699I$ | $0$ |
| $u = -0.908019 - 0.843254I$<br>$a = 0.037172 - 0.239025I$<br>$b = -0.474318 - 0.556665I$ | $3.46367 - 3.13699I$ | $0$ |
| $u = -0.922624 + 0.832948I$<br>$a = -1.81548 + 1.58635I$<br>$b = 3.50548 + 0.24041I$ | $6.68785 + 6.32651I$ | $0$ |
| $u = -0.922624 - 0.832948I$<br>$a = -1.81548 - 1.58635I$<br>$b = 3.50548 - 0.24041I$ | $6.68785 - 6.32651I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.860422 + 0.899570I$<br>$a = 1.18975 + 2.21934I$<br>$b = -3.18431 - 0.74729I$ | $5.25028 + 4.20090I$ | 0 |
| $u = 0.860422 - 0.899570I$<br>$a = 1.18975 - 2.21934I$<br>$b = -3.18431 + 0.74729I$ | $5.25028 - 4.20090I$ | 0 |
| $u = -0.835559 + 0.923554I$<br>$a = -1.35608 + 1.79331I$<br>$b = 2.93378 - 0.19568I$ | $9.6493 - 11.0115I$ | 0 |
| $u = -0.835559 - 0.923554I$<br>$a = -1.35608 - 1.79331I$<br>$b = 2.93378 + 0.19568I$ | $9.6493 + 11.0115I$ | 0 |
| $u = 0.897180 + 0.864300I$<br>$a = 2.40675 + 0.58401I$<br>$b = -3.07009 + 1.40635I$ | $8.90543 + 0.76441I$ | 0 |
| $u = 0.897180 - 0.864300I$<br>$a = 2.40675 - 0.58401I$<br>$b = -3.07009 - 1.40635I$ | $8.90543 - 0.76441I$ | 0 |
| $u = 0.923845 + 0.837317I$<br>$a = 1.51875 + 0.63637I$<br>$b = -1.92655 + 1.55181I$ | $4.41536 - 4.33842I$ | 0 |
| $u = 0.923845 - 0.837317I$<br>$a = 1.51875 - 0.63637I$<br>$b = -1.92655 - 1.55181I$ | $4.41536 + 4.33842I$ | 0 |
| $u = -0.945789 + 0.818483I$<br>$a = -1.75271 + 1.29108I$<br>$b = 3.18525 + 1.25735I$ | $5.27707 + 8.90594I$ | 0 |
| $u = -0.945789 - 0.818483I$<br>$a = -1.75271 - 1.29108I$<br>$b = 3.18525 - 1.25735I$ | $5.27707 - 8.90594I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.873603 + 0.897281I$<br>$a = -1.36566 - 1.37873I$<br>$b = 2.39646 - 0.67516I$ | $12.37940 + 3.59050I$ | $0$ |
| $u = 0.873603 - 0.897281I$<br>$a = -1.36566 + 1.37873I$<br>$b = 2.39646 + 0.67516I$ | $12.37940 - 3.59050I$ | $0$ |
| $u = -0.187535 + 0.719880I$<br>$a = 0.232590 + 0.647272I$<br>$b = -0.128930 + 0.419958I$ | $3.68141 + 0.48804I$ | $5.79013 - 0.50832I$ |
| $u = -0.187535 - 0.719880I$<br>$a = 0.232590 - 0.647272I$<br>$b = -0.128930 - 0.419958I$ | $3.68141 - 0.48804I$ | $5.79013 + 0.50832I$ |
| $u = -0.963501 + 0.810928I$<br>$a = -1.26184 + 1.52225I$<br>$b = 2.89267 + 0.00173I$ | $6.59081 + 7.04791I$ | $0$ |
| $u = -0.963501 - 0.810928I$<br>$a = -1.26184 - 1.52225I$<br>$b = 2.89267 - 0.00173I$ | $6.59081 - 7.04791I$ | $0$ |
| $u = -0.617883 + 0.408127I$<br>$a = -0.400975 - 0.043091I$<br>$b = -0.09166 - 1.74158I$ | $1.87920 - 1.73073I$ | $4.58908 - 1.47296I$ |
| $u = -0.617883 - 0.408127I$<br>$a = -0.400975 + 0.043091I$<br>$b = -0.09166 + 1.74158I$ | $1.87920 + 1.73073I$ | $4.58908 + 1.47296I$ |
| $u = 0.928998 + 0.851199I$<br>$a = -0.92786 - 2.44910I$<br>$b = 2.89100 + 0.71756I$ | $8.80452 - 7.12890I$ | $0$ |
| $u = 0.928998 - 0.851199I$<br>$a = -0.92786 + 2.44910I$<br>$b = 2.89100 - 0.71756I$ | $8.80452 + 7.12890I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.365151+0.631995I$ <br> $a=-1.066770+0.402812I$ <br> $b=-0.148212-0.556282I$ | $-1.64752-3.05905I$ | $-1.73633+4.13553I$ |
| $u=-0.365151-0.631995I$ <br> $a=-1.066770-0.402812I$ <br> $b=-0.148212+0.556282I$ | $-1.64752+3.05905I$ | $-1.73633-4.13553I$ |
| $u=\ \ 0.963585+0.856077I$ <br> $a=\ \ 1.38676+1.16739I$ <br> $b=-3.01233+0.20429I$ | $12.0914-10.0706I$ | $0$ |
| $u=\ \ 0.963585-0.856077I$ <br> $a=\ \ 1.38676-1.16739I$ <br> $b=-3.01233-0.20429I$ | $12.0914+10.0706I$ | $0$ |
| $u=-0.904384+0.920281I$ <br> $a=-0.558498+0.960408I$ <br> $b=\ \ 1.318600-0.099299I$ | $12.29660+3.00090I$ | $0$ |
| $u=-0.904384-0.920281I$ <br> $a=-0.558498-0.960408I$ <br> $b=\ \ 1.318600+0.099299I$ | $12.29660-3.00090I$ | $0$ |
| $u=\ \ 0.972962+0.849039I$ <br> $a=-2.36110-0.95510I$ <br> $b=\ \ 3.18761-1.65953I$ | $4.89111-10.66500I$ | $0$ |
| $u=\ \ 0.972962-0.849039I$ <br> $a=-2.36110+0.95510I$ <br> $b=\ \ 3.18761+1.65953I$ | $4.89111+10.66500I$ | $0$ |
| $u=-0.938245+0.909899I$ <br> $a=\ \ 0.884162+1.060980I$ <br> $b=\ \ 0.12123-1.71305I$ | $12.18760+3.35080I$ | $0$ |
| $u=-0.938245-0.909899I$ <br> $a=\ \ 0.884162-1.060980I$ <br> $b=\ \ 0.12123+1.71305I$ | $12.18760-3.35080I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.958471 + 0.889493I$<br>$a = \quad 1.098670 - 0.306796I$<br>$b = -1.52693 - 0.70793I$ | $12.11800 + 3.65766I$ | $0$ |
| $u = -0.958471 - 0.889493I$<br>$a = \quad 1.098670 + 0.306796I$<br>$b = -1.52693 + 0.70793I$ | $12.11800 - 3.65766I$ | $0$ |
| $u = \quad 1.007110 + 0.835986I$<br>$a = \quad 1.03463 + 1.30135I$<br>$b = -2.29795 + 0.08686I$ | $9.05723 - 8.48405I$ | $0$ |
| $u = \quad 1.007110 - 0.835986I$<br>$a = \quad 1.03463 - 1.30135I$<br>$b = -2.29795 - 0.08686I$ | $9.05723 + 8.48405I$ | $0$ |
| $u = -0.999143 + 0.845974I$<br>$a = \quad 1.94604 - 1.15637I$<br>$b = -3.14503 - 1.10552I$ | $9.1250 + 17.5346I$ | $0$ |
| $u = -0.999143 - 0.845974I$<br>$a = \quad 1.94604 + 1.15637I$<br>$b = -3.14503 + 1.10552I$ | $9.1250 - 17.5346I$ | $0$ |
| $u = \quad 0.651033 + 0.030608I$<br>$a = -0.59854 + 1.49435I$<br>$b = \quad 1.12942 - 0.94839I$ | $0.72830 - 3.26919I$ | $-3.48089 + 6.93706I$ |
| $u = \quad 0.651033 - 0.030608I$<br>$a = -0.59854 - 1.49435I$<br>$b = \quad 1.12942 + 0.94839I$ | $0.72830 + 3.26919I$ | $-3.48089 - 6.93706I$ |
| $u = -0.383604 + 0.502974I$<br>$a = -0.47635 - 1.37590I$<br>$b = \quad 0.178945 + 0.823418I$ | $-1.63832 + 1.39384I$ | $-2.50160 - 4.01659I$ |
| $u = -0.383604 - 0.502974I$<br>$a = -0.47635 + 1.37590I$<br>$b = \quad 0.178945 - 0.823418I$ | $-1.63832 - 1.39384I$ | $-2.50160 + 4.01659I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.320616 + 0.461824I$<br>$a = -1.40865 + 0.41281I$<br>$b = 0.312590 + 0.113240I$ | $1.35107 + 0.45706I$ | $6.25564 - 0.31459I$ |
| $u = 0.320616 - 0.461824I$<br>$a = -1.40865 - 0.41281I$<br>$b = 0.312590 - 0.113240I$ | $1.35107 - 0.45706I$ | $6.25564 + 0.31459I$ |
| $u = 0.108145 + 0.451884I$<br>$a = -1.54856 - 1.08085I$<br>$b = 0.527286 + 0.804510I$ | $0.38768 + 2.59628I$ | $0.25241 - 3.90373I$ |
| $u = 0.108145 - 0.451884I$<br>$a = -1.54856 + 1.08085I$<br>$b = 0.527286 - 0.804510I$ | $0.38768 - 2.59628I$ | $0.25241 + 3.90373I$ |

**II.**
$$\boldsymbol{I_2^u = \langle -2u^{19}+5u^{17}+\cdots+b-1,\ 2u^{19}-u^{18}+\cdots+a-1,\ u^{20}-3u^{18}+\cdots+u+1\rangle}$$

**(i) Arc colorings**

$$a_2 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u \\ -u^3+u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -2u^{19}+u^{18}+\cdots+5u^2+1 \\ 2u^{19}-5u^{17}+\cdots-2u+1 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} u^{19}-2u^{17}+\cdots+2u-2 \\ -u^{19}+u^{18}+\cdots-2u-3 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^2+1 \\ u^2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^3 \\ u^5-u^3+u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} u^4-u^2+1 \\ -u^4 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -u^{19}+u^{18}+\cdots-u+1 \\ u^{19}-2u^{17}+\cdots-u+1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 3u^{19}+u^{18}+\cdots-4u+1 \\ u^{18}-3u^{16}+\cdots-2u-3 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -2u^{19}+u^{18}+\cdots+u+1 \\ u^{19}-2u^{17}+\cdots-u+1 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 9u^{19}-u^{18}-27u^{17}+3u^{16}+86u^{15}-10u^{14}-164u^{13}+28u^{12}+261u^{11}-47u^{10}-316u^9+74u^8+292u^7-76u^6-201u^5+56u^4+88u^3-31u^2-24u+2$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_6$ | $u^{20} - 6u^{19} + \cdots - 11u + 1$ |
| $c_2$ | $u^{20} - 3u^{18} + \cdots - u + 1$ |
| $c_3$ | $u^{20} - u^{19} + \cdots + 2u + 1$ |
| $c_4$ | $u^{20} - u^{19} + \cdots + 10u^2 + 1$ |
| $c_5$ | $u^{20} + 10u^{18} + \cdots + u + 1$ |
| $c_7$ | $u^{20} - 3u^{18} + \cdots + u + 1$ |
| $c_8$ | $u^{20} + 6u^{19} + \cdots + 11u + 1$ |
| $c_9$ | $u^{20} + u^{19} + \cdots + 10u^2 + 1$ |
| $c_{10}$ | $u^{20} - 6u^{18} + \cdots + 8u + 1$ |
| $c_{11}$ | $u^{20} + 10u^{18} + \cdots - u + 1$ |
| $c_{12}$ | $u^{20} - 2u^{19} + \cdots + u + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_6, c_8$ | $y^{20} + 22y^{19} + \cdots + 5y + 1$ |
| $c_2, c_7$ | $y^{20} - 6y^{19} + \cdots - 11y + 1$ |
| $c_3$ | $y^{20} - y^{19} + \cdots + 2y + 1$ |
| $c_4, c_9$ | $y^{20} + 19y^{19} + \cdots + 20y + 1$ |
| $c_5, c_{11}$ | $y^{20} + 20y^{19} + \cdots + 19y + 1$ |
| $c_{10}$ | $y^{20} - 12y^{19} + \cdots - 10y + 1$ |
| $c_{12}$ | $y^{20} + 2y^{19} + \cdots - y + 1$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.930125 + 0.251909I$<br>$a = -0.555551 + 1.090100I$<br>$b = -0.237834 - 0.115011I$ | $-0.42842 + 4.43650I$ | $-4.15561 - 8.27213I$ |
| $u = -0.930125 - 0.251909I$<br>$a = -0.555551 - 1.090100I$<br>$b = -0.237834 + 0.115011I$ | $-0.42842 - 4.43650I$ | $-4.15561 + 8.27213I$ |
| $u = -0.843361 + 0.606962I$<br>$a = -1.19766 - 0.86307I$<br>$b = 0.198932 + 1.255640I$ | $-1.51818 + 2.38684I$ | $3.66992 - 3.46346I$ |
| $u = -0.843361 - 0.606962I$<br>$a = -1.19766 + 0.86307I$<br>$b = 0.198932 - 1.255640I$ | $-1.51818 - 2.38684I$ | $3.66992 + 3.46346I$ |
| $u = 0.993297 + 0.523875I$<br>$a = 0.265213 - 0.240081I$<br>$b = 0.380693 - 0.228858I$ | $1.17594 - 0.95837I$ | $-1.61521 + 3.89652I$ |
| $u = 0.993297 - 0.523875I$<br>$a = 0.265213 + 0.240081I$<br>$b = 0.380693 + 0.228858I$ | $1.17594 + 0.95837I$ | $-1.61521 - 3.89652I$ |
| $u = 0.595627 + 0.611850I$<br>$a = -0.310105 - 0.045545I$<br>$b = -0.844286 - 0.027975I$ | $2.48431 - 3.51175I$ | $1.91261 + 6.52734I$ |
| $u = 0.595627 - 0.611850I$<br>$a = -0.310105 + 0.045545I$<br>$b = -0.844286 + 0.027975I$ | $2.48431 + 3.51175I$ | $1.91261 - 6.52734I$ |
| $u = 0.850202 + 0.853643I$<br>$a = -2.03545 - 1.33030I$<br>$b = 3.20640 - 0.94291I$ | $6.68936 + 1.94064I$ | $3.10110 - 3.51621I$ |
| $u = 0.850202 - 0.853643I$<br>$a = -2.03545 + 1.33030I$<br>$b = 3.20640 + 0.94291I$ | $6.68936 - 1.94064I$ | $3.10110 + 3.51621I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.897079 + 0.812456I$<br>$a = -0.274825 - 0.094266I$<br>$b = -0.559706 + 1.176180I$ | $2.08436 + 3.04014I$ | $-6.90827 - 2.70849I$ |
| $u = -0.897079 - 0.812456I$<br>$a = -0.274825 + 0.094266I$<br>$b = -0.559706 - 1.176180I$ | $2.08436 - 3.04014I$ | $-6.90827 + 2.70849I$ |
| $u = 0.740567 + 0.185874I$<br>$a = 1.67918 - 0.06454I$<br>$b = -0.36120 + 1.64428I$ | $-3.64557 - 0.76917I$ | $-11.12228 - 2.09345I$ |
| $u = 0.740567 - 0.185874I$<br>$a = 1.67918 + 0.06454I$<br>$b = -0.36120 - 1.64428I$ | $-3.64557 + 0.76917I$ | $-11.12228 + 2.09345I$ |
| $u = 0.954211 + 0.815743I$<br>$a = 1.46027 + 1.84888I$<br>$b = -3.33935 + 0.17377I$ | $6.36262 - 8.15795I$ | $2.38095 + 8.44173I$ |
| $u = 0.954211 - 0.815743I$<br>$a = 1.46027 - 1.84888I$<br>$b = -3.33935 - 0.17377I$ | $6.36262 + 8.15795I$ | $2.38095 - 8.44173I$ |
| $u = -0.941711 + 0.919429I$<br>$a = -0.825370 - 0.992714I$<br>$b = -0.14284 + 1.66170I$ | $11.93900 + 3.38003I$ | $-15.3248 - 4.1187I$ |
| $u = -0.941711 - 0.919429I$<br>$a = -0.825370 + 0.992714I$<br>$b = -0.14284 - 1.66170I$ | $11.93900 - 3.38003I$ | $-15.3248 + 4.1187I$ |
| $u = -0.521628 + 0.220168I$<br>$a = 2.29430 - 0.58796I$<br>$b = -0.300816 + 1.237010I$ | $1.17551 - 2.39551I$ | $1.56153 + 4.24080I$ |
| $u = -0.521628 - 0.220168I$<br>$a = 2.29430 + 0.58796I$<br>$b = -0.300816 - 1.237010I$ | $1.17551 + 2.39551I$ | $1.56153 - 4.24080I$ |

**III. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_6$ | $(u^{20} - 6u^{19} + \cdots - 11u + 1)(u^{104} + 25u^{103} + \cdots + 749u + 49)$ |
| $c_2$ | $(u^{20} - 3u^{18} + \cdots - u + 1)(u^{104} + u^{103} + \cdots - 7u + 7)$ |
| $c_3$ | $(u^{20} - u^{19} + \cdots + 2u + 1)(u^{104} - 10u^{102} + \cdots + 34258u + 3709)$ |
| $c_4$ | $(u^{20} - u^{19} + \cdots + 10u^2 + 1)(u^{104} - 2u^{103} + \cdots - 728u + 121)$ |
| $c_5$ | $(u^{20} + 10u^{18} + \cdots + u + 1)(u^{104} - u^{103} + \cdots - u + 7)$ |
| $c_7$ | $(u^{20} - 3u^{18} + \cdots + u + 1)(u^{104} + u^{103} + \cdots - 7u + 7)$ |
| $c_8$ | $(u^{20} + 6u^{19} + \cdots + 11u + 1)(u^{104} + 25u^{103} + \cdots + 749u + 49)$ |
| $c_9$ | $(u^{20} + u^{19} + \cdots + 10u^2 + 1)(u^{104} - 2u^{103} + \cdots - 728u + 121)$ |
| $c_{10}$ | $(u^{20} - 6u^{18} + \cdots + 8u + 1)(u^{104} + 11u^{103} + \cdots + 131198u + 14113)$ |
| $c_{11}$ | $(u^{20} + 10u^{18} + \cdots - u + 1)(u^{104} - u^{103} + \cdots - u + 7)$ |
| $c_{12}$ | $(u^{20} - 2u^{19} + \cdots + u + 1)(u^{104} + 7u^{103} + \cdots - u + 1)$ |

### IV. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_6, c_8$ | $(y^{20} + 22y^{19} + \cdots + 5y + 1)(y^{104} + 115y^{103} + \cdots + 32487y + 2401)$ |
| $c_2, c_7$ | $(y^{20} - 6y^{19} + \cdots - 11y + 1)(y^{104} - 25y^{103} + \cdots - 749y + 49)$ |
| $c_3$ | $(y^{20} - y^{19} + \cdots + 2y + 1)$ $\cdot\,(y^{104} - 20y^{103} + \cdots - 305407844y + 13756681)$ |
| $c_4, c_9$ | $(y^{20} + 19y^{19} + \cdots + 20y + 1)(y^{104} + 76y^{103} + \cdots + 509890y + 14641)$ |
| $c_5, c_{11}$ | $(y^{20} + 20y^{19} + \cdots + 19y + 1)(y^{104} + 57y^{103} + \cdots + 1693y + 49)$ |
| $c_{10}$ | $(y^{20} - 12y^{19} + \cdots - 10y + 1)$ $\cdot\,(y^{104} - 43y^{103} + \cdots - 10011615824y + 199176769)$ |
| $c_{12}$ | $(y^{20} + 2y^{19} + \cdots - y + 1)(y^{104} - 5y^{103} + \cdots + 89y + 1)$ |