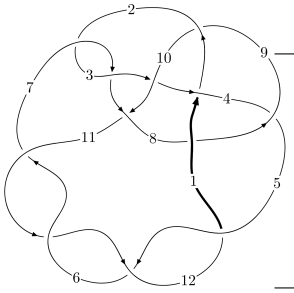
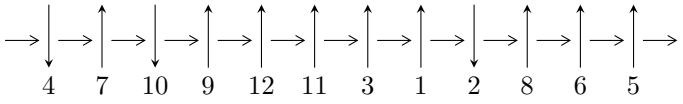
## $12a_{1077}$ $(K12a_{1077})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle -3.32263 \times 10^{205} u^{108} + 2.10413 \times 10^{205} u^{107} + \cdots + 1.51200 \times 10^{205} b + 2.12390 \times 10^{207},$$
$$8.91650 \times 10^{206} u^{108} - 2.53673 \times 10^{207} u^{107} + \cdots + 7.40879 \times 10^{206} a + 2.25210 \times 10^{209},$$
$$u^{109} - u^{108} + \cdots - 523u - 49 \rangle$$
$$I_2^u = \langle -9u^{23} - 12u^{22} + \cdots + 19b + 21,\ -28u^{23} - 31u^{22} + \cdots + 19a + 135,\ u^{24} + 17u^{22} + \cdots - 8u + 1 \rangle$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 133 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.** $\boldsymbol{I_1^u = \langle -3.32 \times 10^{205} u^{108} + 2.10 \times 10^{205} u^{107} + \cdots + 1.51 \times 10^{205} b + 2.12 \times 10^{207},\ 8.92 \times 10^{206} u^{108} - 2.54 \times 10^{207} u^{107} + \cdots + 7.41 \times 10^{206} a + 2.25 \times 10^{209},\ u^{109} - u^{108} + \cdots - 523u - 49 \rangle}$

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_1 = \begin{pmatrix} u \\ u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -1.20350u^{108} + 3.42395u^{107} + \cdots - 3004.64u - 303.976 \\ 2.19751u^{108} - 1.39162u^{107} + \cdots - 1752.63u - 140.470 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -1.37215u^{108} + 3.93654u^{107} + \cdots - 2223.85u - 232.662 \\ 0.727465u^{108} + 1.09516u^{107} + \cdots - 2021.37u - 186.044 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0.854596u^{108} + 2.89992u^{107} + \cdots - 4341.93u - 409.928 \\ 3.39114u^{108} - 2.27160u^{107} + \cdots - 2131.50u - 172.223 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 0.0951266u^{108} + 2.08332u^{107} + \cdots - 2431.47u - 234.663 \\ 3.49614u^{108} - 2.73225u^{107} + \cdots - 1179.46u - 71.1568 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u^2 + 1 \\ -u^4 - 2u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -1.45883u^{108} + 1.21077u^{107} + \cdots + 154.279u - 11.8482 \\ -1.84653u^{108} + 2.51112u^{107} + \cdots - 630.667u - 84.4362 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1.36227u^{108} + 1.16042u^{107} + \cdots - 3434.48u - 316.934 \\ 3.40469u^{108} - 3.71429u^{107} + \cdots - 821.383u - 43.9644 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 4.53824u^{108} - 9.87015u^{107} + \cdots + 4065.85u + 443.964$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{109} - 7u^{108} + \cdots + 29u - 1$ |
| $c_2, c_7$ | $u^{109} + u^{108} + \cdots + 328u - 176$ |
| $c_3$ | $u^{109} + u^{108} + \cdots + 3264u - 131$ |
| $c_4$ | $u^{109} + 3u^{108} + \cdots + 39937u - 4076$ |
| $c_5, c_6, c_{11}$ $c_{12}$ | $u^{109} - u^{108} + \cdots - 523u - 49$ |
| $c_8$ | $u^{109} + 17u^{107} + \cdots - 1024u - 512$ |
| $c_9$ | $u^{109} - 3u^{108} + \cdots - 983u - 1829$ |
| $c_{10}$ | $u^{109} - u^{108} + \cdots + 1782u - 113$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{109} + 19y^{108} + \cdots + 39y - 1$ |
| $c_2, c_7$ | $y^{109} - 55y^{108} + \cdots + 548288y - 30976$ |
| $c_3$ | $y^{109} + 35y^{108} + \cdots + 4271638y - 17161$ |
| $c_4$ | $y^{109} + 39y^{108} + \cdots + 366066273y - 16613776$ |
| $c_5, c_6, c_{11}$ $c_{12}$ | $y^{109} + 137y^{108} + \cdots - 74371y - 2401$ |
| $c_8$ | $y^{109} + 34y^{108} + \cdots - 1310720y - 262144$ |
| $c_9$ | $y^{109} - 9y^{108} + \cdots + 149049445y - 3345241$ |
| $c_{10}$ | $y^{109} + 3y^{108} + \cdots + 2676742y - 12769$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.460766+0.870808I$<br>$a=\ \ 0.73852+1.55368I$<br>$b=-0.758718+1.157840I$ | $-2.62204-8.66245I$ | 0 |
| $u=-0.460766-0.870808I$<br>$a=\ \ 0.73852-1.55368I$<br>$b=-0.758718-1.157840I$ | $-2.62204+8.66245I$ | 0 |
| $u=-0.593725+0.770210I$<br>$a=-0.332197-1.215910I$<br>$b=\ \ 0.789284-1.170020I$ | $-2.71012-6.04112I$ | 0 |
| $u=-0.593725-0.770210I$<br>$a=-0.332197+1.215910I$<br>$b=\ \ 0.789284+1.170020I$ | $-2.71012+6.04112I$ | 0 |
| $u=\ \ 0.152477+0.943526I$<br>$a=\ \ 0.42012-1.85220I$<br>$b=-0.401619-0.827359I$ | $-2.14389+2.29297I$ | 0 |
| $u=\ \ 0.152477-0.943526I$<br>$a=\ \ 0.42012+1.85220I$<br>$b=-0.401619+0.827359I$ | $-2.14389-2.29297I$ | 0 |
| $u=\ \ 0.112809+0.946326I$<br>$a=\ \ 0.00319-1.59483I$<br>$b=-1.13577-1.10507I$ | $-1.54044+5.26091I$ | 0 |
| $u=\ \ 0.112809-0.946326I$<br>$a=\ \ 0.00319+1.59483I$<br>$b=-1.13577+1.10507I$ | $-1.54044-5.26091I$ | 0 |
| $u=\ \ 0.639446+0.862678I$<br>$a=-0.756118+0.465562I$<br>$b=\ \ 0.084260+0.832973I$ | $-1.32969+6.35271I$ | 0 |
| $u=\ \ 0.639446-0.862678I$<br>$a=-0.756118-0.465562I$<br>$b=\ \ 0.084260-0.832973I$ | $-1.32969-6.35271I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \quad 0.418748 + 0.997230I$<br>$a = \quad 0.24444 - 1.43084I$<br>$b = -0.712188 - 1.118230I$ | $-3.00826 + 2.66354I$ | 0 |
| $u = \quad 0.418748 - 0.997230I$<br>$a = \quad 0.24444 + 1.43084I$<br>$b = -0.712188 + 1.118230I$ | $-3.00826 - 2.66354I$ | 0 |
| $u = -0.218252 + 1.062430I$<br>$a = \quad 0.223229 - 1.038330I$<br>$b = \quad 0.159835 - 0.031348I$ | $1.50379 + 0.03899I$ | 0 |
| $u = -0.218252 - 1.062430I$<br>$a = \quad 0.223229 + 1.038330I$<br>$b = \quad 0.159835 + 0.031348I$ | $1.50379 - 0.03899I$ | 0 |
| $u = \quad 0.587407 + 0.935708I$<br>$a = -0.42035 + 1.44738I$<br>$b = \quad 0.88993 + 1.18924I$ | $0.4966 + 14.5114I$ | 0 |
| $u = \quad 0.587407 - 0.935708I$<br>$a = -0.42035 - 1.44738I$<br>$b = \quad 0.88993 - 1.18924I$ | $0.4966 - 14.5114I$ | 0 |
| $u = -0.727402 + 0.519252I$<br>$a = -0.715358 - 0.045331I$<br>$b = -0.483422 - 0.763862I$ | $-1.49581 + 1.55709I$ | 0 |
| $u = -0.727402 - 0.519252I$<br>$a = -0.715358 + 0.045331I$<br>$b = -0.483422 + 0.763862I$ | $-1.49581 - 1.55709I$ | 0 |
| $u = \quad 0.109823 + 0.880396I$<br>$a = -0.355056 - 1.298960I$<br>$b = -0.417616 - 0.733453I$ | $-1.94521 + 1.92752I$ | 0 |
| $u = \quad 0.109823 - 0.880396I$<br>$a = -0.355056 + 1.298960I$<br>$b = -0.417616 + 0.733453I$ | $-1.94521 - 1.92752I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.877879 + 0.036702I$<br>$a = 0.1174360 - 0.0630406I$<br>$b = -0.782835 - 0.914666I$ | $3.44815 + 9.68868I$ | 0 |
| $u = 0.877879 - 0.036702I$<br>$a = 0.1174360 + 0.0630406I$<br>$b = -0.782835 + 0.914666I$ | $3.44815 - 9.68868I$ | 0 |
| $u = -0.347938 + 0.806778I$<br>$a = -0.768867 - 0.818905I$<br>$b = 0.903265 - 0.424132I$ | $2.63909 - 5.44235I$ | 0 |
| $u = -0.347938 - 0.806778I$<br>$a = -0.768867 + 0.818905I$<br>$b = 0.903265 + 0.424132I$ | $2.63909 + 5.44235I$ | 0 |
| $u = 0.822787 + 0.178559I$<br>$a = -0.0403524 - 0.0243912I$<br>$b = 0.362533 + 0.754917I$ | $0.76129 - 1.39793I$ | 0 |
| $u = 0.822787 - 0.178559I$<br>$a = -0.0403524 + 0.0243912I$<br>$b = 0.362533 - 0.754917I$ | $0.76129 + 1.39793I$ | 0 |
| $u = -0.379688 + 0.747993I$<br>$a = 1.274130 + 0.220939I$<br>$b = -0.038809 + 0.777447I$ | $-4.15829 - 0.71433I$ | 0 |
| $u = -0.379688 - 0.747993I$<br>$a = 1.274130 - 0.220939I$<br>$b = -0.038809 - 0.777447I$ | $-4.15829 + 0.71433I$ | 0 |
| $u = -0.095987 + 0.802723I$<br>$a = -0.890588 - 0.950454I$<br>$b = -0.362411 - 0.980984I$ | $-2.06588 + 2.06817I$ | 0 |
| $u = -0.095987 - 0.802723I$<br>$a = -0.890588 + 0.950454I$<br>$b = -0.362411 + 0.980984I$ | $-2.06588 - 2.06817I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.171530+0.752934I$<br>$a=-1.79053+2.22766I$<br>$b=-0.146393+0.485362I$ | $0.21939-6.24723I$ | 0 |
| $u=-0.171530-0.752934I$<br>$a=-1.79053-2.22766I$<br>$b=-0.146393-0.485362I$ | $0.21939+6.24723I$ | 0 |
| $u=0.494722+0.567515I$<br>$a=-1.136220+0.713311I$<br>$b=0.754657+0.858140I$ | $3.36852+4.41963I$ | 0 |
| $u=0.494722-0.567515I$<br>$a=-1.136220-0.713311I$<br>$b=0.754657-0.858140I$ | $3.36852-4.41963I$ | 0 |
| $u=0.757016+1.017730I$<br>$a=0.687807-0.210831I$<br>$b=0.453740-0.661393I$ | $0.69815-4.29313I$ | 0 |
| $u=0.757016-1.017730I$<br>$a=0.687807+0.210831I$<br>$b=0.453740+0.661393I$ | $0.69815+4.29313I$ | 0 |
| $u=-0.377348+0.626015I$<br>$a=1.142720+0.101264I$<br>$b=1.55616+0.50379I$ | $2.49834-6.59777I$ | 0 |
| $u=-0.377348-0.626015I$<br>$a=1.142720-0.101264I$<br>$b=1.55616-0.50379I$ | $2.49834+6.59777I$ | 0 |
| $u=0.647391+0.326742I$<br>$a=-0.065850-0.666232I$<br>$b=-0.532455+0.719738I$ | $4.13259-0.53685I$ | 0 |
| $u=0.647391-0.326742I$<br>$a=-0.065850+0.666232I$<br>$b=-0.532455-0.719738I$ | $4.13259+0.53685I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.256537 + 0.646430I$<br>$a = -0.685536 - 0.318233I$<br>$b = -1.037580 + 0.250937I$ | $-0.24868 + 2.24073I$ | 0 |
| $u = 0.256537 - 0.646430I$<br>$a = -0.685536 + 0.318233I$<br>$b = -1.037580 - 0.250937I$ | $-0.24868 - 2.24073I$ | 0 |
| $u = -0.057770 + 0.665411I$<br>$a = 2.58890 + 1.23024I$<br>$b = -0.170394 + 0.644772I$ | $-3.57204 - 0.28957I$ | $0. - 5.29911I$ |
| $u = -0.057770 - 0.665411I$<br>$a = 2.58890 - 1.23024I$<br>$b = -0.170394 - 0.644772I$ | $-3.57204 + 0.28957I$ | $0. + 5.29911I$ |
| $u = -0.063893 + 0.642845I$<br>$a = -0.45053 - 2.08483I$<br>$b = 0.93471 - 1.35688I$ | $-1.92964 - 2.95489I$ | $2.57875 + 1.41426I$ |
| $u = -0.063893 - 0.642845I$<br>$a = -0.45053 + 2.08483I$<br>$b = 0.93471 + 1.35688I$ | $-1.92964 + 2.95489I$ | $2.57875 - 1.41426I$ |
| $u = -0.638909 + 0.024881I$<br>$a = -0.563125 + 0.175451I$<br>$b = 0.646567 - 0.970277I$ | $0.07830 - 4.93794I$ | $6.00000 + 6.09027I$ |
| $u = -0.638909 - 0.024881I$<br>$a = -0.563125 - 0.175451I$<br>$b = 0.646567 + 0.970277I$ | $0.07830 + 4.93794I$ | $6.00000 - 6.09027I$ |
| $u = 0.253510 + 1.343030I$<br>$a = 0.351524 - 0.178459I$<br>$b = 0.122627 - 0.594413I$ | $-1.10669 + 2.74590I$ | 0 |
| $u = 0.253510 - 1.343030I$<br>$a = 0.351524 + 0.178459I$<br>$b = 0.122627 + 0.594413I$ | $-1.10669 - 2.74590I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.140262+0.609607I$<br>$a=\ \ 0.07457+3.26477I$<br>$b=-0.137741+1.365270I$ | $2.62926-2.52071I$ | $6.81610+3.73768I$ |
| $u=-0.140262-0.609607I$<br>$a=\ \ 0.07457-3.26477I$<br>$b=-0.137741-1.365270I$ | $2.62926+2.52071I$ | $6.81610-3.73768I$ |
| $u=-0.106902+1.388570I$<br>$a=\ \ 0.13391-2.45500I$<br>$b=\ \ 0.08264-1.73255I$ | $-1.97866+1.32972I$ | $0$ |
| $u=-0.106902-1.388570I$<br>$a=\ \ 0.13391+2.45500I$<br>$b=\ \ 0.08264+1.73255I$ | $-1.97866-1.32972I$ | $0$ |
| $u=-0.505744+0.313859I$<br>$a=\ \ 0.22999+1.77910I$<br>$b=-0.926807+1.010130I$ | $3.41210+3.48311I$ | $11.92159-4.33364I$ |
| $u=-0.505744-0.313859I$<br>$a=\ \ 0.22999-1.77910I$<br>$b=-0.926807-1.010130I$ | $3.41210-3.48311I$ | $11.92159+4.33364I$ |
| $u=-0.511040+0.064240I$<br>$a=\ \ 1.24085+1.22763I$<br>$b=-0.631150-0.306840I$ | $4.88085+2.47938I$ | $16.1714-2.9846I$ |
| $u=-0.511040-0.064240I$<br>$a=\ \ 1.24085-1.22763I$<br>$b=-0.631150+0.306840I$ | $4.88085-2.47938I$ | $16.1714+2.9846I$ |
| $u=-0.415054+0.266709I$<br>$a=-1.066750+0.615432I$<br>$b=-0.527823-0.763713I$ | $-1.50863+1.76364I$ | $-0.07333-1.83560I$ |
| $u=-0.415054-0.266709I$<br>$a=-1.066750-0.615432I$<br>$b=-0.527823+0.763713I$ | $-1.50863-1.76364I$ | $-0.07333+1.83560I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.233047+0.425362I$<br>$a=-0.170005+0.247426I$<br>$b=\ \ 0.663430+1.008570I$ | $3.02593+1.12920I$ | $7.44217+4.49627I$ |
| $u=-0.233047-0.425362I$<br>$a=-0.170005-0.247426I$<br>$b=\ \ 0.663430-1.008570I$ | $3.02593-1.12920I$ | $7.44217-4.49627I$ |
| $u=\ \ 0.01686+1.51660I$<br>$a=-0.664703-0.915309I$<br>$b=-1.089160-0.899568I$ | $-3.36859+0.58272I$ | 0 |
| $u=\ \ 0.01686-1.51660I$<br>$a=-0.664703+0.915309I$<br>$b=-1.089160+0.899568I$ | $-3.36859-0.58272I$ | 0 |
| $u=\ \ 0.442362+0.136023I$<br>$a=-1.017570+0.579897I$<br>$b=\ \ 0.719527+0.546714I$ | $1.232000+0.242137I$ | $9.84419-1.89118I$ |
| $u=\ \ 0.442362-0.136023I$<br>$a=-1.017570-0.579897I$<br>$b=\ \ 0.719527-0.546714I$ | $1.232000-0.242137I$ | $9.84419+1.89118I$ |
| $u=\ \ 0.439589$<br>$a=-0.343474$<br>$b=\ \ 0.701822$ | 0.902802 | 11.7930 |
| $u=\ \ 0.08629+1.57817I$<br>$a=\ \ 0.26015-1.55005I$<br>$b=-0.858718-0.987170I$ | $-3.82764+6.26940I$ | 0 |
| $u=\ \ 0.08629-1.57817I$<br>$a=\ \ 0.26015+1.55005I$<br>$b=-0.858718+0.987170I$ | $-3.82764-6.26940I$ | 0 |
| $u=-0.08842+1.60955I$<br>$a=-1.82188-0.26121I$<br>$b=-2.08409-0.31933I$ | $-5.23634-8.20536I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.08842-1.60955I$<br>$a=-1.82188+0.26121I$<br>$b=-2.08409+0.31933I$ | $-5.23634+8.20536I$ | 0 |
| $u=-0.03234+1.61311I$<br>$a=\ \ 0.04407-2.69479I$<br>$b=-0.04210-1.74247I$ | $-5.18858-3.11447I$ | 0 |
| $u=-0.03234-1.61311I$<br>$a=\ \ 0.04407+2.69479I$<br>$b=-0.04210+1.74247I$ | $-5.18858+3.11447I$ | 0 |
| $u=\ \ 0.03872+1.61588I$<br>$a=\ \ 1.217070-0.079614I$<br>$b=\ \ 1.52995-0.17696I$ | $-8.11108+3.13142I$ | 0 |
| $u=\ \ 0.03872-1.61588I$<br>$a=\ \ 1.217070+0.079614I$<br>$b=\ \ 1.52995+0.17696I$ | $-8.11108-3.13142I$ | 0 |
| $u=-0.01440+1.62505I$<br>$a=-0.48073+2.16907I$<br>$b=-1.11064+1.63615I$ | $-9.94149-3.22393I$ | 0 |
| $u=-0.01440-1.62505I$<br>$a=-0.48073-2.16907I$<br>$b=-1.11064-1.63615I$ | $-9.94149+3.22393I$ | 0 |
| $u=-0.00863+1.63161I$<br>$a=-0.90238-1.39932I$<br>$b=\ \ 0.416147-0.734773I$ | $-11.70050-0.48970I$ | 0 |
| $u=-0.00863-1.63161I$<br>$a=-0.90238+1.39932I$<br>$b=\ \ 0.416147+0.734773I$ | $-11.70050+0.48970I$ | 0 |
| $u=-0.12802+1.63733I$<br>$a=-0.514822-0.981847I$<br>$b=\ \ 0.365389-0.912694I$ | $-12.37520-2.75357I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.12802-1.63733I$<br>$a=-0.514822+0.981847I$<br>$b=\ \ 0.365389+0.912694I$ | $-12.37520+2.75357I$ | 0 |
| $u=\ \ 0.00804+1.64429I$<br>$a=\ \ 0.32220+1.59846I$<br>$b=-0.125109+1.071180I$ | $-10.63920+2.06989I$ | 0 |
| $u=\ \ 0.00804-1.64429I$<br>$a=\ \ 0.32220-1.59846I$<br>$b=-0.125109-1.071180I$ | $-10.63920-2.06989I$ | 0 |
| $u=-0.04565+1.64511I$<br>$a=\ \ 0.92794-1.54875I$<br>$b=-0.183795-0.597198I$ | $-8.19749-7.06148I$ | 0 |
| $u=-0.04565-1.64511I$<br>$a=\ \ 0.92794+1.54875I$<br>$b=-0.183795+0.597198I$ | $-8.19749+7.06148I$ | 0 |
| $u=-0.17098+1.64596I$<br>$a=-0.16647+2.08892I$<br>$b=-0.84380+1.55724I$ | $-10.9647-8.9348I$ | 0 |
| $u=-0.17098-1.64596I$<br>$a=-0.16647-2.08892I$<br>$b=-0.84380-1.55724I$ | $-10.9647+8.9348I$ | 0 |
| $u=-0.08812+1.65892I$<br>$a=\ \ 0.006826+0.918066I$<br>$b=-1.065520+0.482337I$ | $-5.96098-7.06983I$ | 0 |
| $u=-0.08812-1.65892I$<br>$a=\ \ 0.006826-0.918066I$<br>$b=-1.065520-0.482337I$ | $-5.96098+7.06983I$ | 0 |
| $u=-0.13141+1.66942I$<br>$a=-0.08075-1.99725I$<br>$b=\ \ 0.82905-1.32942I$ | $-11.3994-10.9715I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.13141-1.66942I$<br>$a=-0.08075+1.99725I$<br>$b=\ \ 0.82905+1.32942I$ | $-11.3994+10.9715I$ | 0 |
| $u=\ \ 0.18431+1.67503I$<br>$a=\ \ 0.433984-1.205970I$<br>$b=-0.355017-1.021980I$ | $-10.00210+9.53915I$ | 0 |
| $u=\ \ 0.18431-1.67503I$<br>$a=\ \ 0.433984+1.205970I$<br>$b=-0.355017+1.021980I$ | $-10.00210-9.53915I$ | 0 |
| $u=\ \ 0.02728+1.68819I$<br>$a=-0.22100+1.80736I$<br>$b=\ \ 0.394131+0.877863I$ | $-11.42230+2.89917I$ | 0 |
| $u=\ \ 0.02728-1.68819I$<br>$a=-0.22100-1.80736I$<br>$b=\ \ 0.394131-0.877863I$ | $-11.42230-2.89917I$ | 0 |
| $u=\ \ 0.03886+1.69770I$<br>$a=\ \ 0.60629+1.86428I$<br>$b=\ \ 1.27696+1.39142I$ | $-10.91290+5.92179I$ | 0 |
| $u=\ \ 0.03886-1.69770I$<br>$a=\ \ 0.60629-1.86428I$<br>$b=\ \ 1.27696-1.39142I$ | $-10.91290-5.92179I$ | 0 |
| $u=\ \ 0.17192+1.69091I$<br>$a=-0.08202-2.01203I$<br>$b=-0.93273-1.40567I$ | $-8.5158+17.5207I$ | 0 |
| $u=\ \ 0.17192-1.69091I$<br>$a=-0.08202+2.01203I$<br>$b=-0.93273+1.40567I$ | $-8.5158-17.5207I$ | 0 |
| $u=\ \ 0.02446+1.70070I$<br>$a=\ \ 0.22547+1.52311I$<br>$b=\ \ 0.457882+1.148320I$ | $-11.24260+2.32048I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.02446 - 1.70070I$<br>$a = 0.22547 - 1.52311I$<br>$b = 0.457882 - 1.148320I$ | $-11.24260 - 2.32048I$ | 0 |
| $u = 0.10914 + 1.69863I$<br>$a = 0.14913 + 1.95949I$<br>$b = 0.81566 + 1.40603I$ | $-12.39230 + 4.74623I$ | 0 |
| $u = 0.10914 - 1.69863I$<br>$a = 0.14913 - 1.95949I$<br>$b = 0.81566 - 1.40603I$ | $-12.39230 - 4.74623I$ | 0 |
| $u = -0.20784 + 1.70978I$<br>$a = 0.444581 + 1.049360I$<br>$b = -0.031378 + 0.789708I$ | $-9.57753 - 2.41613I$ | 0 |
| $u = -0.20784 - 1.70978I$<br>$a = 0.444581 - 1.049360I$<br>$b = -0.031378 - 0.789708I$ | $-9.57753 + 2.41613I$ | 0 |
| $u = -0.132257 + 0.153763I$<br>$a = -3.93927 + 4.00487I$<br>$b = 0.768548 + 0.604426I$ | $2.01071 + 4.98034I$ | $8.20165 - 5.61065I$ |
| $u = -0.132257 - 0.153763I$<br>$a = -3.93927 - 4.00487I$<br>$b = 0.768548 - 0.604426I$ | $2.01071 - 4.98034I$ | $8.20165 + 5.61065I$ |
| $u = 0.09474 + 1.80431I$<br>$a = -0.297448 + 0.880722I$<br>$b = 0.098000 + 0.621739I$ | $-9.84597 - 0.49133I$ | 0 |
| $u = 0.09474 - 1.80431I$<br>$a = -0.297448 - 0.880722I$<br>$b = 0.098000 - 0.621739I$ | $-9.84597 + 0.49133I$ | 0 |

**II. $I_2^u = \langle -9u^{23} - 12u^{22} + \cdots + 19b + 21,\ -28u^{23} - 31u^{22} + \cdots + 19a + 135,\ u^{24} + 17u^{22} + \cdots - 8u + 1 \rangle$**

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_1 = \begin{pmatrix} u \\ u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 1.47368u^{23} + 1.63158u^{22} + \cdots + 14.2632u - 7.10526 \\ 0.473684u^{23} + 0.631579u^{22} + \cdots + 4.26316u - 1.10526 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -2.26316u^{23} + 0.315789u^{22} + \cdots - 29.3684u + 3.94737 \\ -0.315789u^{23} + 0.578947u^{22} + \cdots - 4.84211u - 0.263158 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.789474u^{23} - 0.0526316u^{22} + \cdots - 4.10526u + 4.84211 \\ -u^{21} + u^{20} + \cdots - 9u + 2 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 1.47368u^{23} + 0.631579u^{22} + \cdots + 21.2632u - 8.10526 \\ 0.473684u^{23} - 0.368421u^{22} + \cdots + 11.2632u - 2.10526 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u^2 + 1 \\ -u^4 - 2u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 1.57895u^{23} + 0.105263u^{22} + \cdots + 42.2105u - 11.6842 \\ -0.526316u^{23} - 0.368421u^{22} + \cdots + 12.2632u - 2.10526 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -1.05263u^{23} + 0.263158u^{22} + \cdots - 10.4737u + 6.78947 \\ -0.0526316u^{23} + 0.263158u^{22} + \cdots - 7.47368u + 1.78947 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -\frac{59}{19}u^{23} - \frac{28}{19}u^{22} + \cdots + \frac{248}{19}u + \frac{182}{19}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{24} - 4u^{23} + \cdots + 4u^2 + 1$ |
| $c_2$ | $u^{24} - 5u^{22} + \cdots + u + 1$ |
| $c_3$ | $u^{24} + 6u^{22} + \cdots + u + 1$ |
| $c_4$ | $u^{24} + 6u^{22} + \cdots - 2u + 1$ |
| $c_5, c_6$ | $u^{24} + 17u^{22} + \cdots - 8u + 1$ |
| $c_7$ | $u^{24} - 5u^{22} + \cdots - u + 1$ |
| $c_8$ | $u^{24} + u^{23} + \cdots + 2u^2 + 1$ |
| $c_9$ | $u^{24} + 2u^{22} + \cdots - 2u + 1$ |
| $c_{10}$ | $u^{24} - 8u^{23} + \cdots - 79u + 11$ |
| $c_{11}, c_{12}$ | $u^{24} + 17u^{22} + \cdots + 8u + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{24}+8y^{23}+\cdots+8y+1$ |
| $c_2, c_7$ | $y^{24}-10y^{23}+\cdots-21y+1$ |
| $c_3$ | $y^{24}+12y^{23}+\cdots+17y+1$ |
| $c_4$ | $y^{24}+12y^{23}+\cdots+14y+1$ |
| $c_5, c_6, c_{11}$ $c_{12}$ | $y^{24}+34y^{23}+\cdots-18y+1$ |
| $c_8$ | $y^{24}+15y^{23}+\cdots+4y+1$ |
| $c_9$ | $y^{24}+4y^{23}+\cdots+34y+1$ |
| $c_{10}$ | $y^{24}+8y^{23}+\cdots-499y+121$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.478478 + 0.833064I$<br>$a = 1.115640 - 0.334631I$<br>$b = 0.551092 - 0.370175I$ | $0.99760 - 3.52622I$ | $6.24401 + 1.39201I$ |
| $u = 0.478478 - 0.833064I$<br>$a = 1.115640 + 0.334631I$<br>$b = 0.551092 + 0.370175I$ | $0.99760 + 3.52622I$ | $6.24401 - 1.39201I$ |
| $u = -0.262141 + 0.818317I$<br>$a = -0.07732 - 1.69834I$<br>$b = 1.01437 - 1.27308I$ | $-2.16668 - 4.06335I$ | $2.40315 + 7.26743I$ |
| $u = -0.262141 - 0.818317I$<br>$a = -0.07732 + 1.69834I$<br>$b = 1.01437 + 1.27308I$ | $-2.16668 + 4.06335I$ | $2.40315 - 7.26743I$ |
| $u = -0.548804 + 0.560408I$<br>$a = -0.891155 - 0.268928I$<br>$b = -0.580288 - 0.855599I$ | $-1.02527 + 1.41995I$ | $11.07258 + 1.55795I$ |
| $u = -0.548804 - 0.560408I$<br>$a = -0.891155 + 0.268928I$<br>$b = -0.580288 + 0.855599I$ | $-1.02527 - 1.41995I$ | $11.07258 - 1.55795I$ |
| $u = 0.284755 + 0.642296I$<br>$a = 0.599239 + 0.345710I$<br>$b = -0.936541 - 0.296163I$ | $1.34642 + 6.11668I$ | $4.54984 - 8.96982I$ |
| $u = 0.284755 - 0.642296I$<br>$a = 0.599239 - 0.345710I$<br>$b = -0.936541 + 0.296163I$ | $1.34642 - 6.11668I$ | $4.54984 + 8.96982I$ |
| $u = -0.199573 + 0.663075I$<br>$a = -2.28261 - 0.36973I$<br>$b = 0.140669 - 0.627994I$ | $-3.43628 - 0.70377I$ | $6.83683 + 10.77442I$ |
| $u = -0.199573 - 0.663075I$<br>$a = -2.28261 + 0.36973I$<br>$b = 0.140669 + 0.627994I$ | $-3.43628 + 0.70377I$ | $6.83683 - 10.77442I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.134486 + 1.349140I$<br>$a = 0.144806 - 0.146179I$<br>$b = 0.183622 + 0.415970I$ | $-0.76849 + 3.11269I$ | $9.83926 - 7.64985I$ |
| $u = 0.134486 - 1.349140I$<br>$a = 0.144806 + 0.146179I$<br>$b = 0.183622 - 0.415970I$ | $-0.76849 - 3.11269I$ | $9.83926 + 7.64985I$ |
| $u = 0.05132 + 1.42224I$<br>$a = 0.21771 - 2.62646I$<br>$b = 0.29704 - 1.93684I$ | $-1.66761 - 1.03370I$ | $14.0161 - 3.2121I$ |
| $u = 0.05132 - 1.42224I$<br>$a = 0.21771 + 2.62646I$<br>$b = 0.29704 + 1.93684I$ | $-1.66761 + 1.03370I$ | $14.0161 + 3.2121I$ |
| $u = 0.07622 + 1.63617I$<br>$a = 0.101929 + 0.405310I$<br>$b = 1.139880 + 0.348041I$ | $-6.71868 + 7.43842I$ | $1.50236 - 7.81320I$ |
| $u = 0.07622 - 1.63617I$<br>$a = 0.101929 - 0.405310I$<br>$b = 1.139880 - 0.348041I$ | $-6.71868 - 7.43842I$ | $1.50236 + 7.81320I$ |
| $u = -0.05868 + 1.65356I$<br>$a = 0.686776 + 1.157620I$<br>$b = -0.361633 + 0.703637I$ | $-11.70920 - 1.71148I$ | $0.362162 + 1.154218I$ |
| $u = -0.05868 - 1.65356I$<br>$a = 0.686776 - 1.157620I$<br>$b = -0.361633 - 0.703637I$ | $-11.70920 + 1.71148I$ | $0.362162 - 1.154218I$ |
| $u = -0.06218 + 1.68510I$<br>$a = -0.54264 + 1.99528I$<br>$b = -1.16124 + 1.49277I$ | $-11.09620 - 5.27024I$ | $2.04104 + 1.03200I$ |
| $u = -0.06218 - 1.68510I$<br>$a = -0.54264 - 1.99528I$<br>$b = -1.16124 - 1.49277I$ | $-11.09620 + 5.27024I$ | $2.04104 - 1.03200I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.07826+1.77851I$<br>$a=\ \ 0.054600+1.125900I$<br>$b=-0.138538+0.855802I$ | $-10.04990-1.61550I$ | $0.729320+1.178226I$ |
| $u=-0.07826-1.77851I$<br>$a=\ \ 0.054600-1.125900I$<br>$b=-0.138538-0.855802I$ | $-10.04990+1.61550I$ | $0.729320-1.178226I$ |
| $u=\ \ 0.184379+0.083037I$<br>$a=-4.12697+3.23979I$<br>$b=-0.148424+1.017250I$ | $3.52599-1.84531I$ | $12.90330+1.32554I$ |
| $u=\ \ 0.184379-0.083037I$<br>$a=-4.12697-3.23979I$<br>$b=-0.148424-1.017250I$ | $3.52599+1.84531I$ | $12.90330-1.32554I$ |

**III. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u^{24}-4u^{23}+\cdots+4u^2+1)(u^{109}-7u^{108}+\cdots+29u-1)$ |
| $c_2$ | $(u^{24}-5u^{22}+\cdots+u+1)(u^{109}+u^{108}+\cdots+328u-176)$ |
| $c_3$ | $(u^{24}+6u^{22}+\cdots+u+1)(u^{109}+u^{108}+\cdots+3264u-131)$ |
| $c_4$ | $(u^{24}+6u^{22}+\cdots-2u+1)(u^{109}+3u^{108}+\cdots+39937u-4076)$ |
| $c_5, c_6$ | $(u^{24}+17u^{22}+\cdots-8u+1)(u^{109}-u^{108}+\cdots-523u-49)$ |
| $c_7$ | $(u^{24}-5u^{22}+\cdots-u+1)(u^{109}+u^{108}+\cdots+328u-176)$ |
| $c_8$ | $(u^{24}+u^{23}+\cdots+2u^2+1)(u^{109}+17u^{107}+\cdots-1024u-512)$ |
| $c_9$ | $(u^{24}+2u^{22}+\cdots-2u+1)(u^{109}-3u^{108}+\cdots-983u-1829)$ |
| $c_{10}$ | $(u^{24}-8u^{23}+\cdots-79u+11)(u^{109}-u^{108}+\cdots+1782u-113)$ |
| $c_{11}, c_{12}$ | $(u^{24}+17u^{22}+\cdots+8u+1)(u^{109}-u^{108}+\cdots-523u-49)$ |

**IV. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $(y^{24}+8y^{23}+\cdots+8y+1)(y^{109}+19y^{108}+\cdots+39y-1)$ |
| $c_2, c_7$ | $(y^{24}-10y^{23}+\cdots-21y+1)(y^{109}-55y^{108}+\cdots+548288y-30976)$ |
| $c_3$ | $(y^{24}+12y^{23}+\cdots+17y+1)$ $\cdot(y^{109}+35y^{108}+\cdots+4271638y-17161)$ |
| $c_4$ | $(y^{24}+12y^{23}+\cdots+14y+1)$ $\cdot(y^{109}+39y^{108}+\cdots+366066273y-16613776)$ |
| $c_5, c_6, c_{11}$ $c_{12}$ | $(y^{24}+34y^{23}+\cdots-18y+1)(y^{109}+137y^{108}+\cdots-74371y-2401)$ |
| $c_8$ | $(y^{24}+15y^{23}+\cdots+4y+1)$ $\cdot(y^{109}+34y^{108}+\cdots-1310720y-262144)$ |
| $c_9$ | $(y^{24}+4y^{23}+\cdots+34y+1)$ $\cdot(y^{109}-9y^{108}+\cdots+149049445y-3345241)$ |
| $c_{10}$ | $(y^{24}+8y^{23}+\cdots-499y+121)$ $\cdot(y^{109}+3y^{108}+\cdots+2676742y-12769)$ |