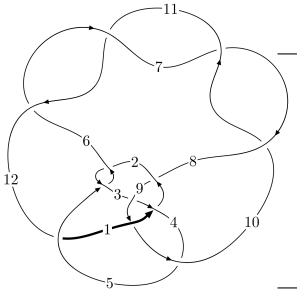
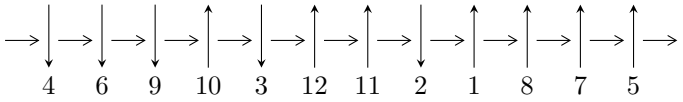
# $12a_{0919}$ $(K12a_{0919})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle -1.07123 \times 10^{220} u^{119} - 3.52410 \times 10^{220} u^{118} + \cdots + 4.05368 \times 10^{221} b + 2.42001 \times 10^{222},$$
$$2.71699 \times 10^{222} u^{119} + 7.36929 \times 10^{222} u^{118} + \cdots + 8.51272 \times 10^{222} a - 2.15694 \times 10^{224},$$
$$u^{120} + 3u^{119} + \cdots - 113u + 21 \rangle$$
$$I_2^u = \langle -u^{23} - 5u^{22} + \cdots + b - 2,\ u^{25} + 4u^{24} + \cdots + a + 1,\ u^{26} + 4u^{25} + \cdots + 4u + 1 \rangle$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 146 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.** $\boldsymbol{I_1^u = \langle -1.07 \times 10^{220} u^{119} - 3.52 \times 10^{220} u^{118} + \cdots + 4.05 \times 10^{221} b + 2.42 \times 10^{222},\ 2.72 \times 10^{222} u^{119} + 7.37 \times 10^{222} u^{118} + \cdots + 8.51 \times 10^{222} a - 2.16 \times 10^{224},\ u^{120} + 3u^{119} + \cdots - 113u + 21 \rangle}$

**(i) Arc colorings**

$$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} -0.319169u^{119} - 0.865680u^{118} + \cdots - 155.503u + 25.3378 \\ 0.0264262u^{119} + 0.0869360u^{118} + \cdots + 27.3115u - 5.96992 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} -0.292742u^{119} - 0.778744u^{118} + \cdots - 128.191u + 19.3679 \\ 0.0264262u^{119} + 0.0869360u^{118} + \cdots + 27.3115u - 5.96992 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0.320534u^{119} + 1.07174u^{118} + \cdots + 84.2977u - 8.85376 \\ -0.142529u^{119} - 0.544385u^{118} + \cdots - 1.27315u + 0.0747437 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0.129398u^{119} + 0.456206u^{118} + \cdots + 5.28891u + 12.2308 \\ 0.109214u^{119} + 0.363655u^{118} + \cdots + 20.1200u - 4.71432 \end{pmatrix}$$

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

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

$$a_9 = \begin{pmatrix} -0.420935u^{119} - 1.00889u^{118} + \cdots - 259.731u + 36.0750 \\ 0.0214302u^{119} - 0.0238555u^{118} + \cdots + 32.0363u - 4.61416 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -u^3 - 2u \\ u^5 + 3u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0.372713u^{119} + 1.18328u^{118} + \cdots + 111.600u - 12.7517 \\ -0.130679u^{119} - 0.522369u^{118} + \cdots - 4.64557u + 0.380200 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -1.52939u^{119} - 5.38696u^{118} + \cdots - 149.423u + 4.34876$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{120} - 7u^{119} + \cdots - 7u + 3$ |
| $c_2, c_5$ | $u^{120} + 7u^{119} + \cdots - 6493u + 976$ |
| $c_3$ | $u^{120} + u^{119} + \cdots + 24u + 8$ |
| $c_4$ | $u^{120} - u^{119} + \cdots + 45u + 1$ |
| $c_6, c_7, c_{10}$ $c_{11}$ | $u^{120} - 3u^{119} + \cdots + 113u + 21$ |
| $c_8$ | $u^{120} - u^{119} + \cdots + 4850u + 311$ |
| $c_9$ | $u^{120} - 5u^{119} + \cdots + 3u + 8$ |
| $c_{12}$ | $u^{120} - u^{119} + \cdots + 18390924u + 2188589$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{120} - y^{119} + \cdots + 197y + 9$ |
| $c_2, c_5$ | $y^{120} + 59y^{119} + \cdots + 31208823y + 952576$ |
| $c_3$ | $y^{120} + 3y^{119} + \cdots - 608y + 64$ |
| $c_4$ | $y^{120} + 13y^{119} + \cdots - 627y + 1$ |
| $c_6, c_7, c_{10}$ $c_{11}$ | $y^{120} + 143y^{119} + \cdots + 20117y + 441$ |
| $c_8$ | $y^{120} - 3y^{119} + \cdots + 32084922y + 96721$ |
| $c_9$ | $y^{120} + 3y^{119} + \cdots + 1655y + 64$ |
| $c_{12}$ | $y^{120} + 17y^{119} + \cdots + 186020618302756y + 4789921810921$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.625548 + 0.784825I$<br>$a = 0.85024 + 1.72968I$<br>$b = 0.652725 - 1.237620I$ | $0.4170 + 15.1844I$ | 0 |
| $u = 0.625548 - 0.784825I$<br>$a = 0.85024 - 1.72968I$<br>$b = 0.652725 + 1.237620I$ | $0.4170 - 15.1844I$ | 0 |
| $u = -0.664268 + 0.771195I$<br>$a = -0.50275 + 1.58998I$<br>$b = -0.418010 - 1.154920I$ | $1.59391 - 5.90280I$ | 0 |
| $u = -0.664268 - 0.771195I$<br>$a = -0.50275 - 1.58998I$<br>$b = -0.418010 + 1.154920I$ | $1.59391 + 5.90280I$ | 0 |
| $u = -0.228753 + 1.013440I$<br>$a = 0.151377 - 0.335120I$<br>$b = 0.262213 - 0.633885I$ | $-2.62048 - 2.67963I$ | 0 |
| $u = -0.228753 - 1.013440I$<br>$a = 0.151377 + 0.335120I$<br>$b = 0.262213 + 0.633885I$ | $-2.62048 + 2.67963I$ | 0 |
| $u = -0.431239 + 0.853725I$<br>$a = -0.696038 + 1.146360I$<br>$b = -0.616958 - 1.221130I$ | $-0.42618 - 6.32755I$ | 0 |
| $u = -0.431239 - 0.853725I$<br>$a = -0.696038 - 1.146360I$<br>$b = -0.616958 + 1.221130I$ | $-0.42618 + 6.32755I$ | 0 |
| $u = -0.652326 + 0.821283I$<br>$a = 0.93055 - 1.45122I$<br>$b = 0.494571 + 1.042560I$ | $1.26439 - 6.29930I$ | 0 |
| $u = -0.652326 - 0.821283I$<br>$a = 0.93055 + 1.45122I$<br>$b = 0.494571 - 1.042560I$ | $1.26439 + 6.29930I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.401279 + 0.815199I$<br>$a = 0.55078 + 1.66023I$<br>$b = 0.491027 - 0.653456I$ | $-2.93538 - 2.24091I$ | 0 |
| $u = 0.401279 - 0.815199I$<br>$a = 0.55078 - 1.66023I$<br>$b = 0.491027 + 0.653456I$ | $-2.93538 + 2.24091I$ | 0 |
| $u = -0.866118 + 0.211506I$<br>$a = 0.59392 - 1.51844I$<br>$b = -0.244074 + 0.985090I$ | $3.30511 + 0.85887I$ | 0 |
| $u = -0.866118 - 0.211506I$<br>$a = 0.59392 + 1.51844I$<br>$b = -0.244074 - 0.985090I$ | $3.30511 - 0.85887I$ | 0 |
| $u = 0.457164 + 0.761542I$<br>$a = -0.326621 + 0.243830I$<br>$b = 1.090030 + 0.316443I$ | $-2.47067 + 9.00999I$ | 0 |
| $u = 0.457164 - 0.761542I$<br>$a = -0.326621 - 0.243830I$<br>$b = 1.090030 - 0.316443I$ | $-2.47067 - 9.00999I$ | 0 |
| $u = -0.844345 + 0.159455I$<br>$a = -0.10365 + 1.62246I$<br>$b = 0.356203 - 0.943024I$ | $3.28222 + 1.32962I$ | 0 |
| $u = -0.844345 - 0.159455I$<br>$a = -0.10365 - 1.62246I$<br>$b = 0.356203 + 0.943024I$ | $3.28222 - 1.32962I$ | 0 |
| $u = -0.368404 + 0.775760I$<br>$a = 0.317373 + 0.103287I$<br>$b = 0.492165 - 0.323146I$ | $-0.64502 - 2.23837I$ | 0 |
| $u = -0.368404 - 0.775760I$<br>$a = 0.317373 - 0.103287I$<br>$b = 0.492165 + 0.323146I$ | $-0.64502 + 2.23837I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.220280+0.812481I$<br>$a=\ \ 0.013441-0.326864I$<br>$b=-0.568421-0.326412I$ | $-2.07608-2.53437I$ | 0 |
| $u=-0.220280-0.812481I$<br>$a=\ \ 0.013441+0.326864I$<br>$b=-0.568421+0.326412I$ | $-2.07608+2.53437I$ | 0 |
| $u=\ \ 0.473153+0.689077I$<br>$a=-1.12745-1.96340I$<br>$b=-0.65606+1.28422I$ | $-0.36949+6.90839I$ | 0 |
| $u=\ \ 0.473153-0.689077I$<br>$a=-1.12745+1.96340I$<br>$b=-0.65606-1.28422I$ | $-0.36949-6.90839I$ | 0 |
| $u=-0.525177+0.645334I$<br>$a=\ \ 1.53665-0.82627I$<br>$b=-0.131909+0.837987I$ | $1.16644-1.03471I$ | 0 |
| $u=-0.525177-0.645334I$<br>$a=\ \ 1.53665+0.82627I$<br>$b=-0.131909-0.837987I$ | $1.16644+1.03471I$ | 0 |
| $u=-0.291740+0.776099I$<br>$a=\ \ 1.71919-2.20972I$<br>$b=\ \ 0.354690+0.973182I$ | $-1.59714-5.68334I$ | 0 |
| $u=-0.291740-0.776099I$<br>$a=\ \ 1.71919+2.20972I$<br>$b=\ \ 0.354690-0.973182I$ | $-1.59714+5.68334I$ | 0 |
| $u=\ \ 0.804988+0.181309I$<br>$a=-0.64328-1.70639I$<br>$b=\ \ 0.551787+1.154660I$ | $2.24078-10.44410I$ | 0 |
| $u=\ \ 0.804988-0.181309I$<br>$a=-0.64328+1.70639I$<br>$b=\ \ 0.551787-1.154660I$ | $2.24078+10.44410I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.435464 + 1.163840I$<br>$a = -0.477768 - 0.452708I$<br>$b = 0.457612 + 0.986002I$ | $-1.90871 - 6.12448I$ | 0 |
| $u = 0.435464 - 1.163840I$<br>$a = -0.477768 + 0.452708I$<br>$b = 0.457612 - 0.986002I$ | $-1.90871 + 6.12448I$ | 0 |
| $u = 0.312213 + 0.670675I$<br>$a = -2.45180 - 0.62358I$<br>$b = -0.276880 + 1.179290I$ | $2.99061 + 5.74701I$ | 0 |
| $u = 0.312213 - 0.670675I$<br>$a = -2.45180 + 0.62358I$<br>$b = -0.276880 - 1.179290I$ | $2.99061 - 5.74701I$ | 0 |
| $u = -0.611234 + 0.404963I$<br>$a = -0.280714 + 1.021810I$<br>$b = 0.409342 - 0.968824I$ | $2.06942 - 0.09531I$ | 0 |
| $u = -0.611234 - 0.404963I$<br>$a = -0.280714 - 1.021810I$<br>$b = 0.409342 + 0.968824I$ | $2.06942 + 0.09531I$ | 0 |
| $u = 0.265178 + 0.675762I$<br>$a = 0.907659 + 0.058818I$<br>$b = -0.635826 - 0.742426I$ | $-1.70927 - 1.35572I$ | 0 |
| $u = 0.265178 - 0.675762I$<br>$a = 0.907659 - 0.058818I$<br>$b = -0.635826 + 0.742426I$ | $-1.70927 + 1.35572I$ | 0 |
| $u = 0.477406 + 0.539745I$<br>$a = -0.40824 - 2.03755I$<br>$b = -0.695213 + 0.661441I$ | $-1.98346 + 3.79368I$ | 0 |
| $u = 0.477406 - 0.539745I$<br>$a = -0.40824 + 2.03755I$<br>$b = -0.695213 - 0.661441I$ | $-1.98346 - 3.79368I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.317025+1.246230I$<br>$a=-0.026753+0.968420I$<br>$b=\ 0.177012-0.806896I$ | $-0.96778-2.86869I$ | 0 |
| $u=-0.317025-1.246230I$<br>$a=-0.026753-0.968420I$<br>$b=\ 0.177012+0.806896I$ | $-0.96778+2.86869I$ | 0 |
| $u=-0.562362+0.425162I$<br>$a=\ 1.14356-1.65586I$<br>$b=\ 0.569282+0.913694I$ | $2.01019-3.90867I$ | 0 |
| $u=-0.562362-0.425162I$<br>$a=\ 1.14356+1.65586I$<br>$b=\ 0.569282-0.913694I$ | $2.01019+3.90867I$ | 0 |
| $u=\ 0.225130+0.643055I$<br>$a=\ 0.068835-0.831530I$<br>$b=-1.200640-0.266059I$ | $-3.67039+0.48350I$ | $-14.9920+0.I$ |
| $u=\ 0.225130-0.643055I$<br>$a=\ 0.068835+0.831530I$<br>$b=-1.200640+0.266059I$ | $-3.67039-0.48350I$ | $-14.9920+0.I$ |
| $u=-0.093216+0.673095I$<br>$a=-0.270909-0.289084I$<br>$b=-1.231520+0.269233I$ | $-3.57756-0.12160I$ | $-10.28202+0.I$ |
| $u=-0.093216-0.673095I$<br>$a=-0.270909+0.289084I$<br>$b=-1.231520-0.269233I$ | $-3.57756+0.12160I$ | $-10.28202+0.I$ |
| $u=-0.446966+1.257260I$<br>$a=\ 0.495105-0.621086I$<br>$b=-0.021715+0.799405I$ | $-1.20679-3.78688I$ | 0 |
| $u=-0.446966-1.257260I$<br>$a=\ 0.495105+0.621086I$<br>$b=-0.021715-0.799405I$ | $-1.20679+3.78688I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.629530+0.150393I$<br>$a=\ \ 0.62880+1.85854I$<br>$b=-0.317621-1.094780I$ | $2.56408-2.85612I$ | $9.46770+7.32949I$ |
| $u=-0.629530-0.150393I$<br>$a=\ \ 0.62880-1.85854I$<br>$b=-0.317621+1.094780I$ | $2.56408+2.85612I$ | $9.46770-7.32949I$ |
| $u=\ \ 0.382668+0.514882I$<br>$a=\ \ 1.84856+1.00624I$<br>$b=\ \ 0.293177-1.243380I$ | $3.98923-1.87579I$ | $5.54063-1.04613I$ |
| $u=\ \ 0.382668-0.514882I$<br>$a=\ \ 1.84856-1.00624I$<br>$b=\ \ 0.293177+1.243380I$ | $3.98923+1.87579I$ | $5.54063+1.04613I$ |
| $u=\ \ 0.578497+0.051054I$<br>$a=-0.65461+1.47641I$<br>$b=\ \ 0.759679-0.238852I$ | $-0.40672-5.50449I$ | $1.76198+4.14204I$ |
| $u=\ \ 0.578497-0.051054I$<br>$a=-0.65461-1.47641I$<br>$b=\ \ 0.759679+0.238852I$ | $-0.40672+5.50449I$ | $1.76198-4.14204I$ |
| $u=\ \ 0.532532+0.187598I$<br>$a=\ \ 1.18895+2.11769I$<br>$b=-0.497715-1.161640I$ | $1.08707-3.42611I$ | $1.72053+6.26758I$ |
| $u=\ \ 0.532532-0.187598I$<br>$a=\ \ 1.18895-2.11769I$<br>$b=-0.497715+1.161640I$ | $1.08707+3.42611I$ | $1.72053-6.26758I$ |
| $u=-0.04540+1.44920I$<br>$a=\ \ 0.367775+0.643599I$<br>$b=\ \ 0.026768-1.176870I$ | $-3.45810-2.30008I$ | $0$ |
| $u=-0.04540-1.44920I$<br>$a=\ \ 0.367775-0.643599I$<br>$b=\ \ 0.026768+1.176870I$ | $-3.45810+2.30008I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.309791 + 0.416406I$<br>$a = -0.69493 - 1.64086I$<br>$b = 0.07779 + 1.49925I$ | $4.33831 + 4.48628I$ | $5.04775 - 11.15203I$ |
| $u = 0.309791 - 0.416406I$<br>$a = -0.69493 + 1.64086I$<br>$b = 0.07779 - 1.49925I$ | $4.33831 - 4.48628I$ | $5.04775 + 11.15203I$ |
| $u = -0.08145 + 1.50429I$<br>$a = 1.222310 - 0.288322I$<br>$b = 0.833892 + 0.788272I$ | $-4.18143 - 5.88825I$ | $0$ |
| $u = -0.08145 - 1.50429I$<br>$a = 1.222310 + 0.288322I$<br>$b = 0.833892 - 0.788272I$ | $-4.18143 + 5.88825I$ | $0$ |
| $u = -0.460138 + 0.159934I$<br>$a = 0.446442 - 0.151823I$<br>$b = 0.220319 - 0.177672I$ | $1.128220 - 0.578541I$ | $6.90581 + 1.85948I$ |
| $u = -0.460138 - 0.159934I$<br>$a = 0.446442 + 0.151823I$<br>$b = 0.220319 + 0.177672I$ | $1.128220 + 0.578541I$ | $6.90581 - 1.85948I$ |
| $u = 0.01350 + 1.51921I$<br>$a = 0.224356 + 1.386720I$<br>$b = -0.16079 - 1.44445I$ | $-2.02769 - 2.99413I$ | $0$ |
| $u = 0.01350 - 1.51921I$<br>$a = 0.224356 - 1.386720I$<br>$b = -0.16079 + 1.44445I$ | $-2.02769 + 2.99413I$ | $0$ |
| $u = -0.006027 + 0.464389I$<br>$a = -2.34329 - 1.60530I$<br>$b = -0.559969 + 0.976244I$ | $-0.49653 + 2.02090I$ | $-3.31654 - 3.14040I$ |
| $u = -0.006027 - 0.464389I$<br>$a = -2.34329 + 1.60530I$<br>$b = -0.559969 - 0.976244I$ | $-0.49653 - 2.02090I$ | $-3.31654 + 3.14040I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.07646 + 1.53961I$<br>$a = 0.986531 + 0.194432I$<br>$b = 0.577422 - 1.081640I$ | $-2.90076 - 0.32481I$ | 0 |
| $u = 0.07646 - 1.53961I$<br>$a = 0.986531 - 0.194432I$<br>$b = 0.577422 + 1.081640I$ | $-2.90076 + 0.32481I$ | 0 |
| $u = -0.00038 + 1.54891I$<br>$a = -1.94500 + 0.43752I$<br>$b = -0.280651 - 0.692596I$ | $-6.48074 + 4.22012I$ | 0 |
| $u = -0.00038 - 1.54891I$<br>$a = -1.94500 - 0.43752I$<br>$b = -0.280651 + 0.692596I$ | $-6.48074 - 4.22012I$ | 0 |
| $u = 0.05314 + 1.55048I$<br>$a = -0.184731 - 0.761283I$<br>$b = 0.02432 + 1.74883I$ | $-2.45328 + 5.55828I$ | 0 |
| $u = 0.05314 - 1.55048I$<br>$a = -0.184731 + 0.761283I$<br>$b = 0.02432 - 1.74883I$ | $-2.45328 - 5.55828I$ | 0 |
| $u = 0.15491 + 1.55643I$<br>$a = -0.82924 - 1.18408I$<br>$b = -0.752148 + 0.870766I$ | $-9.03254 + 6.14039I$ | 0 |
| $u = 0.15491 - 1.55643I$<br>$a = -0.82924 + 1.18408I$<br>$b = -0.752148 - 0.870766I$ | $-9.03254 - 6.14039I$ | 0 |
| $u = -0.00212 + 1.57413I$<br>$a = -0.946756 - 0.825288I$<br>$b = -0.664242 + 1.178100I$ | $-7.67853 + 1.98811I$ | 0 |
| $u = -0.00212 - 1.57413I$<br>$a = -0.946756 + 0.825288I$<br>$b = -0.664242 - 1.178100I$ | $-7.67853 - 1.98811I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.13611+1.57594I$<br>$a=\ \ 1.128580-0.382016I$<br>$b=\ \ 0.107935+0.661267I$ | $-6.26155-3.40298I$ | 0 |
| $u=-0.13611-1.57594I$<br>$a=\ \ 1.128580+0.382016I$<br>$b=\ \ 0.107935-0.661267I$ | $-6.26155+3.40298I$ | 0 |
| $u=\ \ 0.07007+1.59231I$<br>$a=-0.403565-0.426318I$<br>$b=-1.39653-0.42118I$ | $-11.35050+1.61971I$ | 0 |
| $u=\ \ 0.07007-1.59231I$<br>$a=-0.403565+0.426318I$<br>$b=-1.39653+0.42118I$ | $-11.35050-1.61971I$ | 0 |
| $u=\ \ 0.09082+1.60361I$<br>$a=\ \ 0.0310267-0.1013430I$<br>$b=-0.913355-0.697544I$ | $-9.53778+0.07962I$ | 0 |
| $u=\ \ 0.09082-1.60361I$<br>$a=\ \ 0.0310267+0.1013430I$<br>$b=-0.913355+0.697544I$ | $-9.53778-0.07962I$ | 0 |
| $u=\ \ 0.13636+1.60275I$<br>$a=-1.09748-0.97396I$<br>$b=-0.76988+1.36218I$ | $-8.15606+9.17141I$ | 0 |
| $u=\ \ 0.13636-1.60275I$<br>$a=-1.09748+0.97396I$<br>$b=-0.76988-1.36218I$ | $-8.15606-9.17141I$ | 0 |
| $u=\ \ 0.08683+1.61189I$<br>$a=-1.45265-0.10339I$<br>$b=-0.411620+1.085140I$ | $-4.89872+7.21900I$ | 0 |
| $u=\ \ 0.08683-1.61189I$<br>$a=-1.45265+0.10339I$<br>$b=-0.411620-1.085140I$ | $-4.89872-7.21900I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.04284+1.61451I$<br>$a=-0.390124-0.085366I$<br>$b=-1.44437+0.50696I$ | $-11.56430-0.73640I$ | 0 |
| $u=-0.04284-1.61451I$<br>$a=-0.390124+0.085366I$<br>$b=-1.44437-0.50696I$ | $-11.56430+0.73640I$ | 0 |
| $u=0.242549+0.287615I$<br>$a=0.26718+3.42266I$<br>$b=-0.187422-1.358580I$ | $4.20331-3.56534I$ | $11.53644-5.14411I$ |
| $u=0.242549-0.287615I$<br>$a=0.26718-3.42266I$<br>$b=-0.187422+1.358580I$ | $4.20331+3.56534I$ | $11.53644+5.14411I$ |
| $u=0.302146+0.218430I$<br>$a=1.70032+0.53203I$<br>$b=-0.647516-0.347712I$ | $-1.39515-0.93354I$ | $-2.59819+1.05734I$ |
| $u=0.302146-0.218430I$<br>$a=1.70032-0.53203I$<br>$b=-0.647516+0.347712I$ | $-1.39515+0.93354I$ | $-2.59819-1.05734I$ |
| $u=0.13215+1.62639I$<br>$a=0.235834+0.252213I$<br>$b=1.274680+0.408764I$ | $-10.6279+11.2400I$ | 0 |
| $u=0.13215-1.62639I$<br>$a=0.235834-0.252213I$<br>$b=1.274680-0.408764I$ | $-10.6279-11.2400I$ | 0 |
| $u=-0.09471+1.63132I$<br>$a=1.09576-1.32590I$<br>$b=0.415498+1.133850I$ | $-9.90493-7.22703I$ | 0 |
| $u=-0.09471-1.63132I$<br>$a=1.09576+1.32590I$<br>$b=0.415498-1.133850I$ | $-9.90493+7.22703I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.11983+1.63478I$<br>$a=\ 0.420350-0.053792I$<br>$b=\ 0.814231-0.470879I$ | $-8.96610-4.18743I$ | 0 |
| $u=-0.11983-1.63478I$<br>$a=\ 0.420350+0.053792I$<br>$b=\ 0.814231+0.470879I$ | $-8.96610+4.18743I$ | 0 |
| $u=-0.19786+1.62793I$<br>$a=-0.686177+0.983980I$<br>$b=-0.563755-1.295860I$ | $-6.46228-9.15504I$ | 0 |
| $u=-0.19786-1.62793I$<br>$a=-0.686177-0.983980I$<br>$b=-0.563755+1.295860I$ | $-6.46228+9.15504I$ | 0 |
| $u=\ 0.10538+1.63975I$<br>$a=\ 0.684829+1.032230I$<br>$b=\ 0.566553-0.984332I$ | $-11.38700-0.34719I$ | 0 |
| $u=\ 0.10538-1.63975I$<br>$a=\ 0.684829-1.032230I$<br>$b=\ 0.566553+0.984332I$ | $-11.38700+0.34719I$ | 0 |
| $u=-0.08032+1.64238I$<br>$a=-0.263674-0.067179I$<br>$b=-0.957818-0.135285I$ | $-10.59110-3.79827I$ | 0 |
| $u=-0.08032-1.64238I$<br>$a=-0.263674+0.067179I$<br>$b=-0.957818+0.135285I$ | $-10.59110+3.79827I$ | 0 |
| $u=\ 0.19073+1.63818I$<br>$a=\ 1.005040+0.964618I$<br>$b=\ 0.74549-1.29153I$ | $-7.7737+18.3011I$ | 0 |
| $u=\ 0.19073-1.63818I$<br>$a=\ 1.005040-0.964618I$<br>$b=\ 0.74549+1.29153I$ | $-7.7737-18.3011I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.12817+1.64887I$<br>$a=-0.721083+0.623451I$<br>$b=-0.83820-1.26724I$ | $-9.00210-8.51228I$ | 0 |
| $u=-0.12817-1.64887I$<br>$a=-0.721083-0.623451I$<br>$b=-0.83820+1.26724I$ | $-9.00210+8.51228I$ | 0 |
| $u=-0.050019+0.338335I$<br>$a=-6.94756+1.11891I$<br>$b=0.062101-0.634357I$ | $0.21944+4.30614I$ | $1.88171+4.03006I$ |
| $u=-0.050019-0.338335I$<br>$a=-6.94756-1.11891I$<br>$b=0.062101+0.634357I$ | $0.21944-4.30614I$ | $1.88171-4.03006I$ |
| $u=-0.19822+1.64976I$<br>$a=1.012780-0.835118I$<br>$b=0.624628+1.094730I$ | $-7.08366-9.56953I$ | 0 |
| $u=-0.19822-1.64976I$<br>$a=1.012780+0.835118I$<br>$b=0.624628-1.094730I$ | $-7.08366+9.56953I$ | 0 |
| $u=-0.05801+1.70542I$<br>$a=0.188637-0.386957I$<br>$b=0.300986-0.464446I$ | $-12.20180-3.83656I$ | 0 |
| $u=-0.05801-1.70542I$<br>$a=0.188637+0.386957I$<br>$b=0.300986+0.464446I$ | $-12.20180+3.83656I$ | 0 |
| $u=0.01854+1.73599I$<br>$a=0.152199-0.115967I$<br>$b=0.476701+0.602644I$ | $-12.59170-4.70299I$ | 0 |
| $u=0.01854-1.73599I$<br>$a=0.152199+0.115967I$<br>$b=0.476701-0.602644I$ | $-12.59170+4.70299I$ | 0 |

**II.**

$\boldsymbol{I_2^u = \langle -u^{23}-5u^{22}+\cdots+b-2,\ u^{25}+4u^{24}+\cdots+a+1,\ u^{26}+4u^{25}+\cdots+4u+1\rangle}$

**(i) Arc colorings**

$$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} -u^{25} - 4u^{24} + \cdots - 30u - 1 \\ u^{23} + 5u^{22} + \cdots + 15u + 2 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} -u^{25} - 4u^{24} + \cdots - 15u + 1 \\ u^{23} + 5u^{22} + \cdots + 15u + 2 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -2u^{25} - 8u^{24} + \cdots - 44u - 8 \\ -2u^{23} - 6u^{22} + \cdots + 6u + 4 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -u^{22} - 4u^{21} + \cdots - 36u - 10 \\ -u^{24} - 5u^{23} + \cdots + u + 3 \end{pmatrix}$$

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

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

$$a_9 = \begin{pmatrix} u^{25} + 5u^{24} + \cdots + 50u + 9 \\ -u^{24} - 4u^{23} + \cdots - 12u - 4 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -u^3 - 2u \\ u^5 + 3u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -2u^{25} - 8u^{24} + \cdots - 45u - 7 \\ -u^{23} - 2u^{22} + \cdots + 8u + 4 \end{pmatrix}$$

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

**(iii) Cusp Shapes**

$= -2u^{25} - 7u^{24} - 50u^{23} - 147u^{22} - 551u^{21} - 1347u^{20} - 3480u^{19} - 7052u^{18} - 13852u^{17} - 23223u^{16} - 36165u^{15} - 49939u^{14} - 62589u^{13} - 70498u^{12} - 70952u^{11} - 64028u^{10} - 50884u^9 - 35704u^8 - 21740u^7 - 11365u^6 - 5190u^5 - 1995u^4 - 763u^3 - 263u^2 - 68u - 16$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{26} - 4u^{25} + \cdots + 3u^2 + 1$ |
| $c_2$ | $u^{26} - 8u^{25} + \cdots - 4u + 1$ |
| $c_3$ | $u^{26} + 5u^{24} + \cdots + 6u^2 + 1$ |
| $c_4$ | $u^{26} + 6u^{24} + \cdots + 5u^2 + 1$ |
| $c_5$ | $u^{26} + 8u^{25} + \cdots + 4u + 1$ |
| $c_6, c_7$ | $u^{26} + 4u^{25} + \cdots + 4u + 1$ |
| $c_8$ | $u^{26} - 4u^{24} + \cdots - 25u + 19$ |
| $c_9$ | $u^{26} - 2u^{25} + \cdots + 2u^2 + 1$ |
| $c_{10}, c_{11}$ | $u^{26} - 4u^{25} + \cdots - 4u + 1$ |
| $c_{12}$ | $u^{26} - 4u^{24} + \cdots + 37u + 19$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{26} - 6y^{25} + \cdots + 6y + 1$ |
| $c_2, c_5$ | $y^{26} + 14y^{25} + \cdots + 26y + 1$ |
| $c_3$ | $y^{26} + 10y^{25} + \cdots + 12y + 1$ |
| $c_4$ | $y^{26} + 12y^{25} + \cdots + 10y + 1$ |
| $c_6, c_7, c_{10}$ $c_{11}$ | $y^{26} + 34y^{25} + \cdots + 42y + 1$ |
| $c_8$ | $y^{26} - 8y^{25} + \cdots + 287y + 361$ |
| $c_9$ | $y^{26} - 6y^{25} + \cdots + 4y + 1$ |
| $c_{12}$ | $y^{26} - 8y^{25} + \cdots - 1407y + 361$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.075660 + 1.010990I$<br>$a = -1.326460 - 0.463849I$<br>$b = 0.060453 + 0.631462I$ | $-1.96200 - 3.72629I$ | $0.36372 + 5.75292I$ |
| $u = 0.075660 - 1.010990I$<br>$a = -1.326460 + 0.463849I$<br>$b = 0.060453 - 0.631462I$ | $-1.96200 + 3.72629I$ | $0.36372 - 5.75292I$ |
| $u = -0.523509 + 0.804009I$<br>$a = -0.91178 + 1.45977I$<br>$b = -0.471030 - 1.130290I$ | $0.61532 - 5.73624I$ | $0.67749 + 7.26439I$ |
| $u = -0.523509 - 0.804009I$<br>$a = -0.91178 - 1.45977I$<br>$b = -0.471030 + 1.130290I$ | $0.61532 + 5.73624I$ | $0.67749 - 7.26439I$ |
| $u = -0.820777 + 0.137567I$<br>$a = 0.33177 - 1.57517I$<br>$b = -0.314875 + 0.937706I$ | $2.80165 + 1.27529I$ | $0.76483 - 4.01128I$ |
| $u = -0.820777 - 0.137567I$<br>$a = 0.33177 + 1.57517I$<br>$b = -0.314875 - 0.937706I$ | $2.80165 - 1.27529I$ | $0.76483 + 4.01128I$ |
| $u = -0.087067 + 1.263330I$<br>$a = -0.500286 + 0.695318I$<br>$b = -0.105564 - 1.230040I$ | $0.68127 - 4.36817I$ | $4.61666 + 4.88375I$ |
| $u = -0.087067 - 1.263330I$<br>$a = -0.500286 - 0.695318I$<br>$b = -0.105564 + 1.230040I$ | $0.68127 + 4.36817I$ | $4.61666 - 4.88375I$ |
| $u = -0.400450 + 1.230050I$<br>$a = 0.124823 - 0.619651I$<br>$b = -0.188953 + 0.761286I$ | $-1.45270 - 3.11273I$ | $-3.51640 + 3.25261I$ |
| $u = -0.400450 - 1.230050I$<br>$a = 0.124823 + 0.619651I$<br>$b = -0.188953 - 0.761286I$ | $-1.45270 + 3.11273I$ | $-3.51640 - 3.25261I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.178821+0.592010I$<br>$a=-0.219820+0.544018I$<br>$b=-1.287000+0.158714I$ | $-3.22698-0.61881I$ | $3.93730+11.39562I$ |
| $u=-0.178821-0.592010I$<br>$a=-0.219820-0.544018I$<br>$b=-1.287000-0.158714I$ | $-3.22698+0.61881I$ | $3.93730-11.39562I$ |
| $u=-0.00514+1.52348I$<br>$a=\ \ 0.550174-0.979342I$<br>$b=-0.05694+1.50728I$ | $-2.47705+3.70060I$ | $0.-7.20844I$ |
| $u=-0.00514-1.52348I$<br>$a=\ \ 0.550174+0.979342I$<br>$b=-0.05694-1.50728I$ | $-2.47705-3.70060I$ | $0.+7.20844I$ |
| $u=\ \ 0.06342+1.54650I$<br>$a=\ \ 1.89982+0.52199I$<br>$b=\ \ 0.364208-0.669495I$ | $-6.51875+5.57148I$ | $-1.60003-7.19671I$ |
| $u=\ \ 0.06342-1.54650I$<br>$a=\ \ 1.89982-0.52199I$<br>$b=\ \ 0.364208+0.669495I$ | $-6.51875-5.57148I$ | $-1.60003+7.19671I$ |
| $u=\ \ 0.167142+0.367743I$<br>$a=\ \ 5.28595+2.93649I$<br>$b=\ \ 0.246063-0.655184I$ | $0.19972+4.69306I$ | $0.8121-15.8385I$ |
| $u=\ \ 0.167142-0.367743I$<br>$a=\ \ 5.28595-2.93649I$<br>$b=\ \ 0.246063+0.655184I$ | $0.19972-4.69306I$ | $0.8121+15.8385I$ |
| $u=-0.05944+1.59597I$<br>$a=-0.399128+0.226443I$<br>$b=-1.39917+0.35339I$ | $-10.86180-1.53524I$ | $0.+2.31456I$ |
| $u=-0.05944-1.59597I$<br>$a=-0.399128-0.226443I$<br>$b=-1.39917-0.35339I$ | $-10.86180+1.53524I$ | $0.-2.31456I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.14829+1.62552I$<br>$a=-0.947483+0.859182I$<br>$b=-0.657237-1.233060I$ | $-7.59986-8.25625I$ | $0.+4.95434I$ |
| $u=-0.14829-1.62552I$<br>$a=-0.947483-0.859182I$<br>$b=-0.657237+1.233060I$ | $-7.59986+8.25625I$ | $0.-4.95434I$ |
| $u=-0.042037+0.282733I$<br>$a=\ \ 2.42524-2.28986I$<br>$b=-0.104076+1.401760I$ | $3.89349+3.83221I$ | $-3.62557-6.49552I$ |
| $u=-0.042037-0.282733I$<br>$a=\ \ 2.42524+2.28986I$<br>$b=-0.104076-1.401760I$ | $3.89349-3.83221I$ | $-3.62557+6.49552I$ |
| $u=-0.04070+1.71759I$<br>$a=-0.312820+0.164008I$<br>$b=-0.085877+0.446316I$ | $-11.92580-4.08431I$ | $5.51713+7.53332I$ |
| $u=-0.04070-1.71759I$<br>$a=-0.312820-0.164008I$<br>$b=-0.085877-0.446316I$ | $-11.92580+4.08431I$ | $5.51713-7.53332I$ |

**III. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u^{26}-4u^{25}+\cdots+3u^2+1)(u^{120}-7u^{119}+\cdots-7u+3)$ |
| $c_2$ | $(u^{26}-8u^{25}+\cdots-4u+1)(u^{120}+7u^{119}+\cdots-6493u+976)$ |
| $c_3$ | $(u^{26}+5u^{24}+\cdots+6u^2+1)(u^{120}+u^{119}+\cdots+24u+8)$ |
| $c_4$ | $(u^{26}+6u^{24}+\cdots+5u^2+1)(u^{120}-u^{119}+\cdots+45u+1)$ |
| $c_5$ | $(u^{26}+8u^{25}+\cdots+4u+1)(u^{120}+7u^{119}+\cdots-6493u+976)$ |
| $c_6, c_7$ | $(u^{26}+4u^{25}+\cdots+4u+1)(u^{120}-3u^{119}+\cdots+113u+21)$ |
| $c_8$ | $(u^{26}-4u^{24}+\cdots-25u+19)(u^{120}-u^{119}+\cdots+4850u+311)$ |
| $c_9$ | $(u^{26}-2u^{25}+\cdots+2u^2+1)(u^{120}-5u^{119}+\cdots+3u+8)$ |
| $c_{10}, c_{11}$ | $(u^{26}-4u^{25}+\cdots-4u+1)(u^{120}-3u^{119}+\cdots+113u+21)$ |
| $c_{12}$ | $(u^{26}-4u^{24}+\cdots+37u+19)$ $\cdot(u^{120}-u^{119}+\cdots+18390924u+2188589)$ |

**IV. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $(y^{26}-6y^{25}+\cdots+6y+1)(y^{120}-y^{119}+\cdots+197y+9)$ |
| $c_2, c_5$ | $(y^{26}+14y^{25}+\cdots+26y+1)$ $\cdot(y^{120}+59y^{119}+\cdots+31208823y+952576)$ |
| $c_3$ | $(y^{26}+10y^{25}+\cdots+12y+1)(y^{120}+3y^{119}+\cdots-608y+64)$ |
| $c_4$ | $(y^{26}+12y^{25}+\cdots+10y+1)(y^{120}+13y^{119}+\cdots-627y+1)$ |
| $c_6, c_7, c_{10}$ $c_{11}$ | $(y^{26}+34y^{25}+\cdots+42y+1)(y^{120}+143y^{119}+\cdots+20117y+441)$ |
| $c_8$ | $(y^{26}-8y^{25}+\cdots+287y+361)$ $\cdot(y^{120}-3y^{119}+\cdots+32084922y+96721)$ |
| $c_9$ | $(y^{26}-6y^{25}+\cdots+4y+1)(y^{120}+3y^{119}+\cdots+1655y+64)$ |
| $c_{12}$ | $(y^{26}-8y^{25}+\cdots-1407y+361)$ $\cdot(y^{120}+17y^{119}+\cdots+186020618302756y+4789921810921)$ |