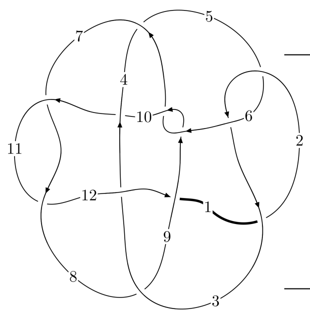
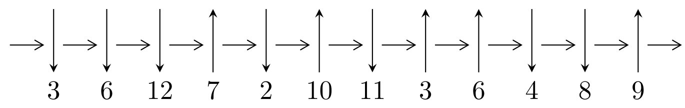
# $12n_{0484}$ ($K12n_{0484}$)




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$\begin{aligned}
I_1^u = \langle & -2.57724\times 10^{98}u^{40} + 8.25670\times 10^{97}u^{39} + \cdots + 1.32591\times 10^{100}b + 2.87003\times 10^{100},\\
& -1.90566\times 10^{100}u^{40} + 7.67451\times 10^{99}u^{39} + \cdots + 1.84302\times 10^{102}a - 3.98069\times 10^{102},\\
& 2u^{41} + 59u^{39} + \cdots - 792u - 139\rangle\\
I_2^u = \langle & 183u^{10} + 1583u^9 + \cdots + 3889b - 2353,\ 2799u^{10} + 10760u^9 + \cdots + 3889a + 223,\\
& u^{11} + 3u^{10} + 7u^9 + 13u^8 + 11u^7 + 19u^6 + 6u^5 + 18u^4 + 6u^2 - 2u + 1\rangle\\
I_3^u = \langle & b+1,\ a-1,\ u+1\rangle\\
I_4^u = \langle & -2u^3 - 2u^2 + 2b - 3u - 3,\ -2u^3 + a - 3u - 2,\ 2u^4 + 3u^2 + 2u + 1\rangle
\end{aligned}$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 57 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.** $\boldsymbol{I_1^u = \langle -2.58 \times 10^{98} u^{40} + 8.26 \times 10^{97} u^{39} + \cdots + 1.33 \times 10^{100} b + 2.87 \times 10^{100},\ -1.91 \times 10^{100} u^{40} + 7.67 \times 10^{99} u^{39} + \cdots + 1.84 \times 10^{102} a - 3.98 \times 10^{102},\ 2u^{41} + 59u^{39} + \cdots - 792u - 139\rangle}$

**(i) Arc colorings**

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 0.0103399u^{40} - 0.00416410u^{39} + \cdots - 1.23241u + 2.15988 \\ 0.0194375u^{40} - 0.00622719u^{39} + \cdots - 11.2533u - 2.16457 \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} -0.0209471u^{40} + 0.00485889u^{39} + \cdots + 19.6703u + 5.53621 \\ -0.00627194u^{40} + 0.00359880u^{39} + \cdots + 4.80640u - 0.268658 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.0223730u^{40} + 0.00212611u^{39} + \cdots + 18.5281u + 3.03016 \\ -0.00396870u^{40} - 0.00262692u^{39} + \cdots + 5.47182u + 1.30806 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.0223730u^{40} + 0.00212611u^{39} + \cdots + 18.5281u + 3.03016 \\ -0.00307852u^{40} - 0.00354962u^{39} + \cdots + 6.18480u + 1.16029 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -0.0184043u^{40} + 0.00475303u^{39} + \cdots + 13.0562u + 1.72210 \\ -0.000584007u^{40} - 0.00418261u^{39} + \cdots + 4.86872u + 0.977723 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -0.0191133u^{40} + 0.00882757u^{39} + \cdots + 0.506034u - 0.758338 \\ 0.00679681u^{40} - 0.00471144u^{39} + \cdots - 3.46799u - 0.799858 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -0.0189883u^{40} + 0.000570424u^{39} + \cdots + 17.9250u + 2.69983 \\ -0.000584007u^{40} - 0.00418261u^{39} + \cdots + 4.86872u + 0.977723 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -0.000436229u^{40} - 0.00330818u^{39} + \cdots + 6.39844u + 2.38333 \\ 0.0110725u^{40} - 0.0101050u^{39} + \cdots - 0.426320u + 1.29385 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -0.00336300u^{40} + 0.00725991u^{39} + \cdots - 12.4525u - 5.75232 \\ -0.0229539u^{40} + 0.00793740u^{39} + \cdots + 12.3051u + 2.17246 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 0.0503579u^{40} - 0.0337763u^{39} + \cdots - 41.9472u - 6.50005$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{41} + 62u^{40} + \cdots + 20980954u + 3066001$ |
| $c_2, c_5$ | $u^{41} - 2u^{40} + \cdots - 994u + 1751$ |
| $c_3$ | $u^{41} - 7u^{40} + \cdots - 32u + 2$ |
| $c_4$ | $u^{41} + 8u^{40} + \cdots + 202u + 482$ |
| $c_6, c_9$ | $u^{41} - 4u^{40} + \cdots - 532u - 484$ |
| $c_7, c_{11}$ | $u^{41} - 18u^{39} + \cdots - 147u - 9$ |
| $c_8$ | $2(2u^{41} + 59u^{39} + \cdots - 792u + 139)$ |
| $c_{10}$ | $2(2u^{41} + 4u^{40} + \cdots + 12u - 1)$ |
| $c_{12}$ | $u^{41} + 50u^{39} + \cdots + 3836088u + 323212$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{41} - 174y^{40} + \cdots - 176579932485582y - 9400362132001$ |
| $c_2, c_5$ | $y^{41} - 62y^{40} + \cdots + 20980954y - 3066001$ |
| $c_3$ | $y^{41} - 7y^{40} + \cdots + 68y - 4$ |
| $c_4$ | $y^{41} + 26y^{40} + \cdots - 2659360y - 232324$ |
| $c_6, c_9$ | $y^{41} + 50y^{39} + \cdots - 1201888y - 234256$ |
| $c_7, c_{11}$ | $y^{41} - 36y^{40} + \cdots + 6831y - 81$ |
| $c_8$ | $4(4y^{41} + 236y^{40} + \cdots - 158364y - 19321)$ |
| $c_{10}$ | $4(4y^{41} + 36y^{40} + \cdots + 32y - 1)$ |
| $c_{12}$ | $y^{41} + 100y^{40} + \cdots + 6045979389712y - 104465996944$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.659232 + 0.776800I$<br>$a = 0.577914 + 0.165637I$<br>$b = -0.024468 - 0.254653I$ | $-0.03579 - 2.12702I$ | $-2.30724 + 6.34493I$ |
| $u = -0.659232 - 0.776800I$<br>$a = 0.577914 - 0.165637I$<br>$b = -0.024468 + 0.254653I$ | $-0.03579 + 2.12702I$ | $-2.30724 - 6.34493I$ |
| $u = 0.393962 + 0.883594I$<br>$a = 0.541007 - 0.684990I$<br>$b = 1.124350 - 0.835430I$ | $3.52455 - 0.44279I$ | $1.64463 + 0.69069I$ |
| $u = 0.393962 - 0.883594I$<br>$a = 0.541007 + 0.684990I$<br>$b = 1.124350 + 0.835430I$ | $3.52455 + 0.44279I$ | $1.64463 - 0.69069I$ |
| $u = 0.254000 + 1.050130I$<br>$a = -1.31930 + 0.64361I$<br>$b = -0.809991 + 0.134439I$ | $-5.50368 - 6.18013I$ | $-6.07543 + 4.97240I$ |
| $u = 0.254000 - 1.050130I$<br>$a = -1.31930 - 0.64361I$<br>$b = -0.809991 - 0.134439I$ | $-5.50368 + 6.18013I$ | $-6.07543 - 4.97240I$ |
| $u = -0.343509 + 0.778339I$<br>$a = -1.50036 - 0.93858I$<br>$b = -0.597196 - 0.150858I$ | $-5.88104 - 0.44141I$ | $-6.92109 + 1.29385I$ |
| $u = -0.343509 - 0.778339I$<br>$a = -1.50036 + 0.93858I$<br>$b = -0.597196 + 0.150858I$ | $-5.88104 + 0.44141I$ | $-6.92109 - 1.29385I$ |
| $u = 0.432526 + 0.728373I$<br>$a = 0.847277 - 0.498164I$<br>$b = -0.263708 - 0.214377I$ | $-1.32932 - 0.71050I$ | $-7.34406 + 3.00260I$ |
| $u = 0.432526 - 0.728373I$<br>$a = 0.847277 + 0.498164I$<br>$b = -0.263708 + 0.214377I$ | $-1.32932 + 0.71050I$ | $-7.34406 - 3.00260I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.786645$<br>$a = 1.52147$<br>$b = -0.499922$ | $-2.75131$ | $5.92420$ |
| $u = 0.572393 + 0.467249I$<br>$a = 0.784322 + 0.182815I$<br>$b = -0.577015 - 1.030610I$ | $-2.75470 - 0.87273I$ | $-3.72912 + 1.33601I$ |
| $u = 0.572393 - 0.467249I$<br>$a = 0.784322 - 0.182815I$<br>$b = -0.577015 + 1.030610I$ | $-2.75470 + 0.87273I$ | $-3.72912 - 1.33601I$ |
| $u = -0.416524 + 1.237420I$<br>$a = 0.408598 - 0.403112I$<br>$b = -0.286242 - 0.497821I$ | $-0.89253 - 2.94273I$ | $0$ |
| $u = -0.416524 - 1.237420I$<br>$a = 0.408598 + 0.403112I$<br>$b = -0.286242 + 0.497821I$ | $-0.89253 + 2.94273I$ | $0$ |
| $u = -0.534052 + 0.272508I$<br>$a = 1.35667 + 0.56380I$<br>$b = 0.977815 - 0.039583I$ | $2.14913 - 0.81916I$ | $6.43098 + 7.00832I$ |
| $u = -0.534052 - 0.272508I$<br>$a = 1.35667 - 0.56380I$<br>$b = 0.977815 + 0.039583I$ | $2.14913 + 0.81916I$ | $6.43098 - 7.00832I$ |
| $u = 0.171734 + 0.527077I$<br>$a = 0.88599 + 1.93343I$<br>$b = -0.381893 + 0.315896I$ | $4.54292 + 2.96089I$ | $-5.84505 - 9.32253I$ |
| $u = 0.171734 - 0.527077I$<br>$a = 0.88599 - 1.93343I$<br>$b = -0.381893 - 0.315896I$ | $4.54292 - 2.96089I$ | $-5.84505 + 9.32253I$ |
| $u = 1.04509 + 1.16303I$<br>$a = -0.575660 + 0.408131I$<br>$b = 0.336966 + 0.467880I$ | $-4.77375 + 7.71761I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.04509 - 1.16303I$<br>$a = -0.575660 - 0.408131I$<br>$b = 0.336966 - 0.467880I$ | $-4.77375 - 7.71761I$ | $0$ |
| $u = -0.356665 + 0.207131I$<br>$a = 1.12852 - 1.40117I$<br>$b = -0.933888 + 0.923317I$ | $-1.64023 - 6.11163I$ | $-0.87211 + 3.36095I$ |
| $u = -0.356665 - 0.207131I$<br>$a = 1.12852 + 1.40117I$<br>$b = -0.933888 - 0.923317I$ | $-1.64023 + 6.11163I$ | $-0.87211 - 3.36095I$ |
| $u = -0.241179 + 0.293581I$<br>$a = 1.84296 - 0.32729I$<br>$b = 0.998293 - 0.269510I$ | $1.88617 - 0.91020I$ | $6.79810 - 1.89134I$ |
| $u = -0.241179 - 0.293581I$<br>$a = 1.84296 + 0.32729I$<br>$b = 0.998293 + 0.269510I$ | $1.88617 + 0.91020I$ | $6.79810 + 1.89134I$ |
| $u = 0.18824 + 1.62909I$<br>$a = -0.155518 + 1.166050I$<br>$b = 0.00435 + 2.45451I$ | $-8.69666 + 3.51054I$ | $0$ |
| $u = 0.18824 - 1.62909I$<br>$a = -0.155518 - 1.166050I$<br>$b = 0.00435 - 2.45451I$ | $-8.69666 - 3.51054I$ | $0$ |
| $u = -0.30115 + 1.75023I$<br>$a = 0.062139 + 1.105720I$<br>$b = 0.52944 + 2.26135I$ | $-14.5520 - 3.8090I$ | $0$ |
| $u = -0.30115 - 1.75023I$<br>$a = 0.062139 - 1.105720I$<br>$b = 0.52944 - 2.26135I$ | $-14.5520 + 3.8090I$ | $0$ |
| $u = -0.24365 + 1.79461I$<br>$a = 0.005218 - 1.222810I$<br>$b = 0.03876 - 2.26816I$ | $-9.19332 - 6.12722I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.24365 - 1.79461I$<br>$a = 0.005218 + 1.222810I$<br>$b = 0.03876 + 2.26816I$ | $-9.19332 + 6.12722I$ | 0 |
| $u = 0.16879 + 1.88364I$<br>$a = -0.044736 - 1.118060I$<br>$b = 0.35074 - 2.24460I$ | $-16.2241 - 3.4621I$ | 0 |
| $u = 0.16879 - 1.88364I$<br>$a = -0.044736 + 1.118060I$<br>$b = 0.35074 + 2.24460I$ | $-16.2241 + 3.4621I$ | 0 |
| $u = 0.32422 + 1.88669I$<br>$a = -0.053583 + 0.940689I$<br>$b = -0.11454 + 2.30108I$ | $-10.43640 + 3.80935I$ | 0 |
| $u = 0.32422 - 1.88669I$<br>$a = -0.053583 - 0.940689I$<br>$b = -0.11454 - 2.30108I$ | $-10.43640 - 3.80935I$ | 0 |
| $u = 0.32406 + 1.92161I$<br>$a = -0.072428 - 1.055780I$<br>$b = -0.14431 - 2.43176I$ | $-15.2118 + 13.8525I$ | 0 |
| $u = 0.32406 - 1.92161I$<br>$a = -0.072428 + 1.055780I$<br>$b = -0.14431 + 2.43176I$ | $-15.2118 - 13.8525I$ | 0 |
| $u = -0.17851 + 2.01135I$<br>$a = -0.115497 + 0.968666I$<br>$b = -0.18704 + 2.37176I$ | $-16.2944 - 5.5634I$ | 0 |
| $u = -0.17851 - 2.01135I$<br>$a = -0.115497 - 0.968666I$<br>$b = -0.18704 - 2.37176I$ | $-16.2944 + 5.5634I$ | 0 |
| $u = -0.99386 + 1.82091I$<br>$a = -0.349882 - 0.371487I$<br>$b = 0.70955 - 1.54548I$ | $-3.40570 + 0.32734I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.99386 - 1.82091I$<br>$a = -0.349882 + 0.371487I$<br>$b = 0.70955 + 1.54548I$ | $-3.40570 - 0.32734I$ | 0 |

**II.** $I_2^u = \langle 183u^{10} + 1583u^9 + \cdots + 3889b - 2353,\ 2799u^{10} + 10760u^9 + \cdots + 3889a + 223,\ u^{11} + 3u^{10} + \cdots - 2u + 1\rangle$

**(i) Arc colorings**

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -0.719722u^{10} - 2.76678u^9 + \cdots - 5.35485u - 0.0573412 \\ -0.0470558u^{10} - 0.407046u^9 + \cdots - 0.206480u + 0.605040 \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} 0.582926u^{10} + 2.36488u^9 + \cdots + 6.37208u + 1.15505 \\ -0.136796u^{10} - 0.401903u^9 + \cdots + 1.01723u - 0.902289 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.622011u^{10} - 2.33685u^9 + \cdots - 4.65287u - 2.26999 \\ -0.556956u^{10} - 1.85060u^9 + \cdots - 0.00128568u + 0.112111 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.622011u^{10} - 2.33685u^9 + \cdots - 4.65287u - 2.26999 \\ -0.497814u^{10} - 1.59038u^9 + \cdots + 0.318334u - 0.358704 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -0.0650553u^{10} - 0.486243u^9 + \cdots - 4.65158u - 2.38210 \\ -0.349447u^{10} - 1.13757u^9 + \cdots + 0.515814u - 0.178966 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -2.03626u^{10} - 6.55953u^9 + \cdots - 8.33942u + 3.59733 \\ 0.212651u^{10} + 0.735665u^9 + \cdots + 1.50141u + 0.276678 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -0.414502u^{10} - 1.62381u^9 + \cdots - 4.13577u - 2.56107 \\ -0.349447u^{10} - 1.13757u^9 + \cdots + 0.515814u - 0.178966 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -0.0105426u^{10} - 0.446387u^9 + \cdots + 1.58215u + 1.43610 \\ 0.266135u^{10} + 0.170995u^9 + \cdots + 1.93829u - 0.618668 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -1.32142u^{10} - 4.41425u^9 + \cdots - 3.51967u + 3.51530 \\ 0.286192u^{10} + 0.459244u^9 + \cdots + 2.97711u - 0.204423 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -\frac{9564}{3889}u^{10} - \frac{28859}{3889}u^9 - \frac{63016}{3889}u^8 - \frac{109107}{3889}u^7 - \frac{66615}{3889}u^6 - \frac{107750}{3889}u^5 + \frac{13439}{3889}u^4 - \frac{81002}{3889}u^3 + \frac{23490}{3889}u^2 + \frac{22170}{3889}u + \frac{11276}{3889}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{11} - 8u^{10} + \cdots - 16u^2 - 1$ |
| $c_2$ | $u^{11} + 6u^{10} + 14u^9 + 16u^8 + 8u^7 - u^6 - 3u^5 - 4u^4 - 7u^3 - 8u^2 - 4u - 1$ |
| $c_3$ | $u^{11} + 3u^{10} + \cdots + 5u + 1$ |
| $c_4$ | $u^{11} + 2u^{10} + \cdots + 2u - 1$ |
| $c_5$ | $u^{11} - 6u^{10} + 14u^9 - 16u^8 + 8u^7 + u^6 - 3u^5 + 4u^4 - 7u^3 + 8u^2 - 4u + 1$ |
| $c_6$ | $u^{11} - 3u^{10} + u^9 + 7u^8 - 8u^7 - 5u^6 + 12u^5 + 2u^4 - 10u^3 + 5u - 1$ |
| $c_7$ | $u^{11} - 3u^9 - 4u^8 + 2u^7 + 11u^6 + 12u^5 - 5u^4 - 11u^3 - 10u^2 + 7u - 1$ |
| $c_8$ | $u^{11} + 3u^{10} + 7u^9 + 13u^8 + 11u^7 + 19u^6 + 6u^5 + 18u^4 + 6u^2 - 2u + 1$ |
| $c_9$ | $u^{11} + 3u^{10} + u^9 - 7u^8 - 8u^7 + 5u^6 + 12u^5 - 2u^4 - 10u^3 + 5u + 1$ |
| $c_{10}$ | $u^{11} + 3u^{10} + 4u^9 + 7u^8 + 6u^7 + 8u^6 + u^5 + 6u^4 + 2u^3 + 2u^2 + 1$ |
| $c_{11}$ | $u^{11} - 3u^9 + 4u^8 + 2u^7 - 11u^6 + 12u^5 + 5u^4 - 11u^3 + 10u^2 + 7u + 1$ |
| $c_{12}$ | $u^{11} - u^{10} + 11u^9 + 26u^7 + 29u^6 + 35u^5 + 42u^4 + 37u^3 + 14u^2 + 4u - 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{11} - 24y^{10} + \cdots - 32y - 1$ |
| $c_2, c_5$ | $y^{11} - 8y^{10} + \cdots - 16y^2 - 1$ |
| $c_3$ | $y^{11} + y^{10} + \cdots + 7y - 1$ |
| $c_4$ | $y^{11} + 2y^{10} + \cdots - 2y - 1$ |
| $c_6, c_9$ | $y^{11} - 7y^{10} + \cdots + 25y - 1$ |
| $c_7, c_{11}$ | $y^{11} - 6y^{10} + \cdots + 29y - 1$ |
| $c_8$ | $y^{11} + 5y^{10} + \cdots - 8y - 1$ |
| $c_{10}$ | $y^{11} - y^{10} + \cdots - 4y - 1$ |
| $c_{12}$ | $y^{11} + 21y^{10} + \cdots + 44y - 1$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.480135 + 0.881380I$<br>$a = -0.153776 - 0.485356I$<br>$b = -1.41525 - 0.50524I$ | $-2.33883 + 7.37149I$ | $-3.11706 - 6.99331I$ |
| $u = 0.480135 - 0.881380I$<br>$a = -0.153776 + 0.485356I$<br>$b = -1.41525 + 0.50524I$ | $-2.33883 - 7.37149I$ | $-3.11706 + 6.99331I$ |
| $u = -0.264154 + 0.702912I$<br>$a = 1.116630 + 0.190741I$<br>$b = 1.138780 - 0.052004I$ | $1.51158 - 1.27486I$ | $-4.85663 + 8.07328I$ |
| $u = -0.264154 - 0.702912I$<br>$a = 1.116630 - 0.190741I$<br>$b = 1.138780 + 0.052004I$ | $1.51158 + 1.27486I$ | $-4.85663 - 8.07328I$ |
| $u = -0.484263 + 1.208900I$<br>$a = 0.410507 - 0.693136I$<br>$b = -0.113275 - 0.961423I$ | $-1.13538 - 3.62559I$ | $-3.13967 + 10.18749I$ |
| $u = -0.484263 - 1.208900I$<br>$a = 0.410507 + 0.693136I$<br>$b = -0.113275 + 0.961423I$ | $-1.13538 + 3.62559I$ | $-3.13967 - 10.18749I$ |
| $u = 0.241024 + 0.302729I$<br>$a = 0.11240 - 3.01728I$<br>$b = 0.661755 - 0.219226I$ | $4.85889 + 2.59846I$ | $5.06519 + 2.32360I$ |
| $u = 0.241024 - 0.302729I$<br>$a = 0.11240 + 3.01728I$<br>$b = 0.661755 + 0.219226I$ | $4.85889 - 2.59846I$ | $5.06519 - 2.32360I$ |
| $u = -0.34106 + 1.71658I$<br>$a = -0.189096 - 1.101710I$<br>$b = -0.12085 - 2.27707I$ | $-9.52186 - 4.70907I$ | $-4.95123 + 4.90980I$ |
| $u = -0.34106 - 1.71658I$<br>$a = -0.189096 + 1.101710I$<br>$b = -0.12085 + 2.27707I$ | $-9.52186 + 4.70907I$ | $-4.95123 - 4.90980I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -2.26337$<br>$a = \quad 0.406666$<br>$b = -2.30231$ | $-3.19814$ | $-36.0010$ |

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

**(i) Arc colorings**

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

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

**(iii) Cusp Shapes** $= -12$

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

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

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

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

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

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -1.00000$<br>$a = \phantom{-}1.00000$<br>$b = -1.00000$ | $-3.28987$ | $-12.0000$ |

**IV.** $\boldsymbol{I_4^u = \langle -2u^3 - 2u^2 + 2b - 3u - 3,\ -2u^3 + a - 3u - 2,\ 2u^4 + 3u^2 + 2u + 1 \rangle}$

**(i) Arc colorings**

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 2u^3 + 3u + 2 \\ u^3 + u^2 + \frac{3}{2}u + \frac{3}{2} \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} -3u^3 + u^2 - \frac{7}{2}u - \frac{3}{2} \\ -u^3 - \frac{1}{2}u - \frac{3}{2} \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -2u^3 - 3u - 2 \\ -u^3 - u^2 - \frac{1}{2}u - \frac{3}{2} \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -2u^3 - 3u - 2 \\ -u^3 - u^2 - \frac{3}{2}u - \frac{3}{2} \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -u^3 + u^2 - \frac{5}{2}u - \frac{1}{2} \\ -1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -2u^2 - 1 \\ u^3 - u^2 + \frac{3}{2}u + \frac{1}{2} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -u^3 + u^2 - \frac{5}{2}u - \frac{3}{2} \\ -1 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u^3 + u^2 - \frac{5}{2}u - \frac{1}{2} \\ -1 \end{pmatrix}$$

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

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

**(iii) Cusp Shapes** $= -4$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_{11}$ | $(u-1)^4$ |
| $c_3, c_4$ | $u^4 + 2u^3 + 5u^2 + 4u + 2$ |
| $c_5, c_7$ | $(u+1)^4$ |
| $c_6, c_9, c_{12}$ | $(u^2-2)^2$ |
| $c_8$ | $2(2u^4 + 3u^2 + 2u + 1)$ |
| $c_{10}$ | $2(2u^4 + 3u^2 - 2u + 1)$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_5$ $c_7, c_{11}$ | $(y-1)^4$ |
| $c_3, c_4$ | $y^4+6y^3+13y^2+4y+4$ |
| $c_6, c_9, c_{12}$ | $(y-2)^4$ |
| $c_8, c_{10}$ | $4(4y^4+12y^3+13y^2+2y+1)$ |

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

| Solutions to $I_4^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.353553 + 1.257820I$<br>$a = -0.207107 + 0.736813I$<br>$b = -1.06066 + 1.25782I$ | 1.64493 | −4.00000 |
| $u = 0.353553 - 1.257820I$<br>$a = -0.207107 - 0.736813I$<br>$b = -1.06066 - 1.25782I$ | 1.64493 | −4.00000 |
| $u = -0.353553 + 0.409748I$<br>$a = 1.20711 + 1.39897I$<br>$b = 1.060660 + 0.409748I$ | 1.64493 | −4.00000 |
| $u = -0.353553 - 0.409748I$<br>$a = 1.20711 - 1.39897I$<br>$b = 1.060660 - 0.409748I$ | 1.64493 | −4.00000 |

## V. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $((u-1)^5)(u^{11}-8u^{10}+\cdots-16u^2-1)$<br>$\cdot(u^{41}+62u^{40}+\cdots+20980954u+3066001)$ |
| $c_2$ | $(u-1)^5$<br>$\cdot(u^{11}+6u^{10}+14u^9+16u^8+8u^7-u^6-3u^5-4u^4-7u^3-8u^2-4u-1)$<br>$\cdot(u^{41}-2u^{40}+\cdots-994u+1751)$ |
| $c_3$ | $(u+1)(u^4+2u^3+\cdots+4u+2)(u^{11}+3u^{10}+\cdots+5u+1)$<br>$\cdot(u^{41}-7u^{40}+\cdots-32u+2)$ |
| $c_4$ | $(u-1)(u^4+2u^3+\cdots+4u+2)(u^{11}+2u^{10}+\cdots+2u-1)$<br>$\cdot(u^{41}+8u^{40}+\cdots+202u+482)$ |
| $c_5$ | $(u+1)^5$<br>$\cdot(u^{11}-6u^{10}+14u^9-16u^8+8u^7+u^6-3u^5+4u^4-7u^3+8u^2-4u+1)$<br>$\cdot(u^{41}-2u^{40}+\cdots-994u+1751)$ |
| $c_6$ | $u(u^2-2)^2$<br>$\cdot(u^{11}-3u^{10}+u^9+7u^8-8u^7-5u^6+12u^5+2u^4-10u^3+5u-1)$<br>$\cdot(u^{41}-4u^{40}+\cdots-532u-484)$ |
| $c_7$ | $(u-1)(u+1)^4$<br>$\cdot(u^{11}-3u^9-4u^8+2u^7+11u^6+12u^5-5u^4-11u^3-10u^2+7u-1)$<br>$\cdot(u^{41}-18u^{39}+\cdots-147u-9)$ |
| $c_8$ | $4(u+1)(2u^4+3u^2+2u+1)$<br>$\cdot(u^{11}+3u^{10}+7u^9+13u^8+11u^7+19u^6+6u^5+18u^4+6u^2-2u+1)$<br>$\cdot(2u^{41}+59u^{39}+\cdots-792u+139)$ |
| $c_9$ | $u(u^2-2)^2$<br>$\cdot(u^{11}+3u^{10}+u^9-7u^8-8u^7+5u^6+12u^5-2u^4-10u^3+5u+1)$<br>$\cdot(u^{41}-4u^{40}+\cdots-532u-484)$ |
| $c_{10}$ | $4(u+1)(2u^4+3u^2-2u+1)$<br>$\cdot(u^{11}+3u^{10}+4u^9+7u^8+6u^7+8u^6+u^5+6u^4+2u^3+2u^2+1)$<br>$\cdot(2u^{41}+4u^{40}+\cdots+12u-1)$ |
| $c_{11}$ | $(u-1)^4(u+1)$<br>$\cdot(u^{11}-3u^9+4u^8+2u^7-11u^6+12u^5+5u^4-11u^3+10u^2+7u+1)$<br>$\cdot(u^{41}-18u^{39}+\cdots-147u-9)$ |
| $c_{12}$ | $u(u^2-2)^2$<br>$\cdot(u^{11}-u^{10}+11u^9+26u^7+29u^6+35u^5+42u^4+37u^3+14u^2+4u-1)$<br>$\cdot(u^{41}+50u^{39}+\cdots+3836088u+323212)$ |

## VI. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $((y-1)^5)(y^{11}-24y^{10}+\cdots-32y-1)$<br>$\cdot(y^{41}-174y^{40}+\cdots-176579932485582y-9400362132001)$ |
| $c_2, c_5$ | $((y-1)^5)(y^{11}-8y^{10}+\cdots-16y^2-1)$<br>$\cdot(y^{41}-62y^{40}+\cdots+20980954y-3066001)$ |
| $c_3$ | $(y-1)(y^4+6y^3+\cdots+4y+4)(y^{11}+y^{10}+\cdots+7y-1)$<br>$\cdot(y^{41}-7y^{40}+\cdots+68y-4)$ |
| $c_4$ | $(y-1)(y^4+6y^3+\cdots+4y+4)(y^{11}+2y^{10}+\cdots-2y-1)$<br>$\cdot(y^{41}+26y^{40}+\cdots-2659360y-232324)$ |
| $c_6, c_9$ | $y(y-2)^4(y^{11}-7y^{10}+\cdots+25y-1)$<br>$\cdot(y^{41}+50y^{39}+\cdots-1201888y-234256)$ |
| $c_7, c_{11}$ | $((y-1)^5)(y^{11}-6y^{10}+\cdots+29y-1)(y^{41}-36y^{40}+\cdots+6831y-81)$ |
| $c_8$ | $16(y-1)(4y^4+12y^3+\cdots+2y+1)(y^{11}+5y^{10}+\cdots-8y-1)$<br>$\cdot(4y^{41}+236y^{40}+\cdots-158364y-19321)$ |
| $c_{10}$ | $16(y-1)(4y^4+12y^3+\cdots+2y+1)(y^{11}-y^{10}+\cdots-4y-1)$<br>$\cdot(4y^{41}+36y^{40}+\cdots+32y-1)$ |
| $c_{12}$ | $y(y-2)^4(y^{11}+21y^{10}+\cdots+44y-1)$<br>$\cdot(y^{41}+100y^{40}+\cdots+6045979389712y-104465996944)$ |