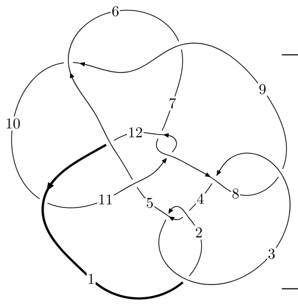
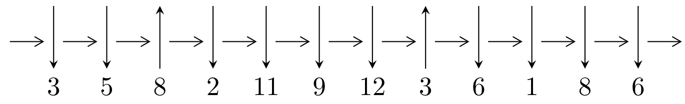
# $12n_{0254}$ ($K12n_{0254}$)




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle 2.85386 \times 10^{22} u^{20} - 1.50646 \times 10^{23} u^{19} + \cdots + 1.12972 \times 10^{24} b + 1.18141 \times 10^{25},$$
$$4.93819 \times 10^{24} u^{20} - 2.24476 \times 10^{25} u^{19} + \cdots + 2.48538 \times 10^{25} a + 6.80715 \times 10^{26},$$
$$u^{21} - 5u^{20} + \cdots + 528u - 64\rangle$$
$$I_2^u = \langle -271u^5a^3 - 2553u^5a^2 + \cdots + 3664a - 2027,\ -2u^5a^3 + u^5a^2 + \cdots - 4a - 2,\ u^6 + u^5 - u^4 - 2u^3 + u + 1\rangle$$
$$I_3^u = \langle -17u^{10} + 21u^9 + 46u^8 + 6u^7 - 188u^6 - 125u^5 + 284u^4 + 136u^3 + 86u^2 + 356b - 512u + 71,$$
$$-617u^{10} + 202u^9 + \cdots + 178a - 1470,\ u^{11} - 3u^9 + 2u^7 + 5u^6 + u^5 - 4u^4 + 6u^3 - 2u^2 + u + 1\rangle$$

$$I_1^v = \langle a,\ b + 2v + 2,\ 4v^2 + 6v + 1\rangle$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 58 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.** $\boldsymbol{I^u_1 = \langle 2.85\times10^{22}u^{20} - 1.51\times10^{23}u^{19} + \cdots + 1.13\times10^{24}b + 1.18\times10^{25},\ 4.94\times10^{24}u^{20} - 2.24\times10^{25}u^{19} + \cdots + 2.49\times10^{25}a + 6.81\times10^{26},\ u^{21} - 5u^{20} + \cdots + 528u - 64\rangle}$

**(i) Arc colorings**

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

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

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

$$a_{12} = \begin{pmatrix} -0.198690u^{20} + 0.903187u^{19} + \cdots + 168.839u - 27.3888 \\ -0.0252617u^{20} + 0.133349u^{19} + \cdots + 44.8453u - 10.4576 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -0.0389223u^{20} + 0.169523u^{19} + \cdots + 22.6922u - 1.25931 \\ -0.204843u^{20} + 0.945787u^{19} + \cdots + 195.515u - 36.3690 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -0.256774u^{20} + 1.17458u^{19} + \cdots + 228.962u - 39.2339 \\ -0.169105u^{20} + 0.785773u^{19} + \cdots + 165.000u - 30.9802 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.126591u^{20} + 0.558334u^{19} + \cdots + 86.6544u - 10.5130 \\ 0.416280u^{20} - 1.91677u^{19} + \cdots - 391.813u + 72.1250 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -0.223951u^{20} + 1.03654u^{19} + \cdots + 213.684u - 37.8464 \\ -0.0252617u^{20} + 0.133349u^{19} + \cdots + 44.8453u - 10.4576 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -0.500539u^{20} + 2.28989u^{19} + \cdots + 447.169u - 77.8622 \\ -0.373948u^{20} + 1.73156u^{19} + \cdots + 360.515u - 67.3492 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.126591u^{20} + 0.558334u^{19} + \cdots + 86.6544u - 10.5130 \\ 0.373948u^{20} - 1.73156u^{19} + \cdots - 360.515u + 67.3492 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u \\ -u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.0720983u^{20} - 0.344853u^{19} + \cdots - 82.1841u + 17.8758 \\ 0.441542u^{20} - 2.05012u^{19} + \cdots - 436.659u + 82.5826 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= \frac{5901169089837214436323269 7}{4970756710935323909775468 8}u^{20} - \frac{27817798792123811415926084 1}{4970756710935323909775468 8}u^{19} + \cdots - \frac{1571705307045613219526430018 5}{1242689177733830977443867 2}u + \frac{3802892543306374073195196 49}{1553361472167288721804834}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{21}+11u^{20}+\cdots+2416u+256$ |
| $c_2, c_4$ | $u^{21}-3u^{20}+\cdots-12u+16$ |
| $c_3, c_8$ | $u^{21}+5u^{20}+\cdots+528u+64$ |
| $c_5, c_7, c_{11}$ | $u^{21}-u^{20}+\cdots-2u+1$ |
| $c_6, c_9, c_{12}$ | $u^{21}-15u^{19}+\cdots+3u-1$ |
| $c_{10}$ | $u^{21}-19u^{20}+\cdots+96u-64$ |

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

| Crossings | Riley Polynomials at each crossing |
| --- | --- |
| $c_1$ | $y^{21} + y^{20} + \cdots - 37120y - 65536$ |
| $c_2, c_4$ | $y^{21} - 11y^{20} + \cdots + 2416y - 256$ |
| $c_3, c_8$ | $y^{21} - 9y^{20} + \cdots + 54016y - 4096$ |
| $c_5, c_7, c_{11}$ | $y^{21} + 13y^{20} + \cdots + 46y^2 - 1$ |
| $c_6, c_9, c_{12}$ | $y^{21} - 30y^{20} + \cdots + 41y - 1$ |
| $c_{10}$ | $y^{21} - 11y^{20} + \cdots + 115712y - 4096$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.121943 + 0.682474I$<br>$a = 0.563394 - 0.200224I$<br>$b = 0.242967 + 0.329112I$ | $-0.472540 - 0.941822I$ | $-7.59562 + 7.26185I$ |
| $u = -0.121943 - 0.682474I$<br>$a = 0.563394 + 0.200224I$<br>$b = 0.242967 - 0.329112I$ | $-0.472540 + 0.941822I$ | $-7.59562 - 7.26185I$ |
| $u = 0.603944$<br>$a = 0.453168$<br>$b = 0.799712$ | $-1.50093$ | $-5.01190$ |
| $u = 0.536882 + 1.288830I$<br>$a = 0.332371 + 0.204687I$<br>$b = -0.203835 - 0.523003I$ | $-7.32268 + 3.73921I$ | $-2.18512 - 2.93436I$ |
| $u = 0.536882 - 1.288830I$<br>$a = 0.332371 - 0.204687I$<br>$b = -0.203835 + 0.523003I$ | $-7.32268 - 3.73921I$ | $-2.18512 + 2.93436I$ |
| $u = -0.45031 + 1.42697I$<br>$a = 0.401321 - 0.196262I$<br>$b = -0.169622 + 1.002850I$ | $-0.856656 + 0.283512I$ | $-6.72739 - 0.35031I$ |
| $u = -0.45031 - 1.42697I$<br>$a = 0.401321 + 0.196262I$<br>$b = -0.169622 - 1.002850I$ | $-0.856656 - 0.283512I$ | $-6.72739 + 0.35031I$ |
| $u = 1.39749 + 0.58008I$<br>$a = 0.000890 + 1.116300I$<br>$b = 0.416233 - 1.089790I$ | $-3.89482 + 3.14186I$ | $-8.38778 - 3.45220I$ |
| $u = 1.39749 - 0.58008I$<br>$a = 0.000890 - 1.116300I$<br>$b = 0.416233 + 1.089790I$ | $-3.89482 - 3.14186I$ | $-8.38778 + 3.45220I$ |
| $u = 0.452501$<br>$a = 2.15908$<br>$b = -0.287661$ | $-2.05646$ | $-0.974600$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.68409 + 1.39512I$<br>$a = 0.435024 + 0.190053I$<br>$b = -0.549126 - 1.238180I$ | $-2.93350 - 6.63406I$ | $-8.79219 + 4.92171I$ |
| $u = 0.68409 - 1.39512I$<br>$a = 0.435024 - 0.190053I$<br>$b = -0.549126 + 1.238180I$ | $-2.93350 + 6.63406I$ | $-8.79219 - 4.92171I$ |
| $u = 1.30096 + 0.91198I$<br>$a = 0.393242 + 1.276420I$<br>$b = 0.90620 - 1.50613I$ | $-0.8291 + 14.7385I$ | $-8.45146 - 7.52643I$ |
| $u = 1.30096 - 0.91198I$<br>$a = 0.393242 - 1.276420I$<br>$b = 0.90620 + 1.50613I$ | $-0.8291 - 14.7385I$ | $-8.45146 + 7.52643I$ |
| $u = -1.42639 + 0.82761I$<br>$a = 0.254534 - 1.154900I$<br>$b = 0.63940 + 1.47836I$ | $2.34232 - 8.31871I$ | $-5.94131 + 4.58592I$ |
| $u = -1.42639 - 0.82761I$<br>$a = 0.254534 + 1.154900I$<br>$b = 0.63940 - 1.47836I$ | $2.34232 + 8.31871I$ | $-5.94131 - 4.58592I$ |
| $u = 0.334496$<br>$a = 0.508543$<br>$b = -1.69359$ | $-10.4004$ | $21.7570$ |
| $u = 1.62920 + 0.48052I$<br>$a = -0.319293 - 1.001180I$<br>$b = -0.737374 + 0.986244I$ | $5.91302 + 6.12351I$ | $-10.80009 - 6.57387I$ |
| $u = 1.62920 - 0.48052I$<br>$a = -0.319293 + 1.001180I$<br>$b = -0.737374 - 0.986244I$ | $5.91302 - 6.12351I$ | $-10.80009 + 6.57387I$ |
| $u = -1.74543 + 0.04421I$<br>$a = -0.121882 + 0.958359I$<br>$b = -0.454067 - 1.159470I$ | $6.80819 + 0.98118I$ | $-9.12937 - 0.92113I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.74543-0.04421I$ | | |
| $a=-0.121882-0.958359I$ | $6.80819-0.98118I$ | $-9.12937+0.92113I$ |
| $b=-0.454067+1.159470I$ | | |

**II.** $\boldsymbol{I^u_2 = \langle -271u^5a^3 - 2553u^5a^2 + \cdots + 3664a - 2027,\ -2u^5a^3 + u^5a^2 + \cdots - 4a - 2,\ u^6 + u^5 - u^4 - 2u^3 + u + 1\rangle}$

**(i) Arc colorings**

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} a \\ 0.110657a^3u^5 + 1.04247a^2u^5 + \cdots - 1.49612a + 0.827685 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 0.518579a^3u^5 + 0.461004a^2u^5 + \cdots + 0.0661494a + 0.956309 \\ -1.96366a^3u^5 - 0.801552a^2u^5 + \cdots - 1.76072a - 1.99755 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -0.518579a^3u^5 - 0.461004a^2u^5 + \cdots - 0.0661494a - 0.956309 \\ -0.110657a^3u^5 - 1.04247a^2u^5 + \cdots + 1.49612a + 0.172315 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^2 - 1 \\ u^2 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 0.110657a^3u^5 + 1.04247a^2u^5 + \cdots - 0.496121a + 0.827685 \\ 0.110657a^3u^5 + 1.04247a^2u^5 + \cdots - 1.49612a + 0.827685 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u^4 + u^2 - 1 \\ -u^4 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^2 - 1 \\ u^4 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ -u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -1.32993a^3u^5 + 1.68150a^2u^5 + \cdots - 2.77909a + 0.292364 \\ -1.44059a^3u^5 + 0.639036a^2u^5 + \cdots - 2.28297a - 0.535321 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -4u^4 + 4u^2 + 4u - 10$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u^6 + 3u^5 + 5u^4 + 4u^3 + 2u^2 + u + 1)^4$ |
| $c_2, c_3, c_4$<br>$c_8$ | $(u^6 - u^5 - u^4 + 2u^3 - u + 1)^4$ |
| $c_5, c_7, c_{11}$ | $u^{24} + 3u^{23} + \cdots + 418u + 319$ |
| $c_6, c_9, c_{12}$ | $u^{24} - 3u^{23} + \cdots - 38u + 181$ |
| $c_{10}$ | $(u^2 + u - 1)^{12}$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $(y^6 + y^5 + 5y^4 + 6y^2 + 3y + 1)^4$ |
| $c_2, c_3, c_4$ $c_8$ | $(y^6 - 3y^5 + 5y^4 - 4y^3 + 2y^2 - y + 1)^4$ |
| $c_5, c_7, c_{11}$ | $y^{24} + 11y^{23} + \cdots + 621500y + 101761$ |
| $c_6, c_9, c_{12}$ | $y^{24} - 13y^{23} + \cdots - 152760y + 32761$ |
| $c_{10}$ | $(y^2 - 3y + 1)^{12}$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.002190 + 0.295542I$<br>$a = -0.642556 - 0.992563I$<br>$b = -0.61676 + 1.29086I$ | $5.83845 + 0.92430I$ | $-4.28328 - 0.79423I$ |
| $u = 1.002190 + 0.295542I$<br>$a = 0.85932 - 1.36236I$<br>$b = 0.022966 + 0.740302I$ | $-2.05724 + 0.92430I$ | $-4.28328 - 0.79423I$ |
| $u = 1.002190 + 0.295542I$<br>$a = 0.30955 + 1.60690I$<br>$b = 0.04999 - 1.65697I$ | $5.83845 + 0.92430I$ | $-4.28328 - 0.79423I$ |
| $u = 1.002190 + 0.295542I$<br>$a = 0.012501 - 0.246000I$<br>$b = 1.46084 + 0.21819I$ | $-2.05724 + 0.92430I$ | $-4.28328 - 0.79423I$ |
| $u = 1.002190 - 0.295542I$<br>$a = -0.642556 + 0.992563I$<br>$b = -0.61676 - 1.29086I$ | $5.83845 - 0.92430I$ | $-4.28328 + 0.79423I$ |
| $u = 1.002190 - 0.295542I$<br>$a = 0.85932 + 1.36236I$<br>$b = 0.022966 - 0.740302I$ | $-2.05724 - 0.92430I$ | $-4.28328 + 0.79423I$ |
| $u = 1.002190 - 0.295542I$<br>$a = 0.30955 - 1.60690I$<br>$b = 0.04999 + 1.65697I$ | $5.83845 - 0.92430I$ | $-4.28328 + 0.79423I$ |
| $u = 1.002190 - 0.295542I$<br>$a = 0.012501 + 0.246000I$<br>$b = 1.46084 - 0.21819I$ | $-2.05724 - 0.92430I$ | $-4.28328 + 0.79423I$ |
| $u = -0.428243 + 0.664531I$<br>$a = -1.40914 + 1.08956I$<br>$b = 0.634044 - 0.520697I$ | $-5.83845 + 0.92430I$ | $-11.71672 - 0.79423I$ |
| $u = -0.428243 + 0.664531I$<br>$a = -0.93092 - 1.84591I$<br>$b = 0.192218 - 1.006480I$ | $2.05724 + 0.92430I$ | $-11.71672 - 0.79423I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.428243+0.664531I$<br>$a=\ \ 2.36603+0.04486I$<br>$b=-0.032636+1.358240I$ | $2.05724+0.92430I$ | $-11.71672-0.79423I$ |
| $u=-0.428243+0.664531I$<br>$a=-2.34802+3.62566I$<br>$b=-1.051840-0.400227I$ | $-5.83845+0.92430I$ | $-11.71672-0.79423I$ |
| $u=-0.428243-0.664531I$<br>$a=-1.40914-1.08956I$<br>$b=\ \ 0.634044+0.520697I$ | $-5.83845-0.92430I$ | $-11.71672+0.79423I$ |
| $u=-0.428243-0.664531I$<br>$a=-0.93092+1.84591I$<br>$b=\ \ 0.192218+1.006480I$ | $2.05724-0.92430I$ | $-11.71672+0.79423I$ |
| $u=-0.428243-0.664531I$<br>$a=\ \ 2.36603-0.04486I$<br>$b=-0.032636-1.358240I$ | $2.05724-0.92430I$ | $-11.71672+0.79423I$ |
| $u=-0.428243-0.664531I$<br>$a=-2.34802-3.62566I$<br>$b=-1.051840+0.400227I$ | $-5.83845-0.92430I$ | $-11.71672+0.79423I$ |
| $u=-1.073950+0.558752I$<br>$a=\ \ 0.461962-1.241720I$<br>$b=\ \ 0.48362+1.59891I$ | $3.94784-5.69302I$ | $-8.00000+5.51057I$ |
| $u=-1.073950+0.558752I$<br>$a=-0.327999+0.551063I$<br>$b=-1.003490-0.857180I$ | $3.94784-5.69302I$ | $-8.00000+5.51057I$ |
| $u=-1.073950+0.558752I$<br>$a=-0.370228+0.210083I$<br>$b=\ \ 1.67733-0.62104I$ | $-3.94784-5.69302I$ | $-8.00000+5.51057I$ |
| $u=-1.073950+0.558752I$<br>$a=\ \ 0.01951+1.59808I$<br>$b=-0.316295-1.320830I$ | $-3.94784-5.69302I$ | $-8.00000+5.51057I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.073950-0.558752I$<br>$a=\ \ 0.461962+1.241720I$<br>$b=\ \ 0.48362-1.59891I$ | $3.94784+5.69302I$ | $-8.00000-5.51057I$ |
| $u=-1.073950-0.558752I$<br>$a=-0.327999-0.551063I$<br>$b=-1.003490+0.857180I$ | $3.94784+5.69302I$ | $-8.00000-5.51057I$ |
| $u=-1.073950-0.558752I$<br>$a=-0.370228-0.210083I$<br>$b=\ \ 1.67733+0.62104I$ | $-3.94784+5.69302I$ | $-8.00000-5.51057I$ |
| $u=-1.073950-0.558752I$<br>$a=\ \ 0.01951-1.59808I$<br>$b=-0.316295+1.320830I$ | $-3.94784+5.69302I$ | $-8.00000-5.51057I$ |

**III.** $\boldsymbol{I_3^u = \langle -17u^{10} + 21u^9 + \cdots + 356b + 71,\ -617u^{10} + 202u^9 + \cdots + 178a - 1470,\ u^{11} - 3u^9 + \cdots + u + 1\rangle}$

**(i) Arc colorings**

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

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

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

$$a_{12} = \begin{pmatrix} 3.46629u^{10} - 1.13483u^9 + \cdots - 13.9270u + 8.25843 \\ 0.0477528u^{10} - 0.0589888u^9 + \cdots + 1.43820u - 0.199438 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 2.36798u^{10} - 0.278090u^9 + \cdots - 9.50562u + 8.34551 \\ -0.00842697u^{10} + 0.216292u^9 + \cdots + 0.893258u + 0.0646067 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 2.99719u^{10} - 0.261236u^9 + \cdots - 10.7022u + 8.68820 \\ -0.0758427u^{10} + 0.446629u^9 + \cdots + 1.53933u + 0.0814607 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.705056u^{10} + 0.429775u^9 + \cdots + 2.73596u - 1.26124 \\ -0.0365169u^{10} + 0.103933u^9 + \cdots + 0.370787u + 0.446629 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 3.51404u^{10} - 1.19382u^9 + \cdots - 12.4888u + 8.05899 \\ 0.0477528u^{10} - 0.0589888u^9 + \cdots + 1.43820u - 0.199438 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0.637640u^{10} - 0.199438u^9 + \cdots - 2.08989u + 1.27809 \\ -0.0674157u^{10} + 0.230337u^9 + \cdots + 0.646067u + 0.0168539 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.705056u^{10} + 0.429775u^9 + \cdots + 2.73596u - 1.26124 \\ -0.0674157u^{10} + 0.230337u^9 + \cdots + 0.646067u + 0.0168539 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u \\ u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 4.17135u^{10} - 1.56461u^9 + \cdots - 16.6629u + 10.5197 \\ 0.0842697u^{10} - 0.162921u^9 + \cdots + 1.06742u - 0.646067 \end{pmatrix}$$

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

**(iii) Cusp Shapes**
$= \frac{1809}{356}u^{10} - \frac{507}{356}u^9 - \frac{2437}{178}u^8 + \frac{665}{178}u^7 + \frac{410}{89}u^6 + \frac{8485}{356}u^5 + \frac{653}{178}u^4 - \frac{2875}{178}u^3 + \frac{3149}{89}u^2 - \frac{4741}{178}u + \frac{2863}{356}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{11} - 6u^{10} + \cdots - 3u - 1$ |
| $c_2$ | $u^{11} + 4u^{10} + 5u^9 - 2u^8 - 11u^7 - 8u^6 + 4u^5 + 8u^4 + 2u^3 - 2u^2 - u - 1$ |
| $c_3$ | $u^{11} - 3u^9 + 2u^7 - 5u^6 + u^5 + 4u^4 + 6u^3 + 2u^2 + u - 1$ |
| $c_4$ | $u^{11} - 4u^{10} + 5u^9 + 2u^8 - 11u^7 + 8u^6 + 4u^5 - 8u^4 + 2u^3 + 2u^2 - u + 1$ |
| $c_5, c_{11}$ | $u^{11} + 3u^9 + 3u^8 + 3u^7 + 6u^6 + 3u^5 + 2u^4 + 2u^3 - 2u^2 - 3u - 1$ |
| $c_6, c_{12}$ | $u^{11} - 3u^{10} + 2u^9 + 2u^8 - 2u^7 + 3u^6 - 6u^5 + 3u^4 - 3u^3 + 3u^2 + 1$ |
| $c_7$ | $u^{11} + 3u^9 - 3u^8 + 3u^7 - 6u^6 + 3u^5 - 2u^4 + 2u^3 + 2u^2 - 3u + 1$ |
| $c_8$ | $u^{11} - 3u^9 + 2u^7 + 5u^6 + u^5 - 4u^4 + 6u^3 - 2u^2 + u + 1$ |
| $c_9$ | $u^{11} + 3u^{10} + 2u^9 - 2u^8 - 2u^7 - 3u^6 - 6u^5 - 3u^4 - 3u^3 - 3u^2 - 1$ |
| $c_{10}$ | $u^{11} - 5u^{10} + \cdots - 3u - 9$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{11} + 2y^{10} + \cdots + 25y - 1$ |
| $c_2, c_4$ | $y^{11} - 6y^{10} + \cdots - 3y - 1$ |
| $c_3, c_8$ | $y^{11} - 6y^{10} + \cdots + 5y - 1$ |
| $c_5, c_7, c_{11}$ | $y^{11} + 6y^{10} + \cdots + 5y - 1$ |
| $c_6, c_9, c_{12}$ | $y^{11} - 5y^{10} + \cdots - 6y - 1$ |
| $c_{10}$ | $y^{11} - 5y^{10} + \cdots + 369y - 81$ |

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

| Solutions to $I_3^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.625397 + 0.494839I$<br>$a = 0.438748 - 1.244100I$<br>$b = 0.821829 + 0.139209I$ | $-3.46083 + 0.46362I$ | $-10.64211 + 0.77158I$ |
| $u = 0.625397 - 0.494839I$<br>$a = 0.438748 + 1.244100I$<br>$b = 0.821829 - 0.139209I$ | $-3.46083 - 0.46362I$ | $-10.64211 - 0.77158I$ |
| $u = -0.564447 + 1.125840I$<br>$a = -0.247928 + 0.345446I$<br>$b = 0.522992 - 0.276078I$ | $-7.82119 - 3.76164I$ | $-18.6525 + 4.0849I$ |
| $u = -0.564447 - 1.125840I$<br>$a = -0.247928 - 0.345446I$<br>$b = 0.522992 + 0.276078I$ | $-7.82119 + 3.76164I$ | $-18.6525 - 4.0849I$ |
| $u = 0.145041 + 0.670202I$<br>$a = 0.32779 + 2.44730I$<br>$b = 0.101556 + 1.234860I$ | $2.75970 - 0.49193I$ | $-4.46246 - 4.43880I$ |
| $u = 0.145041 - 0.670202I$<br>$a = 0.32779 - 2.44730I$<br>$b = 0.101556 - 1.234860I$ | $2.75970 + 0.49193I$ | $-4.46246 + 4.43880I$ |
| $u = -1.50834 + 0.06577I$<br>$a = -0.223191 + 1.141650I$<br>$b = -0.44883 - 1.38945I$ | $7.91909 + 0.79075I$ | $-1.37905 - 0.86737I$ |
| $u = -1.50834 - 0.06577I$<br>$a = -0.223191 - 1.141650I$<br>$b = -0.44883 + 1.38945I$ | $7.91909 - 0.79075I$ | $-1.37905 + 0.86737I$ |
| $u = 1.48572 + 0.56088I$<br>$a = -0.448099 - 0.943396I$<br>$b = -0.619533 + 1.131030I$ | $6.75307 + 5.68255I$ | $-2.50294 - 2.90690I$ |
| $u = 1.48572 - 0.56088I$<br>$a = -0.448099 + 0.943396I$<br>$b = -0.619533 - 1.131030I$ | $6.75307 - 5.68255I$ | $-2.50294 + 2.90690I$ |

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.366747$<br>$a = \quad 17.3054$<br>$b = -0.756037$ | $-5.71995$ | $23.2780$ |

## IV. $I_1^v = \langle a,\ b + 2v + 2,\ 4v^2 + 6v + 1\rangle$

**(i) Arc colorings**

$$a_3 = \begin{pmatrix} v \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 0 \\ -2v-2 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ -2v-3 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -2v-2 \\ -2v-3 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 4v+5 \\ 4v+6 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -2v-2 \\ -2v-2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -4v-5 \\ -4v-6 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 5v+5 \\ 4v+6 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} v \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 4v+6 \\ 6v+8 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -\frac{45}{2}v - \frac{183}{4}$

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

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

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_4$ | $(y-1)^2$ |
| $c_3, c_8$ | $y^2$ |
| $c_5, c_7, c_{10}$ $c_{11}$ | $y^2 - 3y + 1$ |
| $c_6, c_9, c_{12}$ | $y^2 - 7y + 1$ |

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

| Solutions to $I_1^v$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $v = -1.30902$<br>$a = 0$<br>$b = 0.618034$ | $-2.63189$ | $-16.2970$ |
| $v = -0.190983$<br>$a = 0$<br>$b = -1.61803$ | $-10.5276$ | $-41.4530$ |

## V. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u-1)^2(u^6+3u^5+5u^4+4u^3+2u^2+u+1)^4$<br>$\cdot(u^{11}-6u^{10}+\cdots-3u-1)(u^{21}+11u^{20}+\cdots+2416u+256)$ |
| $c_2$ | $(u-1)^2(u^6-u^5-u^4+2u^3-u+1)^4$<br>$\cdot(u^{11}+4u^{10}+5u^9-2u^8-11u^7-8u^6+4u^5+8u^4+2u^3-2u^2-u-1)$<br>$\cdot(u^{21}-3u^{20}+\cdots-12u+16)$ |
| $c_3$ | $u^2(u^6-u^5-u^4+2u^3-u+1)^4$<br>$\cdot(u^{11}-3u^9+2u^7-5u^6+u^5+4u^4+6u^3+2u^2+u-1)$<br>$\cdot(u^{21}+5u^{20}+\cdots+528u+64)$ |
| $c_4$ | $(u+1)^2(u^6-u^5-u^4+2u^3-u+1)^4$<br>$\cdot(u^{11}-4u^{10}+5u^9+2u^8-11u^7+8u^6+4u^5-8u^4+2u^3+2u^2-u+1)$<br>$\cdot(u^{21}-3u^{20}+\cdots-12u+16)$ |
| $c_5$ | $(u^2+u-1)$<br>$\cdot(u^{11}+3u^9+3u^8+3u^7+6u^6+3u^5+2u^4+2u^3-2u^2-3u-1)$<br>$\cdot(u^{21}-u^{20}+\cdots-2u+1)(u^{24}+3u^{23}+\cdots+418u+319)$ |
| $c_6$ | $(u^2-3u+1)$<br>$\cdot(u^{11}-3u^{10}+2u^9+2u^8-2u^7+3u^6-6u^5+3u^4-3u^3+3u^2+1)$<br>$\cdot(u^{21}-15u^{19}+\cdots+3u-1)(u^{24}-3u^{23}+\cdots-38u+181)$ |
| $c_7$ | $(u^2+u-1)$<br>$\cdot(u^{11}+3u^9-3u^8+3u^7-6u^6+3u^5-2u^4+2u^3+2u^2-3u+1)$<br>$\cdot(u^{21}-u^{20}+\cdots-2u+1)(u^{24}+3u^{23}+\cdots+418u+319)$ |
| $c_8$ | $u^2(u^6-u^5-u^4+2u^3-u+1)^4$<br>$\cdot(u^{11}-3u^9+2u^7+5u^6+u^5-4u^4+6u^3-2u^2+u+1)$<br>$\cdot(u^{21}+5u^{20}+\cdots+528u+64)$ |
| $c_9$ | $(u^2+3u+1)$<br>$\cdot(u^{11}+3u^{10}+2u^9-2u^8-2u^7-3u^6-6u^5-3u^4-3u^3-3u^2-1)$<br>$\cdot(u^{21}-15u^{19}+\cdots+3u-1)(u^{24}-3u^{23}+\cdots-38u+181)$ |
| $c_{10}$ | $((u^2+u-1)^{13})(u^{11}-5u^{10}+\cdots-3u-9)(u^{21}-19u^{20}+\cdots+96u-64)$ |
| $c_{11}$ | $(u^2-u-1)$<br>$\cdot(u^{11}+3u^9+3u^8+3u^7+6u^6+3u^5+2u^4+2u^3-2u^2-3u-1)$<br>$\cdot(u^{21}-u^{20}+\cdots-2u+1)(u^{24}+3u^{23}+\cdots+418u+319)$ |
| $c_{12}$ | $(u^2+3u+1)$<br>$\cdot(u^{11}-3u^{10}+2u^9+2u^8-2u^7+3u^6-6u^5+3u^4-3u^3+3u^2+1)$<br>$\cdot(u^{21}-15u^{19}+\cdots+3u-1)(u^{24}-3u^{23}+\cdots-38u+181)$ |

## VI. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $((y-1)^2)(y^6+y^5+\cdots+3y+1)^4(y^{11}+2y^{10}+\cdots+25y-1)$ $\cdot(y^{21}+y^{20}+\cdots-37120y-65536)$ |
| $c_2, c_4$ | $(y-1)^2(y^6-3y^5+5y^4-4y^3+2y^2-y+1)^4$ $\cdot(y^{11}-6y^{10}+\cdots-3y-1)(y^{21}-11y^{20}+\cdots+2416y-256)$ |
| $c_3, c_8$ | $y^2(y^6-3y^5+\cdots-y+1)^4(y^{11}-6y^{10}+\cdots+5y-1)$ $\cdot(y^{21}-9y^{20}+\cdots+54016y-4096)$ |
| $c_5, c_7, c_{11}$ | $(y^2-3y+1)(y^{11}+6y^{10}+\cdots+5y-1)(y^{21}+13y^{20}+\cdots+46y^2-1)$ $\cdot(y^{24}+11y^{23}+\cdots+621500y+101761)$ |
| $c_6, c_9, c_{12}$ | $(y^2-7y+1)(y^{11}-5y^{10}+\cdots-6y-1)(y^{21}-30y^{20}+\cdots+41y-1)$ $\cdot(y^{24}-13y^{23}+\cdots-152760y+32761)$ |
| $c_{10}$ | $((y^2-3y+1)^{13})(y^{11}-5y^{10}+\cdots+369y-81)$ $\cdot(y^{21}-11y^{20}+\cdots+115712y-4096)$ |