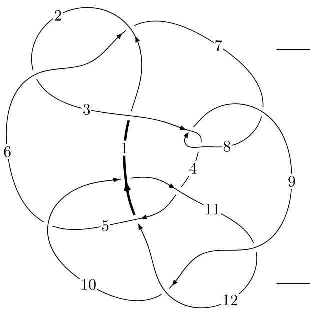
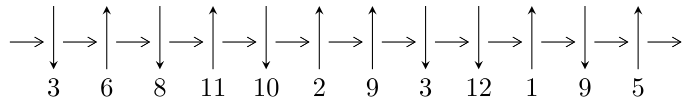
$12n_{0422}$ ($K12n_{0422}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u = \langle &-8.28749 \times 10^{71} u^{53} - 2.33614 \times 10^{73} u^{52} + \cdots + 3.81141 \times 10^{75} b + 2.99444 \times 10^{75}, \\
&- 5.98664 \times 10^{75} u^{53} + 1.19971 \times 10^{76} u^{52} + \cdots + 6.47940 \times 10^{76} a + 3.22020 \times 10^{76}, \\
&u^{54} - 2u^{53} + \cdots - 112u + 17 \rangle \\
I_2^u = \langle &-58u^{17} - 4u^{16} + \cdots + 69b - 127u,\ 4u^{16} - 58u^{15} + \cdots + 69a - 220,\ u^{18} + 6u^{16} + \cdots + 3u + 1 \rangle \\
I_3^u = \langle &-4a^4u + 18a^3u + 16a^3 + 9a^2u - 54a^2 - 52au + 5b + 19a + 13u + 16, \\
&a^5 + 5a^4u - 5a^4 - 20a^3u - 4a^3 + 8a^2u + 27a^2 + 14au - 12a - 4u - 3,\ u^2 + 1 \rangle \\
I_4^u = \langle &-u^3 - 2u^2 + 4b - 3u - 3,\ -3u^3 - 2u^2 + 4a - u + 3,\ u^4 + u^3 + u^2 + 1 \rangle
\end{aligned}$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 86 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. $I_1^u = \langle -8.29\times10^{71}u^{53} - 2.34\times10^{73}u^{52} + \cdots + 3.81\times10^{75}b + 2.99\times10^{75},\ -5.99\times10^{75}u^{53} + 1.20\times10^{76}u^{52} + \cdots + 6.48\times10^{76}a + 3.22\times10^{76},\ u^{54} - 2u^{53} + \cdots - 112u + 17\rangle$

(i) Arc colorings

$$a_3 = \begin{pmatrix}1\\0\end{pmatrix}$$

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

$$a_4 = \begin{pmatrix}1\\u^2\end{pmatrix}$$

$$a_{11} = \begin{pmatrix}0.0923949u^{53} - 0.185157u^{52} + \cdots + 40.8873u - 0.496990\\0.000217439u^{53} + 0.00612933u^{52} + \cdots - 0.304074u - 0.785651\end{pmatrix}$$

$$a_5 = \begin{pmatrix}0.0305442u^{53} - 0.0451577u^{52} + \cdots + 24.5663u - 1.15616\\-0.0138523u^{53} + 0.00619132u^{52} + \cdots - 0.901321u - 0.406547\end{pmatrix}$$

$$a_9 = \begin{pmatrix}-u\\u\end{pmatrix}$$

$$a_{12} = \begin{pmatrix}0.0985707u^{53} - 0.190389u^{52} + \cdots + 41.7676u - 0.391645\\-0.00595836u^{53} + 0.0113616u^{52} + \cdots - 1.18445u - 0.890996\end{pmatrix}$$

$$a_{10} = \begin{pmatrix}-0.0179807u^{53} + 0.0629584u^{52} + \cdots - 19.1557u + 6.53660\\0.0110158u^{53} - 0.0169178u^{52} + \cdots + 5.55246u - 1.06284\end{pmatrix}$$

$$a_6 = \begin{pmatrix}0.0249321u^{53} - 0.0384523u^{52} + \cdots + 38.2889u - 5.30849\\-0.0248738u^{53} + 0.0481071u^{52} + \cdots - 11.7942u + 1.11363\end{pmatrix}$$

$$a_1 = \begin{pmatrix}0.0752792u^{53} - 0.116667u^{52} + \cdots + 7.64721u + 4.45628\\-0.00164042u^{53} + 0.00683312u^{52} + \cdots - 1.67223u - 0.577146\end{pmatrix}$$

$$a_2 = \begin{pmatrix}0.0769197u^{53} - 0.123500u^{52} + \cdots + 9.31944u + 5.03343\\-0.00164042u^{53} + 0.00683312u^{52} + \cdots - 1.67223u - 0.577146\end{pmatrix}$$

$$a_7 = \begin{pmatrix}u^3\\-u^3 - u\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -0.0961909u^{53} + 0.214297u^{52} + \cdots - 61.1959u - 0.495059$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{54} + 20u^{53} + \cdots + 15886u + 289$
c_2, c_6	$u^{54} - 2u^{53} + \cdots - 20u + 17$
c_3, c_8	$u^{54} - 2u^{53} + \cdots - 112u + 17$
c_4	$2(2u^{54} - 3u^{53} + \cdots + 26787u + 17894)$
c_5	$2(2u^{54} - 11u^{53} + \cdots - 27633u + 3982)$
c_7	$u^{54} - 60u^{53} + \cdots - 17614u + 289$
c_9, c_{11}	$u^{54} - 4u^{53} + \cdots - 481u + 16$
c_{10}	$u^{54} + 8u^{53} + \cdots + 2976u + 256$
c_{12}	$u^{54} + 7u^{53} + \cdots + 8u + 4$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{54} + 40y^{53} + \cdots - 35600546y + 83521$
c_2, c_6	$y^{54} + 20y^{53} + \cdots + 15886y + 289$
c_3, c_8	$y^{54} + 60y^{53} + \cdots + 17614y + 289$
c_4	$4(4y^{54} - 205y^{53} + \cdots + 5.53025 \times 10^9 y + 3.20195 \times 10^8)$
c_5	$4(4y^{54} - 173y^{53} + \cdots + 1.70212 \times 10^8 y + 1.58563 \times 10^7)$
c_7	$y^{54} - 120y^{53} + \cdots - 34842354y + 83521$
c_9, c_{11}	$y^{54} - 32y^{53} + \cdots - 95457y + 256$
c_{10}	$y^{54} - 12y^{53} + \cdots - 1545216y + 65536$
c_{12}	$y^{54} + 17y^{53} + \cdots + 152y + 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.957433 + 0.281564I$ $a = -0.006064 + 0.203861I$ $b = -0.977124 - 0.024450I$	$-0.08167 + 4.27758I$	$0. - 6.47467I$
$u = -0.957433 - 0.281564I$ $a = -0.006064 - 0.203861I$ $b = -0.977124 + 0.024450I$	$-0.08167 - 4.27758I$	$0. + 6.47467I$
$u = 0.793853 + 0.517771I$ $a = -0.306183 - 1.163520I$ $b = -0.116628 + 0.088009I$	$1.69843 - 5.87991I$	$0.83203 + 7.69197I$
$u = 0.793853 - 0.517771I$ $a = -0.306183 + 1.163520I$ $b = -0.116628 - 0.088009I$	$1.69843 + 5.87991I$	$0.83203 - 7.69197I$
$u = 1.013690 + 0.409819I$ $a = 0.220672 + 0.502762I$ $b = 1.064360 - 0.405958I$	$-1.51017 - 11.89510I$	$0. + 8.55352I$
$u = 1.013690 - 0.409819I$ $a = 0.220672 - 0.502762I$ $b = 1.064360 + 0.405958I$	$-1.51017 + 11.89510I$	$0. - 8.55352I$
$u = 0.037687 + 0.876774I$ $a = 0.136169 - 0.748261I$ $b = 0.550636 + 0.960686I$	$1.21558 + 1.50306I$	$6.28567 - 3.87694I$
$u = 0.037687 - 0.876774I$ $a = 0.136169 + 0.748261I$ $b = 0.550636 - 0.960686I$	$1.21558 - 1.50306I$	$6.28567 + 3.87694I$
$u = 0.001197 + 1.155080I$ $a = 0.039928 - 0.931322I$ $b = -0.218113 - 0.358208I$	$-4.74660 + 4.32144I$	0
$u = 0.001197 - 1.155080I$ $a = 0.039928 + 0.931322I$ $b = -0.218113 + 0.358208I$	$-4.74660 - 4.32144I$	0

Solutions to I_1^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.904014+0.749313I$ $a=-0.058317-0.639795I$ $b=-0.223581-0.049635I$	$0.351082+0.581835I$	0
$u=-0.904014-0.749313I$ $a=-0.058317+0.639795I$ $b=-0.223581+0.049635I$	$0.351082-0.581835I$	0
$u=-0.409754+0.654267I$ $a=\ \ 0.291468-0.544174I$ $b=-0.353183+0.474337I$	$0.11724+1.46636I$	$1.51920-4.74355I$
$u=-0.409754-0.654267I$ $a=\ \ 0.291468+0.544174I$ $b=-0.353183-0.474337I$	$0.11724-1.46636I$	$1.51920+4.74355I$
$u=\ \ 0.897207+0.878746I$ $a=\ \ 0.058361-0.299184I$ $b=\ \ 0.522375-0.201536I$	$-8.36051-3.29219I$	0
$u=\ \ 0.897207-0.878746I$ $a=\ \ 0.058361+0.299184I$ $b=\ \ 0.522375+0.201536I$	$-8.36051+3.29219I$	0
$u=\ \ 0.611149+0.347151I$ $a=-1.294480+0.114710I$ $b=-0.647792-0.170688I$	$-3.32384-4.22762I$	$-7.57484+8.95989I$
$u=\ \ 0.611149-0.347151I$ $a=-1.294480-0.114710I$ $b=-0.647792+0.170688I$	$-3.32384+4.22762I$	$-7.57484-8.95989I$
$u=-0.483135+0.456682I$ $a=-1.53675+0.04736I$ $b=\ \ 2.67924+0.85527I$	$-1.86209+1.74879I$	$-7.3853+15.6719I$
$u=-0.483135-0.456682I$ $a=-1.53675-0.04736I$ $b=\ \ 2.67924-0.85527I$	$-1.86209-1.74879I$	$-7.3853-15.6719I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.246711+0.521269I$ $a=\ \ 2.44870+1.79272I$ $b=-1.76240-0.40967I$	$-1.60277+1.13073I$	$-16.4890-3.6045I$
$u=-0.246711-0.521269I$ $a=\ \ 2.44870-1.79272I$ $b=-1.76240+0.40967I$	$-1.60277-1.13073I$	$-16.4890+3.6045I$
$u=\ \ 0.10747+1.43757I$ $a=\ \ 0.102943+0.232479I$ $b=-0.094147+1.058770I$	$1.12918-2.68232I$	0
$u=\ \ 0.10747-1.43757I$ $a=\ \ 0.102943-0.232479I$ $b=-0.094147-1.058770I$	$1.12918+2.68232I$	0
$u=-0.00780+1.45535I$ $a=-1.192260-0.326002I$ $b=\ \ 1.97371+1.02164I$	$3.51163+1.45830I$	0
$u=-0.00780-1.45535I$ $a=-1.192260+0.326002I$ $b=\ \ 1.97371-1.02164I$	$3.51163-1.45830I$	0
$u=\ \ 0.19633+1.47266I$ $a=\ \ 1.48406-0.07567I$ $b=-2.29341+0.86754I$	$2.64331-7.12189I$	0
$u=\ \ 0.19633-1.47266I$ $a=\ \ 1.48406+0.07567I$ $b=-2.29341-0.86754I$	$2.64331+7.12189I$	0
$u=-0.04819+1.51041I$ $a=\ \ 2.12814+0.24940I$ $b=-2.35877+0.37102I$	$5.05765+2.00436I$	0
$u=-0.04819-1.51041I$ $a=\ \ 2.12814-0.24940I$ $b=-2.35877-0.37102I$	$5.05765-2.00436I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.14469+1.50993I$ $a=-2.37791+0.99739I$ $b=2.62830-0.29767I$	$4.66611+3.99543I$	0
$u=-0.14469-1.50993I$ $a=-2.37791-0.99739I$ $b=2.62830+0.29767I$	$4.66611-3.99543I$	0
$u=0.416507+0.239610I$ $a=-1.55874+2.96139I$ $b=-0.873187-1.078590I$	$-4.35238-0.88122I$	$-11.36984+2.33709I$
$u=0.416507-0.239610I$ $a=-1.55874-2.96139I$ $b=-0.873187+1.078590I$	$-4.35238+0.88122I$	$-11.36984-2.33709I$
$u=0.076348+0.449359I$ $a=0.72833-2.03428I$ $b=0.287091-0.797176I$	$-7.12845-4.50045I$	$-11.43251+4.54345I$
$u=0.076348-0.449359I$ $a=0.72833+2.03428I$ $b=0.287091+0.797176I$	$-7.12845+4.50045I$	$-11.43251-4.54345I$
$u=-0.40434+1.49345I$ $a=1.322190-0.362322I$ $b=-1.84535-0.27981I$	$5.61605+9.26553I$	0
$u=-0.40434-1.49345I$ $a=1.322190+0.362322I$ $b=-1.84535+0.27981I$	$5.61605-9.26553I$	0
$u=0.30238+1.53005I$ $a=-1.301220-0.393687I$ $b=1.85609-0.14113I$	$8.31392-2.90879I$	0
$u=0.30238-1.53005I$ $a=-1.301220+0.393687I$ $b=1.85609+0.14113I$	$8.31392+2.90879I$	0

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.27909 + 1.54859I$ $a = 1.298040 + 0.169903I$ $b = -2.14228 - 0.45801I$	$8.47521 - 9.84153I$	0
$u = 0.27909 - 1.54859I$ $a = 1.298040 - 0.169903I$ $b = -2.14228 + 0.45801I$	$8.47521 + 9.84153I$	0
$u = 0.39619 + 1.53466I$ $a = -1.76073 - 0.05353I$ $b = 2.40677 - 0.68198I$	$4.7262 - 17.0140I$	0
$u = 0.39619 - 1.53466I$ $a = -1.76073 + 0.05353I$ $b = 2.40677 + 0.68198I$	$4.7262 + 17.0140I$	0
$u = -0.13238 + 1.58588I$ $a = -1.380160 - 0.026218I$ $b = 2.15283 - 0.30201I$	$10.02230 + 3.29278I$	0
$u = -0.13238 - 1.58588I$ $a = -1.380160 + 0.026218I$ $b = 2.15283 + 0.30201I$	$10.02230 - 3.29278I$	0
$u = -0.23845 + 1.60519I$ $a = -0.816814 - 0.178396I$ $b = 1.219210 - 0.053943I$	$8.27340 + 4.54754I$	0
$u = -0.23845 - 1.60519I$ $a = -0.816814 + 0.178396I$ $b = 1.219210 + 0.053943I$	$8.27340 - 4.54754I$	0
$u = -0.30330 + 1.60247I$ $a = 1.55917 + 0.09890I$ $b = -2.15065 - 0.77492I$	$7.29392 + 10.27410I$	0
$u = -0.30330 - 1.60247I$ $a = 1.55917 - 0.09890I$ $b = -2.15065 + 0.77492I$	$7.29392 - 10.27410I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.09043 + 1.66784I$ $a = 0.873862 + 0.020648I$ $b = -1.291800 - 0.398267I$	$9.44818 + 2.46020I$	0
$u = 0.09043 - 1.66784I$ $a = 0.873862 - 0.020648I$ $b = -1.291800 + 0.398267I$	$9.44818 - 2.46020I$	0
$u = 0.060670 + 0.183744I$ $a = 2.84612 + 3.51731I$ $b = -0.617177 - 0.303114I$	$-1.88776 + 1.50114I$	$-7.21238 - 4.30156I$
$u = 0.060670 - 0.183744I$ $a = 2.84612 - 3.51731I$ $b = -0.617177 + 0.303114I$	$-1.88776 - 1.50114I$	$-7.21238 + 4.30156I$

II. $I_2^u = \langle -58u^{17} - 4u^{16} + \cdots + 69b - 127u,\ 4u^{16} - 58u^{15} + \cdots + 69a - 220,\ u^{18} + 6u^{16} + \cdots + 3u + 1\rangle$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -0.0579710u^{16} + 0.840580u^{15} + \cdots + 2.49275u + 3.18841 \\ 0.840580u^{17} + 0.0579710u^{16} + \cdots + 2.52174u^2 + 1.84058u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0.594203u^{16} - 0.173913u^{15} + \cdots - 1.88406u + 2.47826 \\ -0.173913u^{17} - 0.594203u^{16} + \cdots - 1.18841u^2 - 0.115942u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 0.840580u^{15} + 4.20290u^{13} + \cdots + 3.33333u + 3.18841 \\ 0.840580u^{17} + 4.20290u^{15} + \cdots + 3.18841u^2 + u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -0.0579710u^{16} + 0.637681u^{15} + \cdots + 0.826087u + 3.24638 \\ 0.637681u^{17} + 0.0579710u^{16} + \cdots + 2.57971u^2 + 1.84058u \end{pmatrix}$$

$$a_6 = \begin{pmatrix} u \\ -u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} u^3 \\ -u^3 - u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{20}{23}u^{15} - \frac{100}{23}u^{13} - \frac{44}{23}u^{12} - \frac{200}{23}u^{11} - \frac{176}{23}u^{10} - \frac{316}{23}u^9 - \frac{264}{23}u^8 - \frac{448}{23}u^7 - \frac{260}{23}u^6 - 16u^5 - \frac{212}{23}u^4 - \frac{208}{23}u^3 - \frac{84}{23}u^2 - 4u - \frac{106}{23}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{18} + 12u^{17} + \cdots + 3u + 1$
c_2, c_3, c_6 c_8	$u^{18} + 6u^{16} + \cdots + 3u + 1$
c_4, c_{10}	$(u^6 + u^5 - u^4 - 2u^3 + u + 1)^3$
c_5	$(u^6 + 3u^5 + 5u^4 + 4u^3 + 2u^2 + u + 1)^3$
c_7	$u^{18} - 12u^{17} + \cdots - 3u + 1$
c_9, c_{11}	$(u^6 - u^5 - u^4 + 2u^3 - u + 1)^3$
c_{12}	$(u^6 - 3u^5 + 5u^4 - 4u^3 + 2u^2 - u + 1)^3$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_7	$y^{18} - 12y^{17} + \cdots + 95y + 1$
c_2, c_3, c_6 c_8	$y^{18} + 12y^{17} + \cdots + 3y + 1$
c_4, c_9, c_{10} c_{11}	$(y^6 - 3y^5 + 5y^4 - 4y^3 + 2y^2 - y + 1)^3$
c_5, c_{12}	$(y^6 + y^5 + 5y^4 + 6y^2 + 3y + 1)^3$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.577722 + 0.852843I$ $a = 0.419544 - 0.969814I$ $b = -0.118598 + 0.263815I$	$1.89061 + 0.92430I$	$3.71672 - 0.79423I$
$u = -0.577722 - 0.852843I$ $a = 0.419544 + 0.969814I$ $b = -0.118598 - 0.263815I$	$1.89061 - 0.92430I$	$3.71672 + 0.79423I$
$u = 0.196160 + 0.885066I$ $a = 1.60482 - 0.28185I$ $b = -1.52575 + 1.43171I$	$-1.89061 + 0.92430I$	$-3.71672 - 0.79423I$
$u = 0.196160 - 0.885066I$ $a = 1.60482 + 0.28185I$ $b = -1.52575 - 1.43171I$	$-1.89061 - 0.92430I$	$-3.71672 + 0.79423I$
$u = -0.945163 + 0.610473I$ $a = -0.143905 + 0.192004I$ $b = -0.927303 - 0.292719I$	$5.69302I$	$0. - 5.51057I$
$u = -0.945163 - 0.610473I$ $a = -0.143905 - 0.192004I$ $b = -0.927303 + 0.292719I$	$- 5.69302I$	$0. + 5.51057I$
$u = 0.090472 + 1.133120I$ $a = 2.41289 - 3.72770I$ $b = -2.74223 + 4.58587I$	$-1.89061 - 0.92430I$	$-3.71672 + 0.79423I$
$u = 0.090472 - 1.133120I$ $a = 2.41289 + 3.72770I$ $b = -2.74223 - 4.58587I$	$-1.89061 + 0.92430I$	$-3.71672 - 0.79423I$
$u = 0.686633 + 0.502578I$ $a = -0.0705976 + 0.0706558I$ $b = 0.937976 + 0.262282I$	$1.89061 + 0.92430I$	$3.71672 - 0.79423I$
$u = 0.686633 - 0.502578I$ $a = -0.0705976 - 0.0706558I$ $b = 0.937976 - 0.262282I$	$1.89061 - 0.92430I$	$3.71672 + 0.79423I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.824262 + 0.925280I$ $a = 0.162842 - 0.773386I$ $b = 0.076951 - 0.173677I$	$5.69302I$	$0. - 5.51057I$
$u = 0.824262 - 0.925280I$ $a = 0.162842 + 0.773386I$ $b = 0.076951 + 0.173677I$	$-5.69302I$	$0. + 5.51057I$
$u = -0.108911 + 1.355420I$ $a = 1.61896 - 0.60431I$ $b = -2.13131 + 0.32954I$	$1.89061 - 0.92430I$	$3.71672 + 0.79423I$
$u = -0.108911 - 1.355420I$ $a = 1.61896 + 0.60431I$ $b = -2.13131 - 0.32954I$	$1.89061 + 0.92430I$	$3.71672 - 0.79423I$
$u = 0.12090 + 1.53575I$ $a = -1.264280 + 0.562374I$ $b = 1.68058 - 1.22890I$	$-5.69302I$	$0. + 5.51057I$
$u = 0.12090 - 1.53575I$ $a = -1.264280 - 0.562374I$ $b = 1.68058 + 1.22890I$	$5.69302I$	$0. - 5.51057I$
$u = -0.286632 + 0.248050I$ $a = 2.75973 + 0.85089I$ $b = -0.250316 + 0.289655I$	$-1.89061 + 0.92430I$	$-3.71672 - 0.79423I$
$u = -0.286632 - 0.248050I$ $a = 2.75973 - 0.85089I$ $b = -0.250316 - 0.289655I$	$-1.89061 - 0.92430I$	$-3.71672 + 0.79423I$

III.

$$I_3^u = \langle -4a^4u + 18a^3u + \cdots + 19a + 16,\ 5a^4u - 20a^3u + \cdots - 12a - 3,\ u^2 + 1\rangle$$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} a \\ \frac{4}{5}a^4u - \frac{18}{5}a^3u + \cdots - \frac{19}{5}a - \frac{16}{5} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -\frac{2}{5}a^4u - \frac{7}{5}a^3u + \cdots - 8a + \frac{21}{5} \\ \frac{2}{5}a^4u - a^3u + \cdots + \frac{16}{5}a^2 - \frac{4}{5}a \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} \frac{4}{5}a^4u - \frac{18}{5}a^3u + \cdots - \frac{9}{5}a - \frac{16}{5} \\ -a \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -1.40000a^4u + 8.40000a^3u + \cdots + 12.6000a + 4.80000 \\ \frac{4}{5}a^4u - \frac{26}{5}a^3u + \cdots - 7a - \frac{12}{5} \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -1.60000a^3u + 8.40000a^2u + \cdots - 4.20000a + 4.80000 \\ u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -\frac{2}{5}a^4u + \frac{14}{5}a^3u + \cdots + \frac{52}{5}a - \frac{2}{5} \\ -1 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -\frac{2}{5}a^4u + \frac{14}{5}a^3u + \cdots + \frac{52}{5}a + \frac{3}{5} \\ -1 \end{pmatrix}$$

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= \frac{12}{5}a^4 + \frac{48}{5}a^3u - \frac{44}{5}a^3 - \frac{132}{5}a^2u - \frac{72}{5}a^2 - \frac{48}{5}au + \frac{156}{5}a + \frac{68}{5}u - \frac{4}{5}$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_7	$(y-1)^{10}$
c_2, c_3, c_6 c_8	$(y+1)^{10}$
c_4	$(y^5+5y^4+8y^3+3y^2-y+1)^2$
c_5	$(y^5-3y^4+4y^3-y^2-y+1)^2$
c_9, c_{11}	$(y^5-5y^4+8y^3-3y^2-y-1)^2$
c_{10}	$(y^5+3y^4+4y^3+y^2-y-1)^2$
c_{12}	$(y^5+y^4+8y^3+3y^2+3y+1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.000000I$ $a = 0.881366 - 0.510635I$ $b = -0.331455 + 0.820551I$	$-0.32910 + 1.53058I$	$-0.51511 - 4.43065I$
$u = 1.000000I$ $a = -0.142272 - 0.490929I$ $b = 0.361438 - 0.927855I$	$-5.87256 - 4.40083I$	$-4.74431 + 3.49859I$
$u = 1.000000I$ $a = -0.14227 - 1.50907I$ $b = -0.0768928 + 0.0902877I$	$-5.87256 + 4.40083I$	$-4.74431 - 3.49859I$
$u = 1.000000I$ $a = 0.88137 - 1.48936I$ $b = -1.43128 + 1.79928I$	$-0.32910 - 1.53058I$	$-0.51511 + 4.43065I$
$u = 1.000000I$ $a = 3.52181 - 1.00000I$ $b = -3.52181 + 2.21774I$	-2.40108	$-1.48114 + 0.I$
$u = -1.000000I$ $a = 0.881366 + 0.510635I$ $b = -0.331455 - 0.820551I$	$-0.32910 - 1.53058I$	$-0.51511 + 4.43065I$
$u = -1.000000I$ $a = -0.142272 + 0.490929I$ $b = 0.361438 + 0.927855I$	$-5.87256 + 4.40083I$	$-4.74431 - 3.49859I$
$u = -1.000000I$ $a = -0.14227 + 1.50907I$ $b = -0.0768928 - 0.0902877I$	$-5.87256 - 4.40083I$	$-4.74431 + 3.49859I$
$u = -1.000000I$ $a = 0.88137 + 1.48936I$ $b = -1.43128 - 1.79928I$	$-0.32910 + 1.53058I$	$-0.51511 - 4.43065I$
$u = -1.000000I$ $a = 3.52181 + 1.00000I$ $b = -3.52181 - 2.21774I$	-2.40108	$-1.48114 + 0.I$

IV.

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

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{3}{4}u^3 + \frac{1}{2}u^2 + \frac{1}{4}u - \frac{3}{4} \\ \frac{1}{4}u^3 + \frac{1}{2}u^2 + \frac{3}{4}u + \frac{3}{4} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} \frac{3}{8}u^3 + \frac{5}{4}u^2 + \frac{13}{8}u + \frac{17}{8} \\ -\frac{7}{8}u^3 - \frac{1}{4}u^2 - \frac{9}{8}u + \frac{3}{8} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} \frac{3}{4}u^3 + \frac{1}{2}u^2 + \frac{5}{4}u - \frac{3}{4} \\ \frac{1}{4}u^3 + \frac{1}{2}u^2 - \frac{1}{4}u + \frac{3}{4} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{3}{4}u^3 + \frac{1}{2}u^2 + \frac{1}{4}u - \frac{3}{4} \\ \frac{1}{4}u^3 + \frac{1}{2}u^2 + \frac{3}{4}u + \frac{3}{4} \end{pmatrix}$$

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

$$a_1 = \begin{pmatrix} -u^3 \\ -u^3 - u^2 - 1 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} -u^3 \\ u^3 + u \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= \frac{71}{16}u^3 - \frac{7}{8}u^2 + \frac{241}{16}u - \frac{147}{16}$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^4 - 11y^3 + 31y^2 + 10y + 1$
c_2, c_6, c_7	$y^4 + 5y^3 + 7y^2 + 2y + 1$
c_3, c_8	$y^4 + y^3 + 3y^2 + 2y + 1$
c_4, c_5	$4(4y^4 + 19y^3 + 31y^2 + 9y + 1)$
c_9, c_{11}	$(y-1)^4$
c_{10}	y^4
c_{12}	$y^4 + 9y^3 + 31y^2 + 19y + 4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.351808 + 0.720342I$ $a = -1.237690 + 0.353773I$ $b = 0.690267 + 0.767100I$	$-1.43393 - 1.41510I$	$-5.77964 + 9.93490I$
$u = 0.351808 - 0.720342I$ $a = -1.237690 - 0.353773I$ $b = 0.690267 - 0.767100I$	$-1.43393 + 1.41510I$	$-5.77964 - 9.93490I$
$u = -0.851808 + 0.911292I$ $a = 0.112691 + 0.371716I$ $b = 0.434733 + 0.213936I$	$-8.43568 + 3.16396I$	$-15.2516 + 20.5289I$
$u = -0.851808 - 0.911292I$ $a = 0.112691 - 0.371716I$ $b = 0.434733 - 0.213936I$	$-8.43568 - 3.16396I$	$-15.2516 - 20.5289I$

V. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u-1)^{10})(u^4-5u^3+\cdots-2u+1)(u^{18}+12u^{17}+\cdots+3u+1)$ $\cdot(u^{54}+20u^{53}+\cdots+15886u+289)$
c_2	$((u^2+1)^5)(u^4+u^3+3u^2+2u+1)(u^{18}+6u^{16}+\cdots+3u+1)$ $\cdot(u^{54}-2u^{53}+\cdots-20u+17)$
c_3	$((u^2+1)^5)(u^4+u^3+u^2+1)(u^{18}+6u^{16}+\cdots+3u+1)$ $\cdot(u^{54}-2u^{53}+\cdots-112u+17)$
c_4	$4(2u^4-u^3+5u^2+u+1)(u^6+u^5-u^4-2u^3+u+1)^3$ $\cdot(u^{10}+5u^8+8u^6+3u^4-u^2+1)(2u^{54}-3u^{53}+\cdots+26787u+17894)$
c_5	$4(2u^4-u^3+5u^2+u+1)(u^6+3u^5+5u^4+4u^3+2u^2+u+1)^3$ $\cdot(u^{10}-3u^8+4u^6-u^4-u^2+1)(2u^{54}-11u^{53}+\cdots-27633u+3982)$
c_6	$((u^2+1)^5)(u^4-u^3+3u^2-2u+1)(u^{18}+6u^{16}+\cdots+3u+1)$ $\cdot(u^{54}-2u^{53}+\cdots-20u+17)$
c_7	$((u+1)^{10})(u^4+u^3+3u^2+2u+1)(u^{18}-12u^{17}+\cdots-3u+1)$ $\cdot(u^{54}-60u^{53}+\cdots-17614u+289)$
c_8	$((u^2+1)^5)(u^4-u^3+u^2+1)(u^{18}+6u^{16}+\cdots+3u+1)$ $\cdot(u^{54}-2u^{53}+\cdots-112u+17)$
c_9	$(u-1)^4(u^5+u^4-2u^3-u^2+u-1)^2(u^6-u^5-u^4+2u^3-u+1)^3$ $\cdot(u^{54}-4u^{53}+\cdots-481u+16)$
c_{10}	$u^4(u^5-u^4+2u^3-u^2+u-1)^2(u^6+u^5-u^4-2u^3+u+1)^3$ $\cdot(u^{54}+8u^{53}+\cdots+2976u+256)$
c_{11}	$(u+1)^4(u^5-u^4-2u^3+u^2+u+1)^2(u^6-u^5-u^4+2u^3-u+1)^3$ $\cdot(u^{54}-4u^{53}+\cdots-481u+16)$
c_{12}	$(u^4-u^3+5u^2+u+2)(u^6-3u^5+5u^4-4u^3+2u^2-u+1)^3$ $\cdot(u^{10}+u^8+8u^6+3u^4+3u^2+1)(u^{54}+7u^{53}+\cdots+8u+4)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$((y-1)^{10})(y^4-11y^3+\cdots+10y+1)(y^{18}-12y^{17}+\cdots+95y+1)$ $\cdot(y^{54}+40y^{53}+\cdots-35600546y+83521)$
c_2, c_6	$((y+1)^{10})(y^4+5y^3+\cdots+2y+1)(y^{18}+12y^{17}+\cdots+3y+1)$ $\cdot(y^{54}+20y^{53}+\cdots+15886y+289)$
c_3, c_8	$((y+1)^{10})(y^4+y^3+3y^2+2y+1)(y^{18}+12y^{17}+\cdots+3y+1)$ $\cdot(y^{54}+60y^{53}+\cdots+17614y+289)$
c_4	$16(4y^4+19y^3+31y^2+9y+1)(y^5+5y^4+8y^3+3y^2-y+1)^2$ $\cdot(y^6-3y^5+5y^4-4y^3+2y^2-y+1)^3$ $\cdot(4y^{54}-205y^{53}+\cdots+5530254095y+320195236)$
c_5	$16(4y^4+19y^3+31y^2+9y+1)(y^5-3y^4+4y^3-y^2-y+1)^2$ $\cdot(y^6+y^5+5y^4+6y^2+3y+1)^3$ $\cdot(4y^{54}-173y^{53}+\cdots+170212239y+15856324)$
c_7	$((y-1)^{10})(y^4+5y^3+\cdots+2y+1)(y^{18}-12y^{17}+\cdots+95y+1)$ $\cdot(y^{54}-120y^{53}+\cdots-34842354y+83521)$
c_9, c_{11}	$(y-1)^4(y^5-5y^4+8y^3-3y^2-y-1)^2$ $\cdot(y^6-3y^5+5y^4-4y^3+2y^2-y+1)^3$ $\cdot(y^{54}-32y^{53}+\cdots-95457y+256)$
c_{10}	$y^4(y^5+3y^4+\cdots-y-1)^2(y^6-3y^5+\cdots-y+1)^3$ $\cdot(y^{54}-12y^{53}+\cdots-1545216y+65536)$
c_{12}	$(y^4+9y^3+31y^2+19y+4)(y^5+y^4+8y^3+3y^2+3y+1)^2$ $\cdot((y^6+y^5+5y^4+6y^2+3y+1)^3)(y^{54}+17y^{53}+\cdots+152y+16)$