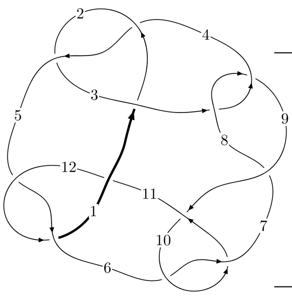
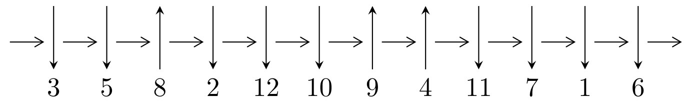
$12a_{0119}$ ($K12a_{0119}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

[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`).

$$
\begin{aligned}
I^u_1 = \langle & 2u^{13} - u^{11} + 2u^{10} + 5u^9 + 2u^8 + 2u^7 - 4u^6 + 3u^5 + 2u^4 - 2u^3 - 12u^2 + 4d - 8u - 8, \\
& - u^{13} + u^{11} - u^{10} - 4u^9 + u^8 + u^7 - 4u^5 - u^4 + 2u^3 + 8u^2 + 4c + 4, \\
& - u^{13} + u^{11} - u^{10} - 3u^9 + u^7 + u^6 - 2u^5 - u^4 + 2u^3 + 6u^2 + 2b + 2u + 2, \\
& 3u^{13} - 2u^{11} + 3u^{10} + 9u^9 + u^8 - u^7 - 4u^6 + 7u^5 + 3u^4 - 6u^3 - 18u^2 + 4a - 8u - 12, \\
& u^{14} - u^{13} - u^{12} + 2u^{11} + 2u^{10} - 3u^9 - u^8 - u^7 + 4u^6 - u^5 - 4u^4 - 4u^3 + 4u^2 + 4\rangle \\
I^u_2 = \langle & -3u^{21} + 9u^{19} + \cdots + 4d + 4,\ -2u^{22} + 6u^{20} + \cdots + 4c - 2, \\
& - u^{16} + 2u^{14} - 5u^{12} + 6u^{10} - u^9 - 6u^8 + u^7 + 4u^6 - 4u^5 - u^4 + 3u^3 - 4u^2 + 2b - 2u, \\
& - 2u^{21} + 4u^{20} + \cdots + 4a + 6,\ u^{23} - 2u^{22} + \cdots + 2u - 2\rangle \\
I^u_3 = \langle & -3u^{21} + 9u^{19} + \cdots + 4d + 4,\ -2u^{22} + 6u^{20} + \cdots + 4c - 2,\ 2u^{22} - 2u^{21} + \cdots + 4b + 2, \\
& - 2u^{22} + u^{21} + \cdots + 4a - 6,\ u^{23} - 2u^{22} + \cdots + 2u - 2\rangle \\
I^u_4 = \langle & -2u^{22} + 3u^{21} + \cdots + 4d + 10u,\ u^{19} - 2u^{17} + \cdots + 4c + 4,\ 2u^{22} - 2u^{21} + \cdots + 4b + 2, \\
& - 2u^{22} + u^{21} + \cdots + 4a - 6,\ u^{23} - 2u^{22} + \cdots + 2u - 2\rangle \\
I^u_5 = \langle & -a^2u^2c - u^2ca + 2a^2u^2 - a^2c + 2cau + 2u^2a + 4ca - 3cu + au - u^2 + d - 4c - 5a + u + 3, \\
& a^2u^2c - a^2cu + 3u^2ca - 2a^2u^2 - a^2c + 4cau - 2u^2c - u^2a + c^2 - ca - 2cu + 2a^2 - 5au + 2a + 3u - 1, \\
& - a^2u^2 + b + 2a - 2,\ a^3 - 2a^2u - 2a^2 + 3au + 3a - u - 1,\ u^3 + u^2 - 1\rangle
\end{aligned}
$$

$$
\begin{aligned}
I^v_1 &= \langle a,\ d,\ c + 1,\ b - 1,\ v + 1\rangle \\
I^v_2 &= \langle c,\ d + 1,\ b,\ a - 1,\ v + 1\rangle \\
I^v_3 &= \langle a,\ d + 1,\ c + a,\ b - 1,\ v + 1\rangle \\
I^v_4 &= \langle a,\ da - c + 1,\ dv - 1,\ cv - a - v,\ b - 1\rangle
\end{aligned}
$$

* 8 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 104 representations.
* 1 irreducible components of $\dim_{\mathbb{C}} = 1$

[2]All coefficients of polynomials are rational numbers. But the coefficients are sometimes approximated in decimal forms when there is not enough margin.

I. $\boldsymbol{I_1^u = \langle 2u^{13} - u^{11} + \cdots + 4d - 8,\ -u^{13} + u^{11} + \cdots + 4c + 4,\ -u^{13} + u^{11} + \cdots + 2b + 2,\ 3u^{13} - 2u^{11} + \cdots + 4a - 12,\ u^{14} - u^{13} + \cdots + 4u^2 + 4\rangle}$

(i) Arc colorings

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

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

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

$$a_5 = \begin{pmatrix} -\frac{3}{4}u^{13} + \frac{1}{2}u^{11} + \cdots + 2u + 3 \\ \frac{1}{2}u^{13} - \frac{1}{2}u^{11} + \cdots - u - 1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -\frac{3}{4}u^{13} + \frac{1}{2}u^{11} + \cdots + 2u + 3 \\ \frac{1}{2}u^{13} - \frac{1}{4}u^{11} + \cdots - 2u - 2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -\frac{1}{4}u^{13} + \frac{1}{4}u^{11} + \cdots + \frac{3}{2}u^2 + 1 \\ \frac{1}{2}u^{13} - \frac{1}{4}u^{11} + \cdots - 2u - 2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{1}{4}u^{13} - \frac{1}{4}u^{11} + \cdots - 2u^2 - 1 \\ -\frac{1}{2}u^{13} + \frac{1}{4}u^{11} + \cdots + 2u + 2 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} \frac{1}{2}u^{13} - \frac{1}{2}u^{11} + \cdots - u - 2 \\ -\frac{1}{2}u^{13} - \frac{1}{2}u^{10} + \cdots + 2u + 2 \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} -\frac{1}{4}u^{13} + \frac{1}{4}u^{11} + \cdots + 2u + 1 \\ \frac{1}{4}u^{11} - \frac{1}{4}u^9 + \cdots - \frac{3}{2}u^3 + u \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -\frac{3}{4}u^{13} + \frac{1}{2}u^{11} + \cdots + 2u + 3 \\ \frac{1}{2}u^{13} - \frac{1}{2}u^{11} + \cdots - u - 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= -3u^{13} - u^{12} + u^{11} - 2u^{10} - 8u^9 - 5u^8 - 3u^7 + 7u^6 - 2u^5 - 7u^4 + 4u^3 + 22u^2 + 16u + 10$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_9, c_{11}	$u^{14} + 7u^{13} + \cdots + 3u + 1$
c_2, c_4, c_5 c_6, c_{10}, c_{12}	$u^{14} - u^{13} + \cdots + u + 1$
c_3, c_8	$u^{14} + u^{13} + \cdots + 4u^2 + 4$
c_7	$u^{14} - 3u^{13} + \cdots + 32u + 16$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_9, c_{11}	$y^{14} + 5y^{13} + \cdots + 9y + 1$
c_2, c_4, c_5 c_6, c_{10}, c_{12}	$y^{14} - 7y^{13} + \cdots - 3y + 1$
c_3, c_8	$y^{14} - 3y^{13} + \cdots + 32y + 16$
c_7	$y^{14} + 9y^{13} + \cdots - 1536y + 256$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.351654 + 0.974470I$ $a = 0.484407 + 0.125788I$ $b = 0.933970 - 0.502203I$ $c = 0.065921 - 0.250683I$ $d = -0.762746 - 0.668204I$	$-2.00841 + 5.97343I$	$-8.41754 - 8.60965I$
$u = -0.351654 - 0.974470I$ $a = 0.484407 - 0.125788I$ $b = 0.933970 + 0.502203I$ $c = 0.065921 + 0.250683I$ $d = -0.762746 + 0.668204I$	$-2.00841 - 5.97343I$	$-8.41754 + 8.60965I$
$u = -0.915559 + 0.598258I$ $a = 0.664888 - 0.608266I$ $b = -0.181237 + 0.749038I$ $c = -1.159390 + 0.550105I$ $d = -0.936616 - 0.512222I$	$0.94494 - 2.29172I$	$-1.04510 + 1.71019I$
$u = -0.915559 - 0.598258I$ $a = 0.664888 + 0.608266I$ $b = -0.181237 - 0.749038I$ $c = -1.159390 - 0.550105I$ $d = -0.936616 + 0.512222I$	$0.94494 + 2.29172I$	$-1.04510 - 1.71019I$
$u = 1.120580 + 0.015323I$ $a = 0.577432 - 1.267280I$ $b = -0.702265 + 0.653431I$ $c = 0.530358 + 0.435838I$ $d = -0.072651 - 0.949218I$	$4.01770 + 3.65190I$	$-0.27967 - 6.51151I$
$u = 1.120580 - 0.015323I$ $a = 0.577432 + 1.267280I$ $b = -0.702265 - 0.653431I$ $c = 0.530358 - 0.435838I$ $d = -0.072651 + 0.949218I$	$4.01770 - 3.65190I$	$-0.27967 + 6.51151I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.145230 + 0.485598I$ $a = -0.08828 + 1.64061I$ $b = -1.032700 - 0.607770I$ $c = 0.834303 + 0.325183I$ $d = -0.546866 - 0.244514I$	$0.82935 - 11.25490I$	$-6.02298 + 10.89166I$
$u = -1.145230 - 0.485598I$ $a = -0.08828 - 1.64061I$ $b = -1.032700 + 0.607770I$ $c = 0.834303 - 0.325183I$ $d = -0.546866 + 0.244514I$	$0.82935 + 11.25490I$	$-6.02298 - 10.89166I$
$u = -0.065300 + 0.726861I$ $a = 0.634835 - 0.129477I$ $b = 0.512305 + 0.308441I$ $c = -0.117499 + 0.636011I$ $d = 0.171343 + 0.691065I$	$-0.66587 - 1.25835I$	$-4.79341 + 6.11957I$
$u = -0.065300 - 0.726861I$ $a = 0.634835 + 0.129477I$ $b = 0.512305 - 0.308441I$ $c = -0.117499 - 0.636011I$ $d = 0.171343 - 0.691065I$	$-0.66587 + 1.25835I$	$-4.79341 - 6.11957I$
$u = 0.800659 + 0.997483I$ $a = 0.429409 - 0.097928I$ $b = 1.213650 + 0.504832I$ $c = -0.65473 - 1.70324I$ $d = -2.26378 - 1.40323I$	$-9.38350 - 10.57210I$	$-12.21836 + 7.10513I$
$u = 0.800659 - 0.997483I$ $a = 0.429409 + 0.097928I$ $b = 1.213650 - 0.504832I$ $c = -0.65473 + 1.70324I$ $d = -2.26378 + 1.40323I$	$-9.38350 + 10.57210I$	$-12.21836 - 7.10513I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = \quad 1.056500 + 0.850786I$ $a = -0.70270 - 1.54576I$ $b = -1.243720 + 0.536134I$ $c = -1.99896 - 0.54543I$ $d = -2.08869 + 1.91409I$	$-8.5386 + 17.3286I$	$-11.2229 - 10.7940I$
$u = \quad 1.056500 - 0.850786I$ $a = -0.70270 + 1.54576I$ $b = -1.243720 - 0.536134I$ $c = -1.99896 + 0.54543I$ $d = -2.08869 - 1.91409I$	$-8.5386 - 17.3286I$	$-11.2229 + 10.7940I$

II. $\boldsymbol{I_2^u = \langle -3u^{21} + 9u^{19} + \cdots + 4d + 4,\ -2u^{22} + 6u^{20} + \cdots + 4c - 2,\ -u^{16} + 2u^{14} + \cdots + 2b - 2u,\ -2u^{21} + 4u^{20} + \cdots + 4a + 6,\ u^{23} - 2u^{22} + \cdots + 2u - 2\rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} \frac{1}{2}u^{21} - u^{20} + \cdots + 5u - \frac{3}{2} \\ \frac{1}{2}u^{16} - u^{14} + \cdots + 2u^2 + u \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} \frac{1}{2}u^{21} - u^{20} + \cdots + 5u - \frac{3}{2} \\ -\frac{1}{4}u^{18} + \frac{1}{2}u^{16} + \cdots - u^3 - 1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} \frac{1}{2}u^{21} - u^{20} + \cdots + 5u - \frac{5}{2} \\ -\frac{1}{4}u^{18} + \frac{1}{2}u^{16} + \cdots - u^3 - 1 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} \frac{1}{2}u^{22} - \frac{3}{2}u^{20} + \cdots - \frac{1}{2}u + \frac{1}{2} \\ \frac{3}{4}u^{21} - \frac{9}{4}u^{19} + \cdots + \frac{1}{2}u - 1 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -\frac{1}{2}u^{21} + u^{20} + \cdots - \frac{9}{2}u + 2 \\ 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u^3 \\ u^5 - u^3 + u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} \frac{1}{4}u^{18} - \frac{3}{4}u^{16} + \cdots + \frac{1}{2}u + \frac{1}{2} \\ \frac{1}{4}u^{18} - \frac{1}{2}u^{16} + \cdots - u^3 + u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -\frac{1}{2}u^{22} + \frac{3}{4}u^{21} + \cdots + u - \frac{3}{2} \\ -\frac{1}{2}u^{22} + \frac{1}{2}u^{21} + \cdots + u - \frac{1}{2} \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= 2u^{22} - 6u^{20} + 4u^{19} + 14u^{18} - 8u^{17} - 20u^{16} + 22u^{15} + 20u^{14} - 28u^{13} - 6u^{12} + 34u^{11} - 6u^{10} - 28u^9 + 36u^8 + 10u^7 - 30u^6 + 26u^5 + 10u^4 - 10u^3 + 10u^2 + 4u - 8$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{23} + 14u^{22} + \cdots + 24u + 16$
c_2, c_4	$u^{23} - 7u^{21} + \cdots - 3u^2 + 4$
c_3, c_8	$u^{23} + 2u^{22} + \cdots + 2u + 2$
c_5, c_6, c_{10} c_{12}	$u^{23} - 2u^{22} + \cdots + 3u - 1$
c_7	$u^{23} - 6u^{22} + \cdots + 8u - 4$
c_9, c_{11}	$u^{23} + 12u^{22} + \cdots + 7u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{23} - 14y^{22} + \cdots - 736y - 256$
c_2, c_4	$y^{23} - 14y^{22} + \cdots + 24y - 16$
c_3, c_8	$y^{23} - 6y^{22} + \cdots + 8y - 4$
c_5, c_6, c_{10} c_{12}	$y^{23} - 12y^{22} + \cdots + 7y - 1$
c_7	$y^{23} + 18y^{22} + \cdots - 8y - 16$
c_9, c_{11}	$y^{23} + 32y^{21} + \cdots + 31y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.694668 + 0.784847I$ $a = 0.450244 - 0.080442I$ $b = 1.152320 + 0.384542I$ $c = 0.782630 + 0.951667I$ $d = 1.54383 + 0.54732I$	$-2.86000 - 1.29238I$	$-6.06322 + 0.45977I$
$u = 0.694668 - 0.784847I$ $a = 0.450244 + 0.080442I$ $b = 1.152320 - 0.384542I$ $c = 0.782630 - 0.951667I$ $d = 1.54383 - 0.54732I$	$-2.86000 + 1.29238I$	$-6.06322 - 0.45977I$
$u = -0.892323 + 0.293165I$ $a = 0.438777 + 0.026420I$ $b = 1.270830 - 0.136735I$ $c = 0.009889 - 0.214450I$ $d = -0.224788 - 1.053390I$	$-3.02064 - 3.59706I$	$-7.24355 + 7.79597I$
$u = -0.892323 - 0.293165I$ $a = 0.438777 - 0.026420I$ $b = 1.270830 + 0.136735I$ $c = 0.009889 + 0.214450I$ $d = -0.224788 + 1.053390I$	$-3.02064 + 3.59706I$	$-7.24355 - 7.79597I$
$u = -1.095410 + 0.175785I$ $a = 0.45789 + 1.51421I$ $b = -0.817025 - 0.605081I$ $c = -0.908669 - 0.269252I$ $d = 0.299223 + 0.396395I$	$3.68412 - 1.20490I$	$-0.197865 + 0.587959I$
$u = -1.095410 - 0.175785I$ $a = 0.45789 - 1.51421I$ $b = -0.817025 + 0.605081I$ $c = -0.908669 + 0.269252I$ $d = 0.299223 - 0.396395I$	$3.68412 + 1.20490I$	$-0.197865 - 0.587959I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.159876 + 0.866608I$ $a = 0.607182 + 0.204119I$ $b = 0.479725 - 0.497445I$ $c = -0.128604 + 0.305274I$ $d = 0.691140 + 0.217382I$	$-0.79201 - 1.83570I$	$-5.62427 + 3.60335I$
$u = 0.159876 - 0.866608I$ $a = 0.607182 - 0.204119I$ $b = 0.479725 + 0.497445I$ $c = -0.128604 - 0.305274I$ $d = 0.691140 - 0.217382I$	$-0.79201 + 1.83570I$	$-5.62427 - 3.60335I$
$u = 1.115790 + 0.351606I$ $a = 0.621931 + 0.844762I$ $b = -0.434825 - 0.767671I$ $c = -0.374060 + 0.344406I$ $d = 0.457120 - 0.806395I$	$2.56195 + 6.12354I$	$-2.77038 - 6.59776I$
$u = 1.115790 - 0.351606I$ $a = 0.621931 - 0.844762I$ $b = -0.434825 + 0.767671I$ $c = -0.374060 - 0.344406I$ $d = 0.457120 + 0.806395I$	$2.56195 - 6.12354I$	$-2.77038 + 6.59776I$
$u = 0.810032 + 0.844947I$ $a = -1.09305 - 1.85522I$ $b = -1.235740 + 0.400126I$ $c = -1.17221 - 1.42613I$ $d = -1.79180 - 0.10501I$	$-10.13410 - 1.43226I$	$-13.58922 + 0.72835I$
$u = 0.810032 - 0.844947I$ $a = -1.09305 + 1.85522I$ $b = -1.235740 - 0.400126I$ $c = -1.17221 + 1.42613I$ $d = -1.79180 + 0.10501I$	$-10.13410 + 1.43226I$	$-13.58922 - 0.72835I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.746640 + 0.934392I$ $a = 0.575739 - 0.436897I$ $b = 0.102199 + 0.836400I$ $c = 0.76290 - 1.40128I$ $d = 1.61980 - 0.96664I$	$-6.07831 + 5.69706I$	$-9.37968 - 4.06061I$
$u = -0.746640 - 0.934392I$ $a = 0.575739 + 0.436897I$ $b = 0.102199 - 0.836400I$ $c = 0.76290 + 1.40128I$ $d = 1.61980 + 0.96664I$	$-6.07831 - 5.69706I$	$-9.37968 + 4.06061I$
$u = 1.001420 + 0.725291I$ $a = -0.59194 - 1.76529I$ $b = -1.170750 + 0.509221I$ $c = 1.41858 + 0.76507I$ $d = 1.50027 - 1.14883I$	$-1.95175 + 7.00485I$	$-4.95661 - 5.13787I$
$u = 1.001420 - 0.725291I$ $a = -0.59194 + 1.76529I$ $b = -1.170750 - 0.509221I$ $c = 1.41858 - 0.76507I$ $d = 1.50027 + 1.14883I$	$-1.95175 - 7.00485I$	$-4.95661 + 5.13787I$
$u = 0.966403 + 0.788262I$ $a = 0.422604 - 0.071283I$ $b = 1.300820 + 0.388090I$ $c = -1.60031 - 0.73645I$ $d = -2.06235 + 0.58473I$	$-9.64490 + 7.52364I$	$-12.34364 - 6.02284I$
$u = 0.966403 - 0.788262I$ $a = 0.422604 + 0.071283I$ $b = 1.300820 - 0.388090I$ $c = -1.60031 + 0.73645I$ $d = -2.06235 - 0.58473I$	$-9.64490 - 7.52364I$	$-12.34364 + 6.02284I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.040150+0.798969I$ $a=\ \ 0.541562-0.570958I$ $b=-0.125501+0.921967I$ $c=\ \ 1.77993-0.50191I$ $d=\ \ 1.69909+1.34789I$	$-5.14546-12.07470I$	$-8.17479+8.06520I$
$u=-1.040150-0.798969I$ $a=\ \ 0.541562+0.570958I$ $b=-0.125501-0.921967I$ $c=\ \ 1.77993+0.50191I$ $d=\ \ 1.69909-1.34789I$	$-5.14546+12.07470I$	$-8.17479-8.06520I$
$u=\ \ 0.598117$ $a=\ \ 0.466081$ $b=\ \ 1.14555$ $c=\ \ 0.628003$ $d=\ \ 0.737621$	-2.27356	-1.62820
$u=-0.272723+0.504579I$ $a=-4.66398+5.23784I$ $b=-1.094820-0.106487I$ $c=\ \ 1.115910+0.788549I$ $d=-0.100347+0.172505I$	$-4.96054+0.60932I$	$-15.8427-0.8440I$
$u=-0.272723-0.504579I$ $a=-4.66398-5.23784I$ $b=-1.094820+0.106487I$ $c=\ \ 1.115910-0.788549I$ $d=-0.100347-0.172505I$	$-4.96054-0.60932I$	$-15.8427+0.8440I$

III. $I_3^u = \langle -3u^{21}+9u^{19}+\cdots+4d+4,\ -2u^{22}+6u^{20}+\cdots+4c-2,\ 2u^{22}-2u^{21}+\cdots+4b+2,\ -2u^{22}+u^{21}+\cdots+4a-6,\ u^{23}-2u^{22}+\cdots+2u-2\rangle$

(i) Arc colorings

$$a_3 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_8 = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_4 = \begin{pmatrix}1\\-u^2\end{pmatrix}$$
$$a_5 = \begin{pmatrix}\frac{1}{2}u^{22}-\frac{1}{4}u^{21}+\cdots+\frac{1}{4}u^2+\frac{3}{2}\\-\frac{1}{2}u^{22}+\frac{1}{2}u^{21}+\cdots-\frac{1}{4}u^2-\frac{1}{2}\end{pmatrix}$$
$$a_9 = \begin{pmatrix}u\\-u^3+u\end{pmatrix}$$
$$a_2 = \begin{pmatrix}\frac{1}{2}u^{22}-\frac{1}{4}u^{21}+\cdots+\frac{1}{4}u^2+\frac{3}{2}\\\frac{1}{4}u^{21}-\frac{3}{4}u^{19}+\cdots+\frac{1}{2}u-1\end{pmatrix}$$
$$a_1 = \begin{pmatrix}\frac{1}{2}u^{22}-\frac{3}{2}u^{20}+\cdots+\frac{1}{2}u+\frac{1}{2}\\\frac{1}{4}u^{21}-\frac{3}{4}u^{19}+\cdots+\frac{1}{2}u-1\end{pmatrix}$$
$$a_{11} = \begin{pmatrix}\frac{1}{2}u^{22}-\frac{3}{2}u^{20}+\cdots-\frac{1}{2}u+\frac{1}{2}\\\frac{3}{4}u^{21}-\frac{9}{4}u^{19}+\cdots+\frac{1}{2}u-1\end{pmatrix}$$
$$a_{12} = \begin{pmatrix}-\frac{1}{2}u^{22}+\frac{3}{2}u^{20}+\cdots-\frac{5}{2}u^2-\frac{1}{2}u\\1\end{pmatrix}$$
$$a_7 = \begin{pmatrix}-u^3\\u^5-u^3+u\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}\frac{1}{4}u^{18}-\frac{3}{4}u^{16}+\cdots+\frac{1}{2}u+\frac{1}{2}\\\frac{1}{4}u^{18}-\frac{1}{2}u^{16}+\cdots-u^3+u\end{pmatrix}$$
$$a_6 = \begin{pmatrix}-\frac{1}{2}u^{22}+\frac{3}{4}u^{21}+\cdots+u-\frac{3}{2}\\-\frac{1}{2}u^{22}+\frac{1}{2}u^{21}+\cdots+u-\frac{1}{2}\end{pmatrix}$$

(ii) Obstruction class $=-1$

(iii) Cusp Shapes
$=2u^{22}-6u^{20}+4u^{19}+14u^{18}-8u^{17}-20u^{16}+22u^{15}+20u^{14}-28u^{13}-6u^{12}+34u^{11}-6u^{10}-28u^9+36u^8+10u^7-30u^6+26u^5+10u^4-10u^3+10u^2+4u-8$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_9	$u^{23} + 12u^{22} + \cdots + 7u + 1$
c_2, c_4, c_6 c_{10}	$u^{23} - 2u^{22} + \cdots + 3u - 1$
c_3, c_8	$u^{23} + 2u^{22} + \cdots + 2u + 2$
c_5, c_{12}	$u^{23} - 7u^{21} + \cdots - 3u^2 + 4$
c_7	$u^{23} - 6u^{22} + \cdots + 8u - 4$
c_{11}	$u^{23} + 14u^{22} + \cdots + 24u + 16$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_9	$y^{23} + 32y^{21} + \cdots + 31y - 1$
c_2, c_4, c_6 c_{10}	$y^{23} - 12y^{22} + \cdots + 7y - 1$
c_3, c_8	$y^{23} - 6y^{22} + \cdots + 8y - 4$
c_5, c_{12}	$y^{23} - 14y^{22} + \cdots + 24y - 16$
c_7	$y^{23} + 18y^{22} + \cdots - 8y - 16$
c_{11}	$y^{23} - 14y^{22} + \cdots - 736y - 256$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.694668 + 0.784847I$ $a = 0.646621 + 0.443219I$ $b = 0.052166 - 0.721195I$ $c = 0.782630 + 0.951667I$ $d = 1.54383 + 0.54732I$	$-2.86000 - 1.29238I$	$-6.06322 + 0.45977I$
$u = 0.694668 - 0.784847I$ $a = 0.646621 - 0.443219I$ $b = 0.052166 + 0.721195I$ $c = 0.782630 - 0.951667I$ $d = 1.54383 - 0.54732I$	$-2.86000 + 1.29238I$	$-6.06322 - 0.45977I$
$u = -0.892323 + 0.293165I$ $a = 0.52674 + 2.12395I$ $b = -0.890003 - 0.443541I$ $c = 0.009889 - 0.214450I$ $d = -0.224788 - 1.053390I$	$-3.02064 - 3.59706I$	$-7.24355 + 7.79597I$
$u = -0.892323 - 0.293165I$ $a = 0.52674 - 2.12395I$ $b = -0.890003 + 0.443541I$ $c = 0.009889 + 0.214450I$ $d = -0.224788 + 1.053390I$	$-3.02064 + 3.59706I$	$-7.24355 - 7.79597I$
$u = -1.095410 + 0.175785I$ $a = 0.663876 - 1.020630I$ $b = -0.552165 + 0.688491I$ $c = -0.908669 - 0.269252I$ $d = 0.299223 + 0.396395I$	$3.68412 - 1.20490I$	$-0.197865 + 0.587959I$
$u = -1.095410 - 0.175785I$ $a = 0.663876 + 1.020630I$ $b = -0.552165 - 0.688491I$ $c = -0.908669 + 0.269252I$ $d = 0.299223 - 0.396395I$	$3.68412 + 1.20490I$	$-0.197865 - 0.587959I$

Solutions to I_3^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.159876 + 0.866608I$ $a = 0.531180 - 0.126379I$ $b = 0.781744 + 0.423915I$ $c = -0.128604 + 0.305274I$ $d = 0.691140 + 0.217382I$	$-0.79201 - 1.83570I$	$-5.62427 + 3.60335I$
$u = 0.159876 - 0.866608I$ $a = 0.531180 + 0.126379I$ $b = 0.781744 - 0.423915I$ $c = -0.128604 - 0.305274I$ $d = 0.691140 - 0.217382I$	$-0.79201 + 1.83570I$	$-5.62427 - 3.60335I$
$u = 1.115790 + 0.351606I$ $a = 0.15695 - 1.65297I$ $b = -0.943072 + 0.599566I$ $c = -0.374060 + 0.344406I$ $d = 0.457120 - 0.806395I$	$2.56195 + 6.12354I$	$-2.77038 - 6.59776I$
$u = 1.115790 - 0.351606I$ $a = 0.15695 + 1.65297I$ $b = -0.943072 - 0.599566I$ $c = -0.374060 - 0.344406I$ $d = 0.457120 + 0.806395I$	$2.56195 - 6.12354I$	$-2.77038 + 6.59776I$
$u = 0.810032 + 0.844947I$ $a = 0.435558 - 0.082401I$ $b = 1.216570 + 0.419344I$ $c = -1.17221 - 1.42613I$ $d = -1.79180 - 0.10501I$	$-10.13410 - 1.43226I$	$-13.58922 + 0.72835I$
$u = 0.810032 - 0.844947I$ $a = 0.435558 + 0.082401I$ $b = 1.216570 - 0.419344I$ $c = -1.17221 + 1.42613I$ $d = -1.79180 + 0.10501I$	$-10.13410 + 1.43226I$	$-13.58922 - 0.72835I$

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.746640 + 0.934392I$ $a = 0.438031 + 0.094410I$ $b = 1.181600 - 0.470208I$ $c = 0.76290 - 1.40128I$ $d = 1.61980 - 0.96664I$	$-6.07831 + 5.69706I$	$-9.37968 - 4.06061I$
$u = -0.746640 - 0.934392I$ $a = 0.438031 - 0.094410I$ $b = 1.181600 + 0.470208I$ $c = 0.76290 + 1.40128I$ $d = 1.61980 + 0.96664I$	$-6.07831 - 5.69706I$	$-9.37968 + 4.06061I$
$u = 1.001420 + 0.725291I$ $a = 0.578527 + 0.586894I$ $b = -0.148145 - 0.864175I$ $c = 1.41858 + 0.76507I$ $d = 1.50027 - 1.14883I$	$-1.95175 + 7.00485I$	$-4.95661 - 5.13787I$
$u = 1.001420 - 0.725291I$ $a = 0.578527 - 0.586894I$ $b = -0.148145 + 0.864175I$ $c = 1.41858 - 0.76507I$ $d = 1.50027 + 1.14883I$	$-1.95175 - 7.00485I$	$-4.95661 + 5.13787I$
$u = 0.966403 + 0.788262I$ $a = -0.73482 - 1.74058I$ $b = -1.205860 + 0.487616I$ $c = -1.60031 - 0.73645I$ $d = -2.06235 + 0.58473I$	$-9.64490 + 7.52364I$	$-12.34364 - 6.02284I$
$u = 0.966403 - 0.788262I$ $a = -0.73482 + 1.74058I$ $b = -1.205860 - 0.487616I$ $c = -1.60031 + 0.73645I$ $d = -2.06235 - 0.58473I$	$-9.64490 - 7.52364I$	$-12.34364 + 6.02284I$

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.040150+0.798969I$ $a=-0.65748+1.62443I$ $b=-1.214090-0.528949I$ $c=1.77993-0.50191I$ $d=1.69909+1.34789I$	$-5.14546-12.07470I$	$-8.17479+8.06520I$
$u=-1.040150-0.798969I$ $a=-0.65748-1.62443I$ $b=-1.214090+0.528949I$ $c=1.77993+0.50191I$ $d=1.69909-1.34789I$	$-5.14546+12.07470I$	$-8.17479-8.06520I$
$u=0.598117$ $a=1.80880$ $b=-0.447146$ $c=0.628003$ $d=0.737621$	-2.27356	-1.62820
$u=-0.272723+0.504579I$ $a=0.510432+0.043771I$ $b=0.944825-0.166773I$ $c=1.115910+0.788549I$ $d=-0.100347+0.172505I$	$-4.96054+0.60932I$	$-15.8427-0.8440I$
$u=-0.272723-0.504579I$ $a=0.510432-0.043771I$ $b=0.944825+0.166773I$ $c=1.115910-0.788549I$ $d=-0.100347-0.172505I$	$-4.96054-0.60932I$	$-15.8427+0.8440I$

IV. $\boldsymbol{I^u_4 = \langle -2u^{22} + 3u^{21} + \cdots + 4d + 10u,\ u^{19} - 2u^{17} + \cdots + 4c + 4,\ 2u^{22} - 2u^{21} + \cdots + 4b + 2,\ -2u^{22} + u^{21} + \cdots + 4a - 6,\ u^{23} - 2u^{22} + \cdots + 2u - 2\rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_8 = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_4 = \begin{pmatrix}1\\-u^2\end{pmatrix}$$
$$a_5 = \begin{pmatrix}\frac{1}{2}u^{22} - \frac{1}{4}u^{21} + \cdots + \frac{1}{4}u^2 + \frac{3}{2}\\-\frac{1}{2}u^{22} + \frac{1}{2}u^{21} + \cdots - \frac{1}{4}u^2 - \frac{1}{2}\end{pmatrix}$$
$$a_9 = \begin{pmatrix}u\\-u^3 + u\end{pmatrix}$$
$$a_2 = \begin{pmatrix}\frac{1}{2}u^{22} - \frac{1}{4}u^{21} + \cdots + \frac{1}{4}u^2 + \frac{3}{2}\\\frac{1}{4}u^{21} - \frac{3}{4}u^{19} + \cdots + \frac{1}{2}u - 1\end{pmatrix}$$
$$a_1 = \begin{pmatrix}\frac{1}{2}u^{22} - \frac{3}{2}u^{20} + \cdots + \frac{1}{2}u + \frac{1}{2}\\\frac{1}{4}u^{21} - \frac{3}{4}u^{19} + \cdots + \frac{1}{2}u - 1\end{pmatrix}$$
$$a_{11} = \begin{pmatrix}-\frac{1}{4}u^{19} + \frac{1}{2}u^{17} + \cdots - 3u - 1\\\frac{1}{2}u^{22} - \frac{3}{4}u^{21} + \cdots + 6u^2 - \frac{5}{2}u\end{pmatrix}$$
$$a_{12} = \begin{pmatrix}-\frac{1}{2}u^{19} + u^{17} + \cdots - \frac{7}{2}u - 1\\\frac{1}{2}u^{22} - \frac{1}{2}u^{21} + \cdots + \frac{13}{2}u^2 - 3u\end{pmatrix}$$
$$a_7 = \begin{pmatrix}-u^3\\u^5 - u^3 + u\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}-\frac{3}{4}u^{19} + \frac{3}{2}u^{17} + \cdots - 3u - 1\\\frac{1}{2}u^{22} - \frac{1}{4}u^{21} + \cdots + 7u^2 - \frac{5}{2}u\end{pmatrix}$$
$$a_6 = \begin{pmatrix}\frac{1}{2}u^{22} - \frac{3}{4}u^{21} + \cdots + \frac{1}{2}u + 1\\-\frac{1}{2}u^{21} + u^{20} + \cdots - 3u - \frac{1}{2}\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= 2u^{22} - 6u^{20} + 4u^{19} + 14u^{18} - 8u^{17} - 20u^{16} + 22u^{15} + 20u^{14} - 28u^{13} - 6u^{12} + 34u^{11} - 6u^{10} - 28u^9 + 36u^8 + 10u^7 - 30u^6 + 26u^5 + 10u^4 - 10u^3 + 10u^2 + 4u - 8$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_{11}	$u^{23} + 12u^{22} + \cdots + 7u + 1$
c_2, c_4, c_5 c_{12}	$u^{23} - 2u^{22} + \cdots + 3u - 1$
c_3, c_8	$u^{23} + 2u^{22} + \cdots + 2u + 2$
c_6, c_{10}	$u^{23} - 7u^{21} + \cdots - 3u^2 + 4$
c_7	$u^{23} - 6u^{22} + \cdots + 8u - 4$
c_9	$u^{23} + 14u^{22} + \cdots + 24u + 16$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_{11}	$y^{23} + 32y^{21} + \cdots + 31y - 1$
c_2, c_4, c_5 c_{12}	$y^{23} - 12y^{22} + \cdots + 7y - 1$
c_3, c_8	$y^{23} - 6y^{22} + \cdots + 8y - 4$
c_6, c_{10}	$y^{23} - 14y^{22} + \cdots + 24y - 16$
c_7	$y^{23} + 18y^{22} + \cdots - 8y - 16$
c_9	$y^{23} - 14y^{22} + \cdots - 736y - 256$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.694668 + 0.784847I$ $a = 0.646621 + 0.443219I$ $b = 0.052166 - 0.721195I$ $c = -1.12753 - 0.96163I$ $d = -0.947232 - 0.143060I$	$-2.86000 - 1.29238I$	$-6.06322 + 0.45977I$
$u = 0.694668 - 0.784847I$ $a = 0.646621 - 0.443219I$ $b = 0.052166 + 0.721195I$ $c = -1.12753 + 0.96163I$ $d = -0.947232 + 0.143060I$	$-2.86000 + 1.29238I$	$-6.06322 - 0.45977I$
$u = -0.892323 + 0.293165I$ $a = 0.52674 + 2.12395I$ $b = -0.890003 - 0.443541I$ $c = 2.65342 - 0.49408I$ $d = -0.702937 + 1.066160I$	$-3.02064 - 3.59706I$	$-7.24355 + 7.79597I$
$u = -0.892323 - 0.293165I$ $a = 0.52674 - 2.12395I$ $b = -0.890003 + 0.443541I$ $c = 2.65342 + 0.49408I$ $d = -0.702937 - 1.066160I$	$-3.02064 + 3.59706I$	$-7.24355 - 7.79597I$
$u = -1.095410 + 0.175785I$ $a = 0.663876 - 1.020630I$ $b = -0.552165 + 0.688491I$ $c = -0.136748 + 0.374893I$ $d = -0.248300 - 1.039030I$	$3.68412 - 1.20490I$	$-0.197865 + 0.587959I$
$u = -1.095410 - 0.175785I$ $a = 0.663876 + 1.020630I$ $b = -0.552165 - 0.688491I$ $c = -0.136748 - 0.374893I$ $d = -0.248300 + 1.039030I$	$3.68412 + 1.20490I$	$-0.197865 - 0.587959I$

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.159876 + 0.866608I$ $a = 0.531180 - 0.126379I$ $b = 0.781744 + 0.423915I$ $c = 0.045517 + 0.729067I$ $d = -0.255613 + 1.166420I$	$-0.79201 - 1.83570I$	$-5.62427 + 3.60335I$
$u = 0.159876 - 0.866608I$ $a = 0.531180 + 0.126379I$ $b = 0.781744 - 0.423915I$ $c = 0.045517 - 0.729067I$ $d = -0.255613 - 1.166420I$	$-0.79201 + 1.83570I$	$-5.62427 - 3.60335I$
$u = 1.115790 + 0.351606I$ $a = 0.15695 - 1.65297I$ $b = -0.943072 + 0.599566I$ $c = 1.233050 - 0.090029I$ $d = -0.375083 - 0.309465I$	$2.56195 + 6.12354I$	$-2.77038 - 6.59776I$
$u = 1.115790 - 0.351606I$ $a = 0.15695 + 1.65297I$ $b = -0.943072 - 0.599566I$ $c = 1.233050 + 0.090029I$ $d = -0.375083 + 0.309465I$	$2.56195 - 6.12354I$	$-2.77038 + 6.59776I$
$u = 0.810032 + 0.844947I$ $a = 0.435558 - 0.082401I$ $b = 1.216570 + 0.419344I$ $c = -1.45901 - 1.35263I$ $d = -3.19657 - 0.86128I$	$-10.13410 - 1.43226I$	$-13.58922 + 0.72835I$
$u = 0.810032 - 0.844947I$ $a = 0.435558 + 0.082401I$ $b = 1.216570 - 0.419344I$ $c = -1.45901 + 1.35263I$ $d = -3.19657 + 0.86128I$	$-10.13410 + 1.43226I$	$-13.58922 - 0.72835I$

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.746640 + 0.934392I$ $a = 0.438031 + 0.094410I$ $b = 1.181600 - 0.470208I$ $c = -0.84775 + 1.27484I$ $d = -2.42278 + 0.85521I$	$-6.07831 + 5.69706I$	$-9.37968 - 4.06061I$
$u = -0.746640 - 0.934392I$ $a = 0.438031 - 0.094410I$ $b = 1.181600 + 0.470208I$ $c = -0.84775 - 1.27484I$ $d = -2.42278 - 0.85521I$	$-6.07831 - 5.69706I$	$-9.37968 + 4.06061I$
$u = 1.001420 + 0.725291I$ $a = 0.578527 + 0.586894I$ $b = -0.148145 - 0.864175I$ $c = -1.45246 - 0.50095I$ $d = -1.32533 + 0.53961I$	$-1.95175 + 7.00485I$	$-4.95661 - 5.13787I$
$u = 1.001420 - 0.725291I$ $a = 0.578527 - 0.586894I$ $b = -0.148145 + 0.864175I$ $c = -1.45246 + 0.50095I$ $d = -1.32533 - 0.53961I$	$-1.95175 - 7.00485I$	$-4.95661 + 5.13787I$
$u = 0.966403 + 0.788262I$ $a = -0.73482 - 1.74058I$ $b = -1.205860 + 0.487616I$ $c = -1.69882 - 1.77273I$ $d = -2.39909 + 1.21573I$	$-9.64490 + 7.52364I$	$-12.34364 - 6.02284I$
$u = 0.966403 - 0.788262I$ $a = -0.73482 + 1.74058I$ $b = -1.205860 - 0.487616I$ $c = -1.69882 + 1.77273I$ $d = -2.39909 - 1.21573I$	$-9.64490 - 7.52364I$	$-12.34364 + 6.02284I$

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.040150+0.798969I$ $a=-0.65748+1.62443I$ $b=-1.214090-0.528949I$ $c=-1.55675+0.92503I$ $d=-2.00676-1.54535I$	$-5.14546-12.07470I$	$-8.17479+8.06520I$
$u=-1.040150-0.798969I$ $a=-0.65748-1.62443I$ $b=-1.214090+0.528949I$ $c=-1.55675-0.92503I$ $d=-2.00676+1.54535I$	$-5.14546+12.07470I$	$-8.17479-8.06520I$
$u=\ \ 0.598117$ $a=\ \ 1.80880$ $b=-0.447146$ $c=-2.70017$ $d=\ \ 0.459836$	-2.27356	-1.62820
$u=-0.272723+0.504579I$ $a=\ \ 0.510432+0.043771I$ $b=\ \ 0.944825-0.166773I$ $c=-0.30283-2.30298I$ $d=-0.35022-4.81571I$	$-4.96054+0.60932I$	$-15.8427-0.8440I$
$u=-0.272723-0.504579I$ $a=\ \ 0.510432-0.043771I$ $b=\ \ 0.944825+0.166773I$ $c=-0.30283+2.30298I$ $d=-0.35022+4.81571I$	$-4.96054-0.60932I$	$-15.8427+0.8440I$

V. $I_5^u = \langle -a^2u^2c - u^2ca + \cdots - 5a + 3,\ a^2u^2c + 3u^2ca + \cdots + 2a - 1,\ -a^2u^2 + b + 2a - 2,\ -2a^2u + 3au + \cdots + 3a - 1,\ u^3 + u^2 - 1\rangle$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} a \\ a^2u^2 - 2a + 2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u \\ u^2 + u - 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} a \\ -a^2u^2 - u^2a + 2a - 2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -a^2u^2 - u^2a + 3a - 2 \\ -a^2u^2 - u^2a + 2a - 2 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} c \\ a^2u^2c + u^2ca + \cdots + 5a - 3 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -2a^2u^2c - 2u^2ca + \cdots - 7a + 5 \\ 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} u^2 - 1 \\ u^2 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -3a^2u^2c - 2u^2ca + \cdots - 3a + 3 \\ -a^2u^2c - 3u^2ca + \cdots - 2a + 1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} a^2u^2c + u^2ca + \cdots + 5a - 3 \\ -a^2u^2c + 2u^2ca + \cdots + 4a - 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u - 6$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_9, c_{11}	$(u^9 + 6u^8 + 15u^7 + 17u^6 + 3u^5 - 12u^4 - 9u^3 + u^2 + 2u + 1)^2$
c_2, c_4, c_5 c_6, c_{10}, c_{12}	$(u^9 - 3u^7 + u^6 + 3u^5 - 2u^4 + u^3 + u^2 - 2u + 1)^2$
c_3, c_8	$(u^3 - u^2 + 1)^6$
c_7	$(u^3 - u^2 + 2u - 1)^6$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_9, c_{11}	$(y^9 - 6y^8 + 27y^7 - 73y^6 + 139y^5 - 184y^4 + 83y^3 - 13y^2 + 2y - 1)^2$
c_2, c_4, c_5 c_6, c_{10}, c_{12}	$(y^9 - 6y^8 + 15y^7 - 17y^6 + 3y^5 + 12y^4 - 9y^3 - y^2 + 2y - 1)^2$
c_3, c_8	$(y^3 - y^2 + 2y - 1)^6$
c_7	$(y^3 + 3y^2 + 2y - 1)^6$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_5^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.877439 + 0.744862I$ $a = 0.616488 - 0.534141I$ $b = -0.073457 + 0.802780I$ $c = 1.28781 - 0.94152I$ $d = 2.02696 - 0.41525I$	$-6.31400 - 2.82812I$	$-9.50976 + 2.97945I$
$u = -0.877439 + 0.744862I$ $a = 0.616488 - 0.534141I$ $b = -0.073457 + 0.802780I$ $c = 1.61569 - 1.41115I$ $d = 1.64564 + 0.80187I$	$-6.31400 - 2.82812I$	$-9.50976 + 2.97945I$
$u = -0.877439 + 0.744862I$ $a = 0.432401 + 0.070043I$ $b = 1.253530 - 0.365043I$ $c = -1.14863 + 0.86295I$ $d = -1.67261 - 0.38662I$	$-6.31400 - 2.82812I$	$-9.50976 + 2.97945I$
$u = -0.877439 + 0.744862I$ $a = 0.432401 + 0.070043I$ $b = 1.253530 - 0.365043I$ $c = 1.28781 - 0.94152I$ $d = 2.02696 - 0.41525I$	$-6.31400 - 2.82812I$	$-9.50976 + 2.97945I$
$u = -0.877439 + 0.744862I$ $a = -0.80377 + 1.95382I$ $b = -1.180080 - 0.437737I$ $c = -1.14863 + 0.86295I$ $d = -1.67261 - 0.38662I$	$-6.31400 - 2.82812I$	$-9.50976 + 2.97945I$
$u = -0.877439 + 0.744862I$ $a = -0.80377 + 1.95382I$ $b = -1.180080 - 0.437737I$ $c = 1.61569 - 1.41115I$ $d = 1.64564 + 0.80187I$	$-6.31400 - 2.82812I$	$-9.50976 + 2.97945I$

Solutions to I_5^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.877439 - 0.744862I$ $a = 0.616488 + 0.534141I$ $b = -0.073457 - 0.802780I$ $c = 1.28781 + 0.94152I$ $d = 2.02696 + 0.41525I$	$-6.31400 + 2.82812I$	$-9.50976 - 2.97945I$
$u = -0.877439 - 0.744862I$ $a = 0.616488 + 0.534141I$ $b = -0.073457 - 0.802780I$ $c = 1.61569 + 1.41115I$ $d = 1.64564 - 0.80187I$	$-6.31400 + 2.82812I$	$-9.50976 - 2.97945I$
$u = -0.877439 - 0.744862I$ $a = 0.432401 - 0.070043I$ $b = 1.253530 + 0.365043I$ $c = -1.14863 - 0.86295I$ $d = -1.67261 + 0.38662I$	$-6.31400 + 2.82812I$	$-9.50976 - 2.97945I$
$u = -0.877439 - 0.744862I$ $a = 0.432401 - 0.070043I$ $b = 1.253530 + 0.365043I$ $c = 1.28781 + 0.94152I$ $d = 2.02696 + 0.41525I$	$-6.31400 + 2.82812I$	$-9.50976 - 2.97945I$
$u = -0.877439 - 0.744862I$ $a = -0.80377 - 1.95382I$ $b = -1.180080 + 0.437737I$ $c = -1.14863 - 0.86295I$ $d = -1.67261 + 0.38662I$	$-6.31400 + 2.82812I$	$-9.50976 - 2.97945I$
$u = -0.877439 - 0.744862I$ $a = -0.80377 - 1.95382I$ $b = -1.180080 + 0.437737I$ $c = 1.61569 + 1.41115I$ $d = 1.64564 - 0.80187I$	$-6.31400 + 2.82812I$	$-9.50976 - 2.97945I$

Solutions to I_5^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.754878$ $a = 0.451991$ $b = 1.21243$ $c = 0.603023 + 0.131096I$ $d = 0.610449 + 0.570600I$	-2.17641	-2.98050
$u = 0.754878$ $a = 0.451991$ $b = 1.21243$ $c = 0.603023 - 0.131096I$ $d = 0.610449 - 0.570600I$	-2.17641	-2.98050
$u = 0.754878$ $a = 1.52888 + 1.24301I$ $b = -0.606217 - 0.320153I$ $c = 0.603023 - 0.131096I$ $d = 0.610449 - 0.570600I$	-2.17641	-2.98050
$u = 0.754878$ $a = 1.52888 + 1.24301I$ $b = -0.606217 - 0.320153I$ $c = -2.71580$ $d = 0.779103$	-2.17641	-2.98050
$u = 0.754878$ $a = 1.52888 - 1.24301I$ $b = -0.606217 + 0.320153I$ $c = 0.603023 + 0.131096I$ $d = 0.610449 + 0.570600I$	-2.17641	-2.98050
$u = 0.754878$ $a = 1.52888 - 1.24301I$ $b = -0.606217 + 0.320153I$ $c = -2.71580$ $d = 0.779103$	-2.17641	-2.98050

VI. $I_1^v = \langle a,\ d,\ c+1,\ b-1,\ v+1\rangle$

(i) Arc colorings

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

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

$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

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

$a_9 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

$a_2 = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$

$a_1 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$

$a_{11} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

$a_{12} = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$

$a_7 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

$a_{10} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

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

(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_5 c_{11}	$u-1$
c_3, c_6, c_7 c_8, c_9, c_{10}	u
c_4, c_{12}	$u+1$

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v = -1.00000$ $a = 0$ $b = 1.00000$ $c = -1.00000$ $d = 0$	-3.28987	-12.0000

VII. $I_2^v = \langle c,\ d+1,\ b,\ a-1,\ v+1 \rangle$

(i) Arc colorings

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

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

$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

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

$a_9 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

$a_{11} = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$

$a_{12} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$

$a_7 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

$a_{10} = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$

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

(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_3 c_4, c_7, c_8	u
c_5, c_{10}	$u+1$
c_6, c_9, c_{11} c_{12}	$u-1$

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v = -1.00000$		
$a = \ \ 1.00000$		
$b = \ \ 0$	-3.28987	-12.0000
$c = \ \ 0$		
$d = -1.00000$		

VIII. $I_3^v = \langle a,\ d+1,\ c+a,\ b-1,\ v+1 \rangle$

(i) Arc colorings

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

(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_6 c_9	$u - 1$
c_3, c_5, c_7 c_8, c_{11}, c_{12}	u
c_4, c_{10}	$u + 1$

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^v	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$v = -1.00000$ $a = 0$ $b = 1.00000$ $c = 0$ $d = -1.00000$	-3.28987	-12.0000

IX. $I_4^v = \langle a,\ da - c + 1,\ dv - 1,\ cv - a - v,\ b - 1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -d^2 - v^2 - 16$

(iv) u-Polynomials at the component : It cannot be defined for a positive dimension component.

(v) Riley Polynomials at the component : It cannot be defined for a positive dimension component.

(iv) Complex Volumes and Cusp Shapes

Solution to I_4^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v = \cdots$		
$a = \cdots$		
$b = \cdots$	-4.93480	$-15.5916 - 0.1902I$
$c = \cdots$		
$d = \cdots$		

X. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_9, c_{11}	$u(u-1)^2$ $\cdot(u^9+6u^8+15u^7+17u^6+3u^5-12u^4-9u^3+u^2+2u+1)^2$ $\cdot(u^{14}+7u^{13}+\cdots+3u+1)(u^{23}+12u^{22}+\cdots+7u+1)^2$ $\cdot(u^{23}+14u^{22}+\cdots+24u+16)$
c_2, c_6	$u(u-1)^2(u^9-3u^7+u^6+3u^5-2u^4+u^3+u^2-2u+1)^2$ $\cdot(u^{14}-u^{13}+\cdots+u+1)(u^{23}-7u^{21}+\cdots-3u^2+4)$ $\cdot(u^{23}-2u^{22}+\cdots+3u-1)^2$
c_3, c_8	$u^3(u^3-u^2+1)^6(u^{14}+u^{13}+\cdots+4u^2+4)(u^{23}+2u^{22}+\cdots+2u+2)^3$
c_4, c_{10}	$u(u+1)^2(u^9-3u^7+u^6+3u^5-2u^4+u^3+u^2-2u+1)^2$ $\cdot(u^{14}-u^{13}+\cdots+u+1)(u^{23}-7u^{21}+\cdots-3u^2+4)$ $\cdot(u^{23}-2u^{22}+\cdots+3u-1)^2$
c_5, c_{12}	$u(u-1)(u+1)(u^9-3u^7+u^6+3u^5-2u^4+u^3+u^2-2u+1)^2$ $\cdot(u^{14}-u^{13}+\cdots+u+1)(u^{23}-7u^{21}+\cdots-3u^2+4)$ $\cdot(u^{23}-2u^{22}+\cdots+3u-1)^2$
c_7	$u^3(u^3-u^2+2u-1)^6(u^{14}-3u^{13}+\cdots+32u+16)$ $\cdot(u^{23}-6u^{22}+\cdots+8u-4)^3$

XI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_9, c_{11}	$y(y-1)^2$ $\cdot (y^9 - 6y^8 + 27y^7 - 73y^6 + 139y^5 - 184y^4 + 83y^3 - 13y^2 + 2y - 1)^2$ $\cdot (y^{14} + 5y^{13} + \cdots + 9y + 1)(y^{23} + 32y^{21} + \cdots + 31y - 1)^2$ $\cdot (y^{23} - 14y^{22} + \cdots - 736y - 256)$
c_2, c_4, c_5 c_6, c_{10}, c_{12}	$y(y-1)^2$ $\cdot (y^9 - 6y^8 + 15y^7 - 17y^6 + 3y^5 + 12y^4 - 9y^3 - y^2 + 2y - 1)^2$ $\cdot (y^{14} - 7y^{13} + \cdots - 3y + 1)(y^{23} - 14y^{22} + \cdots + 24y - 16)$ $\cdot (y^{23} - 12y^{22} + \cdots + 7y - 1)^2$
c_3, c_8	$y^3(y^3 - y^2 + 2y - 1)^6(y^{14} - 3y^{13} + \cdots + 32y + 16)$ $\cdot (y^{23} - 6y^{22} + \cdots + 8y - 4)^3$
c_7	$y^3(y^3 + 3y^2 + 2y - 1)^6(y^{14} + 9y^{13} + \cdots - 1536y + 256)$ $\cdot (y^{23} + 18y^{22} + \cdots - 8y - 16)^3$