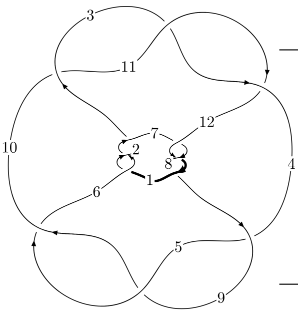
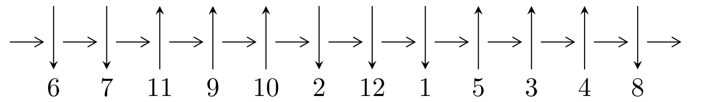
$12a_{1288}$ ($K12a_{1288}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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`).

$$
\begin{aligned}
I^u_1 = \langle &u^{11} + u^{10} - 6u^9 - 5u^8 + 11u^7 + 5u^6 - 7u^5 + 5u^4 + 3u^3 - 4u^2 + 4b - 2u,\\
&- 3u^{11} - 8u^{10} + 9u^9 + 33u^8 - 4u^7 - 30u^6 + 20u^5 - 42u^3 + u^2 + 4a + 10u - 2,\\
&u^{12} + 3u^{11} - 3u^{10} - 14u^9 + u^8 + 18u^7 - 8u^6 - 6u^5 + 24u^4 - 3u^3 - 13u^2 + 6u - 2\rangle\\
I^u_2 = \langle &1999u^{15} + 3106u^{14} + \cdots + 2878b - 22827,\ -1627u^{15} - 1680u^{14} + \cdots + 15829a + 36947,\\
&u^{16} + 3u^{15} + \cdots - 2u - 11\rangle\\
I^u_3 = \langle &u^7a - u^7 - 4u^5a - u^4a + 4u^5 + 4u^3a - u^4 + u^2a - 4u^3 + 2au + u^2 + 2b + a + 1,\\
&- u^7a + u^6a + 2u^7 + 3u^5a - 3u^6 - 3u^4a - 7u^5 - 2u^3a + 10u^4 + 2u^2a + 7u^3 + a^2 - au - 7u^2 + a - 5,\\
&u^8 - u^7 - 4u^6 + 3u^5 + 5u^4 - u^3 - u^2 - 3u - 1\rangle\\
I^u_4 = \langle &-u^{11}a - u^{11} + \cdots + a + 1,\\
&u^{11} - 5u^9 + u^7a - 2u^8 + 9u^7 - 2u^5a + 8u^6 - u^4a - 4u^5 - 10u^4 + u^2a - 6u^3 + a^2 + 2au + 2u^2 + a + 6u + 2,\\
&u^{12} - u^{11} - 4u^{10} + 2u^9 + 7u^8 + u^7 - 5u^6 - 5u^5 - u^4 + 3u^3 + 2u^2 + 1\rangle\\
I^u_5 = \langle &2b - a - 1,\ a^2 - 3,\ u - 1\rangle\\
I^u_6 = \langle &2b - u + 1,\ 3a - u,\ u^2 - 3\rangle\\
I^u_7 = \langle &b + 1,\ a,\ u - 1\rangle\\
I^u_8 = \langle &4b^2 - 4b + 5,\ 2ba - 2b - 3a + 4u + 7,\ 2bu + 2b - 2a + u + 3,\ a^2 - 2a + 1,\ au + a - u - 1,\ u^2 + 2u + 1\rangle\\
I^u_9 = \langle &a - 1,\ u + 1\rangle
\end{aligned}
$$

$$
I^v_1 = \langle a,\ b - 1,\ v + 1\rangle
$$

* 9 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 78 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. $\boldsymbol{I_1^u =}$
$\boldsymbol{\langle u^{11}+u^{10}+\cdots+4b-2u,\ -3u^{11}-8u^{10}+\cdots+4a-2,\ u^{12}+3u^{11}+\cdots+6u-2\rangle}$

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u \\ -u^3+u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u^2+1 \\ -u^4+2u^2 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} \frac{3}{4}u^{11}+2u^{10}+\cdots-\frac{5}{2}u+\frac{1}{2} \\ -\frac{1}{4}u^{11}-\frac{1}{4}u^{10}+\cdots+u^2+\frac{1}{2}u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} \frac{1}{4}u^{11}+u^{10}+\cdots-\frac{7}{2}u+\frac{1}{2} \\ -\frac{1}{4}u^{10}-\frac{3}{4}u^9+\cdots+\frac{3}{2}u-\frac{1}{2} \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -\frac{1}{4}u^{11}-u^{10}+\cdots+\frac{3}{2}u-\frac{1}{2} \\ -\frac{1}{4}u^{11}-\frac{1}{4}u^{10}+\cdots+u^2+\frac{1}{2}u \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -\frac{1}{2}u^{10}-\frac{3}{2}u^9+\cdots-\frac{15}{2}u^2-1 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -\frac{1}{4}u^{11}+\frac{7}{4}u^9+\cdots-\frac{3}{2}u+\frac{3}{2} \\ -u^{11}-\frac{7}{4}u^{10}+\cdots-\frac{5}{2}u+\frac{1}{2} \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -\frac{1}{2}u^{10}-\frac{3}{2}u^9+\cdots+u-1 \\ u \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} \frac{1}{2}u^{11}+\frac{3}{2}u^{10}+\cdots+u+1 \\ -u^2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= \frac{1}{2}u^{11}+u^{10}-\frac{3}{2}u^9-\frac{1}{2}u^8+3u^7-13u^6-8u^5+22u^4-11u^3-\frac{19}{2}u^2+32u-7$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_4, c_5, c_6 c_7, c_8, c_9 c_{10}, c_{11}, c_{12}	$y^{12} - 15y^{11} + \cdots + 16y + 4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.369891 + 0.895594I$ $a = -0.40167 + 1.49298I$ $b = -0.02653 - 1.85453I$	$11.33630 - 5.25212I$	$7.30257 + 4.65184I$
$u = 0.369891 - 0.895594I$ $a = -0.40167 - 1.49298I$ $b = -0.02653 + 1.85453I$	$11.33630 + 5.25212I$	$7.30257 - 4.65184I$
$u = 1.22438$ $a = -1.51331$ $b = -1.43561$	8.64658	-5.83920
$u = 0.740748$ $a = 2.25319$ $b = 0.277533$	10.7798	10.0010
$u = -1.48568 + 0.19251I$ $a = -0.168040 - 0.624592I$ $b = -0.695418 + 0.595170I$	$-11.33630 + 5.25212I$	$-7.30257 - 4.65184I$
$u = -1.48568 - 0.19251I$ $a = -0.168040 + 0.624592I$ $b = -0.695418 - 0.595170I$	$-11.33630 - 5.25212I$	$-7.30257 + 4.65184I$
$u = -1.46094 + 0.44342I$ $a = 0.831296 + 0.555829I$ $b = 1.16548 - 2.08317I$	$15.2352I$	$0. - 7.62682I$
$u = -1.46094 - 0.44342I$ $a = 0.831296 - 0.555829I$ $b = 1.16548 + 2.08317I$	$- 15.2352I$	$0. + 7.62682I$
$u = 0.186071 + 0.332496I$ $a = -0.523030 - 0.852314I$ $b = 0.072588 + 0.300683I$	$- 0.761015I$	$0. + 9.12858I$
$u = 0.186071 - 0.332496I$ $a = -0.523030 + 0.852314I$ $b = 0.072588 - 0.300683I$	$0.761015I$	$0. - 9.12858I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.66904$ $a = 0.443816$ $b = 0.958809$	-10.7798	-10.0010
$u = -1.85286$ $a = -0.660804$ $b = -0.832979$	-8.64658	5.83920

II. $\boldsymbol{I_2^u = \langle 1999u^{15} + 3106u^{14} + \cdots + 2878b - 22827,\ -1627u^{15} - 1680u^{14} + \cdots + 15829a + 36947,\ u^{16} + 3u^{15} + \cdots - 2u - 11\rangle}$

(i) Arc colorings

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

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

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

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

$$a_3 = \begin{pmatrix} -u^2 + 1 \\ -u^4 + 2u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.102786u^{15} + 0.106134u^{14} + \cdots - 0.0633647u - 2.33413 \\ -0.694580u^{15} - 1.07922u^{14} + \cdots - 5.24913u + 7.93155 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0.0812433u^{15} + 0.190220u^{14} + \cdots + 0.503696u + 0.181502 \\ -1.01355u^{15} - 1.80195u^{14} + \cdots - 3.62717u + 5.92113 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0.0504138u^{15} - 0.0794744u^{14} + \cdots + 1.94864u + 1.81092 \\ 0.312370u^{15} + 0.280751u^{14} + \cdots + 1.27762u - 4.97672 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0.503254u^{15} + 0.504896u^{14} + \cdots + 3.85571u - 3.97524 \\ -0.594163u^{15} - 0.777623u^{14} + \cdots - 6.03753u + 4.15705 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0.434645u^{15} + 0.605534u^{14} + \cdots + 2.21884u - 1.80814 \\ 0.0309243u^{15} - 0.298124u^{14} + \cdots + 0.944058u - 3.69180 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.0909091u^{15} - 0.272727u^{14} + \cdots - 2.18182u + 0.181818 \\ -0.594163u^{15} - 0.777623u^{14} + \cdots - 6.03753u + 4.15705 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 0.377914u^{15} + 0.539579u^{14} + \cdots + 1.33679u - 5.79335 \\ 1.00486u^{15} + 1.85198u^{14} + \cdots + 2.96873u - 7.53579 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{3610}{1439}u^{15} - \frac{5684}{1439}u^{14} + \cdots - \frac{43398}{1439}u + \frac{24298}{1439}$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6 c_7, c_8, c_{12}	$y^{16} - 13y^{15} + \cdots - 532y + 121$
c_3, c_4, c_5 c_9, c_{10}, c_{11}	$(y^8 - 9y^7 + 32y^6 - 53y^5 + 31y^4 + 15y^3 - 15y^2 - 7y + 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.694226 + 0.667719I$ $a = 1.12920 - 1.08608I$ $b = 0.276681 + 1.311520I$	10.1546	$6.33746 + 0.I$
$u = 0.694226 - 0.667719I$ $a = 1.12920 + 1.08608I$ $b = 0.276681 - 1.311520I$	10.1546	$6.33746 + 0.I$
$u = 0.262333 + 1.058630I$ $a = 0.019128 - 1.343770I$ $b = 0.19190 + 2.13545I$	$5.44991 - 9.88301I$	$3.28252 + 6.06963I$
$u = 0.262333 - 1.058630I$ $a = 0.019128 + 1.343770I$ $b = 0.19190 - 2.13545I$	$5.44991 + 9.88301I$	$3.28252 - 6.06963I$
$u = 1.15427$ $a = -0.296909$ $b = -0.236501$	-2.57083	2.16010
$u = 0.524313 + 0.657146I$ $a = 0.513557 + 0.640043I$ $b = -0.598451 - 0.154997I$	$-4.77492 - 2.26376I$	$-6.05872 + 4.53378I$
$u = 0.524313 - 0.657146I$ $a = 0.513557 - 0.640043I$ $b = -0.598451 + 0.154997I$	$-4.77492 + 2.26376I$	$-6.05872 - 4.53378I$
$u = -1.345930 + 0.090134I$ $a = 0.078599 + 0.505339I$ $b = 0.329421 - 1.036490I$	$-4.77492 + 2.26376I$	$-6.05872 - 4.53378I$
$u = -1.345930 - 0.090134I$ $a = 0.078599 - 0.505339I$ $b = 0.329421 + 1.036490I$	$-4.77492 - 2.26376I$	$-6.05872 + 4.53378I$
$u = 1.125920 + 0.800303I$ $a = -0.889080 + 0.447838I$ $b = -0.77247 - 1.44681I$	$2.93531 + 3.55755I$	$2.52739 - 2.62489I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.125920 - 0.800303I$ $a = -0.889080 - 0.447838I$ $b = -0.77247 + 1.44681I$	$2.93531 - 3.55755I$	$2.52739 + 2.62489I$
$u = -0.604309$ $a = 0.567118$ $b = 1.07322$	-2.57083	2.16010
$u = -1.47759 + 0.37462I$ $a = -0.854231 - 0.441448I$ $b = -0.72115 + 1.92612I$	$5.44991 + 9.88301I$	$3.28252 - 6.06963I$
$u = -1.47759 - 0.37462I$ $a = -0.854231 + 0.441448I$ $b = -0.72115 - 1.92612I$	$5.44991 - 9.88301I$	$3.28252 + 6.06963I$
$u = -1.55826 + 0.27885I$ $a = 0.822270 + 0.280177I$ $b = 0.375716 - 1.326680I$	$2.93531 + 3.55755I$	$2.52739 - 2.62489I$
$u = -1.55826 - 0.27885I$ $a = 0.822270 - 0.280177I$ $b = 0.375716 + 1.326680I$	$2.93531 - 3.55755I$	$2.52739 + 2.62489I$

III. $\boldsymbol{I_3^u = \langle u^7a - u^7 + \cdots + a + 1,\ -u^7a + 2u^7 + \cdots + a - 5,\ u^8 - u^7 - 4u^6 + 3u^5 + 5u^4 - u^3 - u^2 - 3u - 1\rangle}$

(i) Arc colorings

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

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

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

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

$$a_3 = \begin{pmatrix} -u^2 + 1 \\ -u^4 + 2u^2 \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} u^7 - 4u^5 - u^3a + 4u^3 + au + a + u \\ -\frac{1}{2}u^7a + \frac{1}{2}u^7 + \cdots - \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u^6a - u^7 + \cdots - a + 2 \\ -\frac{1}{2}u^7a + \frac{1}{2}u^7 + \cdots - \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u^6 - u^5 - 3u^4 + 2u^3 + 2u^2 + 1 \\ u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u^7a - u^7 + \cdots - a + 2 \\ -\frac{1}{2}u^7a + \frac{1}{2}u^7 + \cdots - \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

$$a_8 = \begin{pmatrix} u^6 - u^5 - 3u^4 + 2u^3 + 2u^2 + u + 1 \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -u^7 + u^6 + 3u^5 - 2u^4 - 2u^3 - u^2 - u + 1 \\ -u^2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -2u^6 - 2u^5 + 10u^4 + 8u^3 - 12u^2 - 10u - 4$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6 c_7, c_8, c_{12}	$(y^8 - 9y^7 + 32y^6 - 53y^5 + 31y^4 + 15y^3 - 15y^2 - 7y + 1)^2$
c_3, c_4, c_5 c_9, c_{10}, c_{11}	$y^{16} - 13y^{15} + \cdots - 532y + 121$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.151337 + 0.673064I$ $a = 0.762637 - 0.950471I$ $b = 0.076801 + 0.408443I$	$4.77492 + 2.26376I$	$6.05872 - 4.53378I$
$u = -0.151337 + 0.673064I$ $a = 0.30052 + 1.93213I$ $b = -0.06507 - 1.92874I$	$4.77492 + 2.26376I$	$6.05872 - 4.53378I$
$u = -0.151337 - 0.673064I$ $a = 0.762637 + 0.950471I$ $b = 0.076801 - 0.408443I$	$4.77492 - 2.26376I$	$6.05872 + 4.53378I$
$u = -0.151337 - 0.673064I$ $a = 0.30052 - 1.93213I$ $b = -0.06507 + 1.92874I$	$4.77492 - 2.26376I$	$6.05872 + 4.53378I$
$u = -1.359440 + 0.207304I$ $a = -0.897134 + 0.451895I$ $b = -0.592239 - 0.125436I$	$-2.93531 + 3.55755I$	$-2.52739 - 2.62489I$
$u = -1.359440 + 0.207304I$ $a = 1.089640 + 0.371279I$ $b = 1.80045 - 1.27064I$	$-2.93531 + 3.55755I$	$-2.52739 - 2.62489I$
$u = -1.359440 - 0.207304I$ $a = -0.897134 - 0.451895I$ $b = -0.592239 + 0.125436I$	$-2.93531 - 3.55755I$	$-2.52739 + 2.62489I$
$u = -1.359440 - 0.207304I$ $a = 1.089640 - 0.371279I$ $b = 1.80045 + 1.27064I$	$-2.93531 - 3.55755I$	$-2.52739 + 2.62489I$
$u = 1.42757 + 0.33227I$ $a = -0.923905 + 0.477454I$ $b = -1.51269 - 1.88228I$	$-5.44991 - 9.88301I$	$-3.28252 + 6.06963I$
$u = 1.42757 + 0.33227I$ $a = 0.010591 - 0.744025I$ $b = 0.534351 + 0.711339I$	$-5.44991 - 9.88301I$	$-3.28252 + 6.06963I$

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.42757 - 0.33227I$ $a = -0.923905 - 0.477454I$ $b = -1.51269 + 1.88228I$	$-5.44991 + 9.88301I$	$-3.28252 - 6.06963I$
$u = 1.42757 - 0.33227I$ $a = 0.010591 + 0.744025I$ $b = 0.534351 - 0.711339I$	$-5.44991 + 9.88301I$	$-3.28252 - 6.06963I$
$u = 1.50912$ $a = 0.460021 + 0.442457I$ $b = 0.770987 - 0.303857I$	-10.1546	-6.33750
$u = 1.50912$ $a = 0.460021 - 0.442457I$ $b = 0.770987 + 0.303857I$	-10.1546	-6.33750
$u = -0.342714$ $a = 1.76330$ $b = -0.866117$	2.57083	-2.16010
$u = -0.342714$ $a = -3.36804$ $b = -0.159086$	2.57083	-2.16010

IV.

$$\boldsymbol{I^u_4 = \langle -u^{11}a - u^{11} + \cdots + a + 1,\ u^{11} - 5u^9 + \cdots + a + 2,\ u^{12} - u^{11} + \cdots + 2u^2 + 1\rangle}$$

(i) Arc colorings

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

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

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

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

$$a_3 = \begin{pmatrix} -u^2 + 1 \\ -u^4 + 2u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} a \\ u^{11}a + u^{11} + \cdots - a - 1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -u^{10} + 3u^8 + u^7 - 2u^6 - 2u^5 - u^3a - 2u^4 + au + 2u^2 + a + u \\ u^{11}a - 4u^9a + \cdots + u^2 - a \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u^{11} - u^{10} + \cdots + 2u - 1 \\ u^{11}a - u^{11} + \cdots - a - u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u^{10} + 3u^8 + 2u^7 - 2u^6 - 4u^5 - 3u^4 + 3u^2 + 3u + 1 \\ u^{11} - 4u^9 - u^8 + 5u^7 + 3u^6 - u^5 - 2u^4 - u^3 - u - 1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^{11}a + u^{11} + \cdots + 2u - 1 \\ u^{10}a - u^{11} + \cdots + 5u^3 - u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} u^{11} - u^{10} - 4u^9 + 2u^8 + 7u^7 + u^6 - 5u^5 - 5u^4 - u^3 + 3u^2 + 2u \\ u^{11} - 4u^9 - u^8 + 5u^7 + 3u^6 - u^5 - 2u^4 - u^3 - u - 1 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} u^{11} - 4u^9 - 2u^8 + 6u^7 + 6u^6 - 2u^5 - 6u^4 - 3u^3 + 2u^2 + 2u \\ u^{11} - 3u^9 - 2u^8 + 2u^7 + 4u^6 + 3u^5 - 3u^3 - 2u^2 - u - 2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^8 + 12u^6 + 4u^5 - 8u^4 - 8u^3 - 4u^2 + 2$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.895235+0.524661I$ $a=\ \ 1.053870+0.403232I$ $b=\ \ 1.02100-1.56444I$	$-1.89061-0.92430I$	$-3.71672+0.79423I$
$u=-0.895235+0.524661I$ $a=-0.364606+0.330843I$ $b=\ \ 0.939757-0.425557I$	$-1.89061-0.92430I$	$-3.71672+0.79423I$
$u=-0.895235-0.524661I$ $a=\ \ 1.053870-0.403232I$ $b=\ \ 1.02100+1.56444I$	$-1.89061+0.92430I$	$-3.71672-0.79423I$
$u=-0.895235-0.524661I$ $a=-0.364606-0.330843I$ $b=\ \ 0.939757+0.425557I$	$-1.89061+0.92430I$	$-3.71672-0.79423I$
$u=-0.282166+0.828798I$ $a=-0.792263+0.610180I$ $b=\ \ 0.383261-0.056485I$	$5.69302I$	$0.-5.51057I$
$u=-0.282166+0.828798I$ $a=-0.20722-1.56570I$ $b=-0.47925+2.17825I$	$5.69302I$	$0.-5.51057I$
$u=-0.282166-0.828798I$ $a=-0.792263-0.610180I$ $b=\ \ 0.383261+0.056485I$	$-5.69302I$	$0.+5.51057I$
$u=-0.282166-0.828798I$ $a=-0.20722+1.56570I$ $b=-0.47925-2.17825I$	$-5.69302I$	$0.+5.51057I$
$u=-1.155020+0.191936I$ $a=\ \ 0.827710-0.316699I$ $b=-0.087686+0.786615I$	$1.89061+0.92430I$	$3.71672-0.79423I$
$u=-1.155020+0.191936I$ $a=-1.095480-0.303138I$ $b=-1.53926+1.57073I$	$1.89061+0.92430I$	$3.71672-0.79423I$

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.155020-0.191936I$ $a=\quad 0.827710+0.316699I$ $b=-0.087686-0.786615I$	$1.89061-0.92430I$	$3.71672+0.79423I$
$u=-1.155020-0.191936I$ $a=-1.095480+0.303138I$ $b=-1.53926-1.57073I$	$1.89061-0.92430I$	$3.71672+0.79423I$
$u=\quad 1.323480+0.139870I$ $a=-0.847918+0.234635I$ $b=-0.01623-1.47826I$	$-1.89061-0.92430I$	$-3.71672+0.79423I$
$u=\quad 1.323480+0.139870I$ $a=\quad 0.075702-0.376331I$ $b=-0.831407+1.047810I$	$-1.89061-0.92430I$	$-3.71672+0.79423I$
$u=\quad 1.323480-0.139870I$ $a=-0.847918-0.234635I$ $b=-0.01623+1.47826I$	$-1.89061+0.92430I$	$-3.71672-0.79423I$
$u=\quad 1.323480-0.139870I$ $a=\quad 0.075702+0.376331I$ $b=-0.831407-1.047810I$	$-1.89061+0.92430I$	$-3.71672-0.79423I$
$u=\quad 1.356120+0.270046I$ $a=\quad 0.923718-0.383073I$ $b=\quad 0.95599+1.99574I$	$-5.69302I$	$0.+5.51057I$
$u=\quad 1.356120+0.270046I$ $a=-0.083074+0.627698I$ $b=-0.127208-1.130510I$	$-5.69302I$	$0.+5.51057I$
$u=\quad 1.356120-0.270046I$ $a=\quad 0.923718+0.383073I$ $b=\quad 0.95599-1.99574I$	$5.69302I$	$0.-5.51057I$
$u=\quad 1.356120-0.270046I$ $a=-0.083074-0.627698I$ $b=-0.127208+1.130510I$	$5.69302I$	$0.-5.51057I$

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.152828 + 0.487477I$ $a = -1.50418 + 1.36489I$ $b = -0.820813 - 0.942146I$	$1.89061 - 0.92430I$	$3.71672 + 0.79423I$
$u = 0.152828 + 0.487477I$ $a = 0.51374 - 2.55389I$ $b = 1.10185 + 1.67160I$	$1.89061 - 0.92430I$	$3.71672 + 0.79423I$
$u = 0.152828 - 0.487477I$ $a = -1.50418 - 1.36489I$ $b = -0.820813 + 0.942146I$	$1.89061 + 0.92430I$	$3.71672 - 0.79423I$
$u = 0.152828 - 0.487477I$ $a = 0.51374 + 2.55389I$ $b = 1.10185 - 1.67160I$	$1.89061 + 0.92430I$	$3.71672 - 0.79423I$

V. $I_5^u = \langle 2b - a - 1,\ a^2 - 3,\ u - 1 \rangle$

(i) Arc colorings

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

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

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

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

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

$$a_{10} = \begin{pmatrix} a \\ \frac{1}{2}a + \frac{1}{2} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} a \\ -\frac{1}{2}a + \frac{1}{2} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -3 \\ -\frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} 3 \\ \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -2a - 1 \\ -1 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -2a \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_5^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = 1.73205$ $b = 1.36603$	9.86960	0
$u = 1.00000$ $a = -1.73205$ $b = -0.366025$	9.86960	0

VI. $I_6^u = \langle 2b - u + 1,\ 3a - u,\ u^2 - 3\rangle$

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u \\ -2u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -2 \\ -3 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} \frac{1}{3}u \\ \frac{1}{2}u - \frac{1}{2} \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} \frac{1}{3}u - 2 \\ \frac{1}{2}u - \frac{7}{2} \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -\frac{1}{3}u \\ \frac{1}{2}u + \frac{1}{2} \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -\frac{1}{3}u \\ -\frac{1}{2}u + \frac{1}{2} \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ u \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -2 \\ -3 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_6^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.73205$ $a = 0.577350$ $b = 0.366025$	-9.86960	0
$u = -1.73205$ $a = -0.577350$ $b = -1.36603$	-9.86960	0

VII. $\boldsymbol{I^u_7 = \langle b+1,\ a,\ u-1 \rangle}$

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

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

$a_{12} = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$

(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_7 c_8	$u - 1$
c_3, c_4, c_5 c_9, c_{10}, c_{11}	u
c_6, c_{12}	$u + 1$

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_7	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = 0$ $b = -1.00000$	-3.28987	-12.0000

VIII. $\boldsymbol{I_8^u = \langle 4b^2 - 4b + 5,\ 2ba + 4u + \cdots - 3a + 7,\ 2bu + u + \cdots - 2a + 3,\ a^2 - 2a + 1,\ au + a - u - 1,\ u^2 + 2u + 1\rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_8^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.00000$ $a = \quad 1.00000$ $b = \quad 0.500000 + 1.000000I$	0	0
$u = -1.00000$ $a = \quad 1.00000$ $b = \quad 0.500000 + 1.000000I$	0	0
$u = -1.00000$ $a = \quad 1.00000$ $b = \quad 0.500000 - 1.000000I$	0	0
$u = -1.00000$ $a = \quad 1.00000$ $b = \quad 0.500000 - 1.000000I$	0	0

IX. $I_9^u = \langle a - 1,\ u + 1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(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_9^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=\cdots$		
$a=\cdots$	0	0
$b=\cdots$		

X. $\boldsymbol{I_1^v = \langle a,\ b-1,\ v+1 \rangle}$

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

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

$a_{12} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

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

XI. u-Polynomials

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

XII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_4, c_5, c_6 c_7, c_8, c_9 c_{10}, c_{11}, c_{12}	$y(y-3)^2(y-1)^7$ $\cdot (y^8 - 9y^7 + 32y^6 - 53y^5 + 31y^4 + 15y^3 - 15y^2 - 7y + 1)^2$ $\cdot (y^{12} - 15y^{11} + \cdots + 16y + 4)(y^{12} - 9y^{11} + \cdots + 4y + 1)^2$ $\cdot (y^{16} - 13y^{15} + \cdots - 532y + 121)$