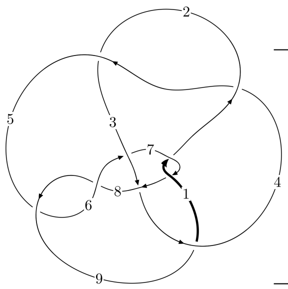
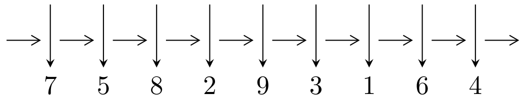
9_{38} ($K9a_{30}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u = \langle & -u^{10} - 2u^9 - 5u^8 - 11u^7 - 14u^6 - 20u^5 - 23u^4 - 16u^3 - 13u^2 + 4b - 4u + 1, \\
& u^{10} + 2u^9 + 5u^8 + 11u^7 + 10u^6 + 12u^5 + 15u^4 - 7u^2 + 8a - 4u - 9, \\
& u^{11} + u^{10} + 3u^9 + 6u^8 + 7u^7 + 10u^6 + 11u^5 + 9u^4 + 9u^3 + 3u^2 + 3u + 1 \rangle \\
I_2^u = \langle & 20020u^{17} - 48508u^{16} + \cdots + 11959b - 19142,\ -16736u^{17} + 49970u^{16} + \cdots + 11959a - 645, \\
& u^{18} - 3u^{17} + \cdots - 2u + 1 \rangle \\
I_3^u = \langle & b + 1,\ 2a + 1,\ u - 1 \rangle
\end{aligned}$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 30 representations.

[1]The image of knot diagram is generated by the software "**Draw programme**" developed by Andrew Bartholomew(`http://www.layer8.co.uk/maths/draw/index.htm#Running-draw`), where we modified some parts for our purpose(`https://github.com/CATsTAILs/LinksPainter`).

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

I.

$$\boldsymbol{I_1^u = \langle -u^{10}-2u^9+\cdots+4b+1,\ u^{10}+2u^9+\cdots+8a-9,\ u^{11}+u^{10}+\cdots+3u+1\rangle}$$

(i) Arc colorings

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

$$a_9 = \begin{pmatrix}0\\u\end{pmatrix}$$

$$a_3 = \begin{pmatrix}-\frac{1}{8}u^{10}-\frac{1}{4}u^9+\cdots+\frac{1}{2}u+\frac{9}{8}\\ \frac{1}{4}u^{10}+\frac{1}{2}u^9+\cdots+u-\frac{1}{4}\end{pmatrix}$$

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

$$a_7 = \begin{pmatrix}-\frac{1}{16}u^{10}-\frac{1}{8}u^9+\cdots-\frac{7}{4}u+\frac{1}{16}\\ -\frac{1}{8}u^{10}-\frac{1}{4}u^9+\cdots-\frac{1}{2}u+\frac{1}{8}\end{pmatrix}$$

$$a_2 = \begin{pmatrix}\frac{1}{8}u^{10}+\frac{1}{4}u^9+\cdots+\frac{3}{2}u+\frac{7}{8}\\ \frac{1}{4}u^{10}+\frac{1}{2}u^9+\cdots+u-\frac{1}{4}\end{pmatrix}$$

$$a_1 = \begin{pmatrix}\frac{1}{16}u^{10}+\frac{1}{8}u^9+\cdots+\frac{7}{4}u+\frac{15}{16}\\ \frac{1}{8}u^{10}+\frac{1}{4}u^9+\cdots+\frac{3}{2}u-\frac{1}{8}\end{pmatrix}$$

$$a_4 = \begin{pmatrix}\frac{3}{8}u^{10}+\frac{3}{4}u^9+\cdots+\frac{5}{2}u+\frac{13}{8}\\ \frac{5}{4}u^{10}+\frac{3}{2}u^9+\cdots+u-\frac{1}{4}\end{pmatrix}$$

$$a_8 = \begin{pmatrix}u\\u^3+u\end{pmatrix}$$

$$a_8 = \begin{pmatrix}u\\u^3+u\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes

$$= -\frac{27}{16}u^{10}+\frac{13}{8}u^9-\frac{23}{16}u^8-\frac{41}{16}u^7+\frac{37}{8}u^6+\frac{7}{4}u^5-\frac{13}{16}u^4+7u^3-\frac{3}{16}u^2+\frac{31}{4}u-\frac{181}{16}$$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_5, c_7 c_8	$u^{11} + u^{10} + 3u^9 + 6u^8 + 7u^7 + 10u^6 + 11u^5 + 9u^4 + 9u^3 + 3u^2 + 3u + 1$
c_2, c_4	$u^{11} - 3u^9 + u^8 + 4u^7 - 2u^6 - u^5 + 10u^4 - 5u^3 - 16u^2 + 9u + 4$
c_3	$u^{11} - 3u^{10} + \cdots - 6u + 8$
c_6, c_9	$2(2u^{11} + u^{10} - 3u^8 + 11u^7 + 2u^6 - 14u^5 + 7u^4 + 6u^3 - 5u^2 + 1)$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_5, c_7 c_8	$y^{11} + 5y^{10} + 11y^9 + 8y^8 - 5y^7 + 47y^5 + 87y^4 + 73y^3 + 27y^2 + 3y - 1$
c_2, c_4	$y^{11} - 6y^{10} + \cdots + 209y - 16$
c_3	$y^{11} + 3y^{10} + \cdots + 52y - 64$
c_6, c_9	$4(4y^{11} - y^{10} + \cdots + 10y - 1)$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.361784+0.962924I$ $a=\ \ 0.42885-1.90311I$ $b=-1.019420+0.904921I$	$0.53843+4.57539I$	$-8.21994-7.99945I$
$u=-0.361784-0.962924I$ $a=\ \ 0.42885+1.90311I$ $b=-1.019420-0.904921I$	$0.53843-4.57539I$	$-8.21994+7.99945I$
$u=-1.186630+0.355210I$ $a=\ \ 0.360998+0.003803I$ $b=\ \ 0.988348+0.222965I$	$-3.44203-0.72668I$	$-9.61068+7.91738I$
$u=-1.186630-0.355210I$ $a=\ \ 0.360998-0.003803I$ $b=\ \ 0.988348-0.222965I$	$-3.44203+0.72668I$	$-9.61068-7.91738I$
$u=\ \ 0.256965+0.681325I$ $a=\ \ 0.565680+0.993565I$ $b=-1.41820-0.12736I$	$-1.48009-1.36667I$	$-10.72983+4.40179I$
$u=\ \ 0.256965-0.681325I$ $a=\ \ 0.565680-0.993565I$ $b=-1.41820+0.12736I$	$-1.48009+1.36667I$	$-10.72983-4.40179I$
$u=\ \ 0.391610+1.210140I$ $a=-0.57189+1.31384I$ $b=\ \ 0.308687-1.224930I$	$6.41512-6.30680I$	$-3.61485+5.61897I$
$u=\ \ 0.391610-1.210140I$ $a=-0.57189-1.31384I$ $b=\ \ 0.308687+1.224930I$	$6.41512+6.30680I$	$-3.61485-5.61897I$
$u=\ \ 0.57851+1.29417I$ $a=-0.05089-1.59336I$ $b=\ \ 1.29294+0.67490I$	$3.25113-12.93290I$	$-6.73085+7.81031I$
$u=\ \ 0.57851-1.29417I$ $a=-0.05089+1.59336I$ $b=\ \ 1.29294-0.67490I$	$3.25113+12.93290I$	$-6.73085-7.81031I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.357337$ $a = \quad 1.03450$ $b = -0.304704$	-0.695510	-14.4380

II. $I^u_2 = \langle 20020u^{17} - 48508u^{16} + \cdots + 11959b - 19142,\ -16736u^{17} + 49970u^{16} + \cdots + 11959a - 645,\ u^{18} - 3u^{17} + \cdots - 2u + 1\rangle$

(i) Arc colorings

$$a_5 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1.39945u^{17} - 4.17844u^{16} + \cdots + 1.61753u + 0.0539343 \\ -1.67405u^{17} + 4.05619u^{16} + \cdots - 1.50280u + 1.60064 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -0.146501u^{17} + 0.631491u^{16} + \cdots - 2.98386u + 4.22619 \\ -0.318087u^{17} + 1.15194u^{16} + \cdots - 0.807425u - 0.186972 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -0.274605u^{17} - 0.122251u^{16} + \cdots + 0.114725u + 1.65457 \\ -1.67405u^{17} + 4.05619u^{16} + \cdots - 1.50280u + 1.60064 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -3.02350u^{17} + 9.06932u^{16} + \cdots - 5.85985u + 4.11447 \\ -1.51769u^{17} + 3.28171u^{16} + \cdots + 1.19801u + 0.319257 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 2.04465u^{17} - 5.56234u^{16} + \cdots + 1.85467u - 1.18196 \\ -0.318087u^{17} + 1.15194u^{16} + \cdots - 0.807425u - 0.186972 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= \frac{35580}{11959}u^{17} - \frac{72112}{11959}u^{16} + \cdots + \frac{57268}{11959}u - \frac{174278}{11959}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_5, c_7 c_8	$u^{18} - 3u^{17} + \cdots - 2u + 1$
c_2, c_4	$(u^9 - u^8 - 2u^7 + 3u^6 + u^5 - 3u^4 + 2u^3 - u + 1)^2$
c_3	$(u^9 + u^8 + 2u^7 + u^6 + 3u^5 + u^4 + 2u^3 + u - 1)^2$
c_6, c_9	$u^{18} - 3u^{17} + \cdots + 4u + 11$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_5, c_7 c_8	$y^{18} + 11y^{17} + \cdots + 14y^2 + 1$
c_2, c_4	$(y^9 - 5y^8 + 12y^7 - 15y^6 + 9y^5 + y^4 - 4y^3 + 2y^2 + y - 1)^2$
c_3	$(y^9 + 3y^8 + 8y^7 + 13y^6 + 17y^5 + 17y^4 + 12y^3 + 6y^2 + y - 1)^2$
c_6, c_9	$y^{18} + 7y^{17} + \cdots + 1260y + 121$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.131255 + 1.025520I$ $a = 2.21228 - 3.01855I$ $b = -0.825933$	2.09142	$-12.65235 + 0.I$
$u = -0.131255 - 1.025520I$ $a = 2.21228 + 3.01855I$ $b = -0.825933$	2.09142	$-12.65235 + 0.I$
$u = 1.068960 + 0.157811I$ $a = 0.330746 + 0.183937I$ $b = 1.172470 - 0.500383I$	$-0.30826 + 7.08493I$	$-9.57680 - 5.91335I$
$u = 1.068960 - 0.157811I$ $a = 0.330746 - 0.183937I$ $b = 1.172470 + 0.500383I$	$-0.30826 - 7.08493I$	$-9.57680 + 5.91335I$
$u = 0.255037 + 0.861194I$ $a = 0.31995 + 1.69908I$ $b = -1.173910 - 0.391555I$	$-1.08148 - 1.33617I$	$-11.28409 + 0.70175I$
$u = 0.255037 - 0.861194I$ $a = 0.31995 - 1.69908I$ $b = -1.173910 + 0.391555I$	$-1.08148 + 1.33617I$	$-11.28409 - 0.70175I$
$u = -0.287150 + 1.197360I$ $a = -0.077942 - 1.012210I$ $b = 0.141484 + 0.739668I$	$2.67293 + 2.45442I$	$-6.32792 - 2.91298I$
$u = -0.287150 - 1.197360I$ $a = -0.077942 + 1.012210I$ $b = 0.141484 - 0.739668I$	$2.67293 - 2.45442I$	$-6.32792 + 2.91298I$
$u = 0.605058 + 1.127080I$ $a = 0.639032 - 1.048120I$ $b = 0.772920 + 0.510351I$	$5.07330 - 2.09337I$	$-3.48501 + 4.16283I$
$u = 0.605058 - 1.127080I$ $a = 0.639032 + 1.048120I$ $b = 0.772920 - 0.510351I$	$5.07330 + 2.09337I$	$-3.48501 - 4.16283I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.658024 + 0.097431I$ $a = 0.910679 + 0.215358I$ $b = 0.141484 - 0.739668I$	$2.67293 - 2.45442I$	$-6.32792 + 2.91298I$
$u = 0.658024 - 0.097431I$ $a = 0.910679 - 0.215358I$ $b = 0.141484 + 0.739668I$	$2.67293 + 2.45442I$	$-6.32792 - 2.91298I$
$u = -0.62758 + 1.28014I$ $a = 0.023182 + 1.259910I$ $b = 1.172470 - 0.500383I$	$-0.30826 + 7.08493I$	$-9.57680 - 5.91335I$
$u = -0.62758 - 1.28014I$ $a = 0.023182 - 1.259910I$ $b = 1.172470 + 0.500383I$	$-0.30826 - 7.08493I$	$-9.57680 + 5.91335I$
$u = 0.31006 + 1.39846I$ $a = -0.515395 + 0.355009I$ $b = 0.772920 - 0.510351I$	$5.07330 + 2.09337I$	$-3.48501 - 4.16283I$
$u = 0.31006 - 1.39846I$ $a = -0.515395 - 0.355009I$ $b = 0.772920 + 0.510351I$	$5.07330 - 2.09337I$	$-3.48501 + 4.16283I$
$u = -0.351155 + 0.305986I$ $a = 1.157480 - 0.200845I$ $b = -1.173910 - 0.391555I$	$-1.08148 - 1.33617I$	$-11.28409 + 0.70175I$
$u = -0.351155 - 0.305986I$ $a = 1.157480 + 0.200845I$ $b = -1.173910 + 0.391555I$	$-1.08148 + 1.33617I$	$-11.28409 - 0.70175I$

III. $I_3^u = \langle b+1,\ 2a+1,\ u-1 \rangle$

(i) Arc colorings

$$a_5 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -0.5 \\ -1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1.25 \\ 1.5 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -1.5 \\ -1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -0.25 \\ 0.5 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -0.5 \\ -1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -9.75$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4, c_8	$u+1$
c_2, c_5, c_7	$u-1$
c_3	u
c_6	$2(2u+1)$
c_9	$2(2u-1)$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_4 c_5, c_7, c_8	$y - 1$
c_3	y
c_6, c_9	$4(4y - 1)$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \quad 1.00000$ $a = -0.500000$ $b = -1.00000$	-3.28987	-9.75000

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_8	$(u+1)$ $\cdot (u^{11} + u^{10} + 3u^9 + 6u^8 + 7u^7 + 10u^6 + 11u^5 + 9u^4 + 9u^3 + 3u^2 + 3u + 1)$ $\cdot (u^{18} - 3u^{17} + \cdots - 2u + 1)$
c_2	$(u-1)(u^9 - u^8 - 2u^7 + 3u^6 + u^5 - 3u^4 + 2u^3 - u + 1)^2$ $\cdot (u^{11} - 3u^9 + u^8 + 4u^7 - 2u^6 - u^5 + 10u^4 - 5u^3 - 16u^2 + 9u + 4)$
c_3	$u(u^9 + u^8 + 2u^7 + u^6 + 3u^5 + u^4 + 2u^3 + u - 1)^2$ $\cdot (u^{11} - 3u^{10} + \cdots - 6u + 8)$
c_4	$(u+1)(u^9 - u^8 - 2u^7 + 3u^6 + u^5 - 3u^4 + 2u^3 - u + 1)^2$ $\cdot (u^{11} - 3u^9 + u^8 + 4u^7 - 2u^6 - u^5 + 10u^4 - 5u^3 - 16u^2 + 9u + 4)$
c_5, c_7	$(u-1)$ $\cdot (u^{11} + u^{10} + 3u^9 + 6u^8 + 7u^7 + 10u^6 + 11u^5 + 9u^4 + 9u^3 + 3u^2 + 3u + 1)$ $\cdot (u^{18} - 3u^{17} + \cdots - 2u + 1)$
c_6	$4(2u+1)(2u^{11} + u^{10} + \cdots - 5u^2 + 1)$ $\cdot (u^{18} - 3u^{17} + \cdots + 4u + 11)$
c_9	$4(2u-1)(2u^{11} + u^{10} + \cdots - 5u^2 + 1)$ $\cdot (u^{18} - 3u^{17} + \cdots + 4u + 11)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_5, c_7 c_8	$(y-1)$ $\cdot\,(y^{11}+5y^{10}+11y^9+8y^8-5y^7+47y^5+87y^4+73y^3+27y^2+3y-1)$ $\cdot\,(y^{18}+11y^{17}+\cdots+14y^2+1)$
c_2, c_4	$(y-1)(y^9-5y^8+12y^7-15y^6+9y^5+y^4-4y^3+2y^2+y-1)^2$ $\cdot\,(y^{11}-6y^{10}+\cdots+209y-16)$
c_3	$y(y^9+3y^8+8y^7+13y^6+17y^5+17y^4+12y^3+6y^2+y-1)^2$ $\cdot\,(y^{11}+3y^{10}+\cdots+52y-64)$
c_6, c_9	$16(4y-1)(4y^{11}-y^{10}+\cdots+10y-1)(y^{18}+7y^{17}+\cdots+1260y+121)$