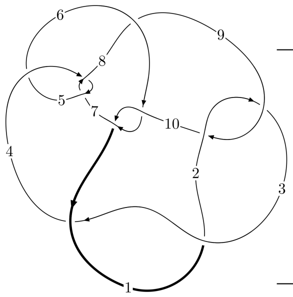
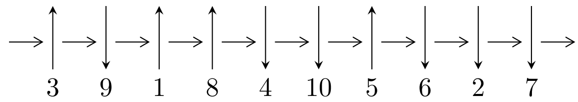
10_{59} $(K10a_2)$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I_1^u = \langle u^{35} - 4u^{34} + \cdots + 2b - 4,\ -6u^{35} + 17u^{34} + \cdots + 2a + 7,\ u^{36} - 3u^{35} + \cdots - 2u + 1\rangle$$
$$I_2^u = \langle b + u,\ a + 1,\ u^2 + u + 1\rangle$$
$$I_3^u = \langle u^2 + b,\ -u^2 + a - 1,\ u^5 + u^3 + u - 1\rangle$$
$$I_4^u = \langle b - u - 1,\ a + u,\ u^2 + u + 1\rangle$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 45 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. $I^u_1 = \langle u^{35}-4u^{34}+\cdots+2b-4,\ -6u^{35}+17u^{34}+\cdots+2a+7,\ u^{36}-3u^{35}+\cdots-2u+1\rangle$

(i) Arc colorings

$$a_4 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_8 = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_5 = \begin{pmatrix}1\\-u^2\end{pmatrix}$$
$$a_6 = \begin{pmatrix}u^2+1\\-u^2\end{pmatrix}$$
$$a_1 = \begin{pmatrix}3u^{35}-\frac{17}{2}u^{34}+\cdots+\frac{13}{2}u-\frac{7}{2}\\-\frac{1}{2}u^{35}+2u^{34}+\cdots-\frac{3}{2}u+2\end{pmatrix}$$
$$a_9 = \begin{pmatrix}-u^5-2u^3-u\\u^5+u^3+u\end{pmatrix}$$
$$a_3 = \begin{pmatrix}-\frac{1}{2}u^{34}+u^{33}+\cdots-\frac{1}{2}u-\frac{1}{2}\\\frac{1}{2}u^{35}-u^{34}+\cdots-\frac{1}{2}u^2+\frac{3}{2}u\end{pmatrix}$$
$$a_2 = \begin{pmatrix}\frac{1}{2}u^{35}-\frac{3}{2}u^{34}+\cdots-\frac{3}{2}u^2-\frac{1}{2}\\\frac{1}{2}u^{35}-u^{34}+\cdots-\frac{1}{2}u^2+\frac{3}{2}u\end{pmatrix}$$
$$a_7 = \begin{pmatrix}-u\\u^3+u\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}2u^{35}-\frac{9}{2}u^{34}+\cdots+\frac{7}{2}u-\frac{5}{2}\\-\frac{3}{2}u^{35}+4u^{34}+\cdots-\frac{3}{2}u+2\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{13}{2}u^{35}+18u^{34}+\cdots-\frac{11}{2}u-2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3	$u^{36} - 11u^{35} + \cdots - 4u + 1$
c_2, c_9	$u^{36} - 3u^{35} + \cdots - 4u + 1$
c_4, c_7	$u^{36} + 3u^{35} + \cdots + 2u + 1$
c_5	$u^{36} + 19u^{35} + \cdots + 4u + 1$
c_6, c_{10}	$u^{36} - 4u^{35} + \cdots - 48u + 16$
c_8	$u^{36} - 3u^{35} + \cdots - 26u + 17$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3	$y^{36} + 31y^{35} + \cdots + 196y + 1$
c_2, c_9	$y^{36} + 11y^{35} + \cdots + 4y + 1$
c_4, c_7	$y^{36} + 19y^{35} + \cdots + 4y + 1$
c_5	$y^{36} - y^{35} + \cdots - 12y + 1$
c_6, c_{10}	$y^{36} - 20y^{35} + \cdots - 128y + 256$
c_8	$y^{36} - 21y^{35} + \cdots + 5682y + 289$

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_1	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.387195+0.859809I$ $a=\quad 0.864957+0.109414I$ $b=-0.0189081+0.0958332I$	$-0.34130-1.65777I$	$-2.55644+4.36495I$
$u=-0.387195-0.859809I$ $a=\quad 0.864957-0.109414I$ $b=-0.0189081-0.0958332I$	$-0.34130+1.65777I$	$-2.55644-4.36495I$
$u=-0.729583+0.777572I$ $a=-1.03050+1.01725I$ $b=\quad 0.317863-1.274650I$	$-1.45237-5.42060I$	$-4.83818+6.67480I$
$u=-0.729583-0.777572I$ $a=-1.03050-1.01725I$ $b=\quad 0.317863+1.274650I$	$-1.45237+5.42060I$	$-4.83818-6.67480I$
$u=\quad 0.859716+0.267248I$ $a=-0.901846+1.060320I$ $b=\quad 0.44242-1.51885I$	$-4.44713-8.11971I$	$-3.47630+5.34748I$
$u=\quad 0.859716-0.267248I$ $a=-0.901846-1.060320I$ $b=\quad 0.44242+1.51885I$	$-4.44713+8.11971I$	$-3.47630-5.34748I$
$u=\quad 0.849597+0.216556I$ $a=\quad 0.853721-0.852880I$ $b=-0.173950+1.239740I$	$-5.28539-2.14662I$	$-5.02569+0.44253I$
$u=\quad 0.849597-0.216556I$ $a=\quad 0.853721+0.852880I$ $b=-0.173950-1.239740I$	$-5.28539+2.14662I$	$-5.02569-0.44253I$
$u=-0.551728+0.987777I$ $a=-0.415426-1.128760I$ $b=\quad 0.676359-0.193589I$	$1.29309-3.12534I$	$1.43285+2.16786I$
$u=-0.551728-0.987777I$ $a=-0.415426+1.128760I$ $b=\quad 0.676359+0.193589I$	$1.29309+3.12534I$	$1.43285-2.16786I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.587634 + 0.555787I$ $a = -0.996846 + 0.434125I$ $b = 0.801082 - 0.030150I$	$2.54802 - 1.41982I$	$3.82315 + 3.52465I$
$u = -0.587634 - 0.555787I$ $a = -0.996846 - 0.434125I$ $b = 0.801082 + 0.030150I$	$2.54802 + 1.41982I$	$3.82315 - 3.52465I$
$u = -0.424101 + 1.130320I$ $a = 1.47023 + 1.05531I$ $b = 0.079663 + 1.259790I$	$-4.09621 - 1.05243I$	$-6.63369 + 0.71979I$
$u = -0.424101 - 1.130320I$ $a = 1.47023 - 1.05531I$ $b = 0.079663 - 1.259790I$	$-4.09621 + 1.05243I$	$-6.63369 - 0.71979I$
$u = 0.515700 + 1.111390I$ $a = -1.30481 + 0.95936I$ $b = 1.199870 + 0.507968I$	$-0.65138 + 7.27213I$	$-2.75984 - 7.42786I$
$u = 0.515700 - 1.111390I$ $a = -1.30481 - 0.95936I$ $b = 1.199870 - 0.507968I$	$-0.65138 - 7.27213I$	$-2.75984 + 7.42786I$
$u = 0.445924 + 1.144390I$ $a = 0.761539 - 0.451840I$ $b = -0.595300 + 0.157343I$	$-4.74271 + 4.00295I$	$-9.23293 - 4.01986I$
$u = 0.445924 - 1.144390I$ $a = 0.761539 + 0.451840I$ $b = -0.595300 - 0.157343I$	$-4.74271 - 4.00295I$	$-9.23293 + 4.01986I$
$u = -0.471044 + 1.134590I$ $a = -1.37055 - 1.28746I$ $b = 0.30745 - 1.38445I$	$-3.75883 - 6.78157I$	$-5.67848 + 6.13587I$
$u = -0.471044 - 1.134590I$ $a = -1.37055 + 1.28746I$ $b = 0.30745 + 1.38445I$	$-3.75883 + 6.78157I$	$-5.67848 - 6.13587I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.024315 + 0.768307I$ $a = 1.47731 - 0.09368I$ $b = 0.090892 - 0.615872I$	$-1.10226 - 1.38558I$	$-6.76484 + 3.92520I$
$u = -0.024315 - 0.768307I$ $a = 1.47731 + 0.09368I$ $b = 0.090892 + 0.615872I$	$-1.10226 + 1.38558I$	$-6.76484 - 3.92520I$
$u = 0.264173 + 1.234870I$ $a = 0.373926 - 0.622707I$ $b = 0.32517 - 1.56431I$	$-9.31556 - 4.56904I$	$-8.72559 + 2.82656I$
$u = 0.264173 - 1.234870I$ $a = 0.373926 + 0.622707I$ $b = 0.32517 + 1.56431I$	$-9.31556 + 4.56904I$	$-8.72559 - 2.82656I$
$u = 0.304638 + 1.233790I$ $a = -0.105861 + 0.569620I$ $b = -0.119820 + 1.383530I$	$-9.88952 + 1.61524I$	$-9.56754 - 2.32735I$
$u = 0.304638 - 1.233790I$ $a = -0.105861 - 0.569620I$ $b = -0.119820 - 1.383530I$	$-9.88952 - 1.61524I$	$-9.56754 + 2.32735I$
$u = 0.636789 + 0.302809I$ $a = -1.62143 + 0.78351I$ $b = 1.017930 - 0.416218I$	$1.68165 - 2.75426I$	$1.42028 + 4.13268I$
$u = 0.636789 - 0.302809I$ $a = -1.62143 - 0.78351I$ $b = 1.017930 + 0.416218I$	$1.68165 + 2.75426I$	$1.42028 - 4.13268I$
$u = 0.549648 + 1.188840I$ $a = 1.80307 - 0.33069I$ $b = -0.278564 - 1.254500I$	$-8.19229 + 7.27945I$	$-7.73458 - 3.93070I$
$u = 0.549648 - 1.188840I$ $a = 1.80307 + 0.33069I$ $b = -0.278564 + 1.254500I$	$-8.19229 - 7.27945I$	$-7.73458 + 3.93070I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.572738 + 1.180430I$ $a = -1.98873 + 0.46037I$ $b = 0.48742 + 1.57860I$	$-7.1856 + 13.3899I$	$-6.02318 - 8.65555I$
$u = 0.572738 - 1.180430I$ $a = -1.98873 - 0.46037I$ $b = 0.48742 - 1.57860I$	$-7.1856 - 13.3899I$	$-6.02318 + 8.65555I$
$u = 0.274519 + 0.624372I$ $a = -2.10757 + 0.21578I$ $b = 0.635668 + 1.038860I$	$-0.04793 + 2.91691I$	$-3.21123 - 0.65680I$
$u = 0.274519 - 0.624372I$ $a = -2.10757 - 0.21578I$ $b = 0.635668 - 1.038860I$	$-0.04793 - 2.91691I$	$-3.21123 + 0.65680I$
$u = -0.597841 + 0.093585I$ $a = -0.261177 + 0.245146I$ $b = 0.304766 + 1.198650I$	$-0.94199 + 2.63032I$	$-1.44776 - 2.88489I$
$u = -0.597841 - 0.093585I$ $a = -0.261177 - 0.245146I$ $b = 0.304766 - 1.198650I$	$-0.94199 - 2.63032I$	$-1.44776 + 2.88489I$

II. $I_2^u = \langle b+u,\ a+1,\ u^2+u+1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 8u+1$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_4, c_5, c_7 c_8, c_9	$y^2 + y + 1$
c_6, c_{10}	y^2

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = -1.00000$ $b = 0.500000 - 0.866025I$	$-\,4.05977I$	$-3.00000 + 6.92820I$
$u = -0.500000 - 0.866025I$ $a = -1.00000$ $b = 0.500000 + 0.866025I$	$4.05977I$	$-3.00000 - 6.92820I$

III. $I_3^u = \langle u^2+b,\ -u^2+a-1,\ u^5+u^3+u-1\rangle$

(i) Arc colorings

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

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

$$a_5 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

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

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

$$a_9 = \begin{pmatrix} -u^3-1 \\ 1 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} -u^2+u+1 \\ u^4-u \end{pmatrix}$$

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

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -6$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.707729 + 0.841955I$ $a = 0.79199 - 1.19175I$ $b = 0.208008 + 1.191750I$	-1.64493	-6.00000
$u = -0.707729 - 0.841955I$ $a = 0.79199 + 1.19175I$ $b = 0.208008 - 1.191750I$	-1.64493	-6.00000
$u = 0.389287 + 1.070680I$ $a = 0.005198 + 0.833601I$ $b = 0.994802 - 0.833601I$	-1.64493	-6.00000
$u = 0.389287 - 1.070680I$ $a = 0.005198 - 0.833601I$ $b = 0.994802 + 0.833601I$	-1.64493	-6.00000
$u = 0.636883$ $a = 1.40562$ $b = -0.405620$	-1.64493	-6.00000

IV. $I_4^u = \langle b - u - 1,\ a + u,\ u^2 + u + 1 \rangle$

(i) Arc colorings

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

(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_4 c_5, c_8	$u^2 + u + 1$
c_3, c_7, c_9	$u^2 - u + 1$
c_6, c_{10}	u^2

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_4, c_5, c_7 c_8, c_9	$y^2 + y + 1$
c_6, c_{10}	y^2

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = 0.500000 - 0.866025I$ $b = 0.500000 + 0.866025I$	0	0
$u = -0.500000 - 0.866025I$ $a = 0.500000 + 0.866025I$ $b = 0.500000 - 0.866025I$	0	0

V. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u^2+u+1)^2)(u^5-2u^4+\cdots+u+1)(u^{36}-11u^{35}+\cdots-4u+1)$
c_2	$((u^2+u+1)^2)(u^5+u^3+u+1)(u^{36}-3u^{35}+\cdots-4u+1)$
c_3	$((u^2-u+1)^2)(u^5-2u^4+\cdots+u+1)(u^{36}-11u^{35}+\cdots-4u+1)$
c_4	$((u^2+u+1)^2)(u^5+u^3+u+1)(u^{36}+3u^{35}+\cdots+2u+1)$
c_5	$((u^2+u+1)^2)(u^5+2u^4+\cdots+u-1)(u^{36}+19u^{35}+\cdots+4u+1)$
c_6, c_{10}	$u^4(u+1)^5(u^{36}-4u^{35}+\cdots-48u+16)$
c_7	$((u^2-u+1)^2)(u^5+u^3+u+1)(u^{36}+3u^{35}+\cdots+2u+1)$
c_8	$((u^2+u+1)^2)(u^5+u^3-2u^2-u+2)(u^{36}-3u^{35}+\cdots-26u+17)$
c_9	$((u^2-u+1)^2)(u^5+u^3+u+1)(u^{36}-3u^{35}+\cdots-4u+1)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_3	$(y^2+y+1)^2(y^5+2y^4+3y^3+6y^2+5y-1)$ $\cdot (y^{36}+31y^{35}+\cdots+196y+1)$
c_2, c_9	$((y^2+y+1)^2)(y^5+2y^4+\cdots+y-1)(y^{36}+11y^{35}+\cdots+4y+1)$
c_4, c_7	$((y^2+y+1)^2)(y^5+2y^4+\cdots+y-1)(y^{36}+19y^{35}+\cdots+4y+1)$
c_5	$((y^2+y+1)^2)(y^5+2y^4+\cdots+5y-1)(y^{36}-y^{35}+\cdots-12y+1)$
c_6, c_{10}	$y^4(y-1)^5(y^{36}-20y^{35}+\cdots-128y+256)$
c_8	$(y^2+y+1)^2(y^5+2y^4-y^3-6y^2+9y-4)$ $\cdot (y^{36}-21y^{35}+\cdots+5682y+289)$