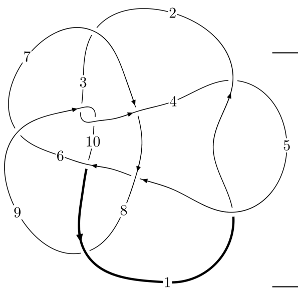
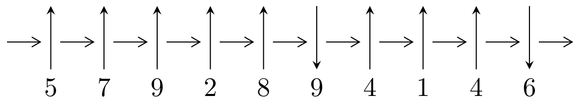
10_{165} $(K10n_{37})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u = \langle &u^{12} + 5u^{11} + 16u^{10} + 34u^9 + 53u^8 + 61u^7 + 48u^6 + 20u^5 - 9u^4 - 24u^3 - 20u^2 + b - 11u - 3,\\
&-3u^{12} - 13u^{11} - 41u^{10} - 85u^9 - 136u^8 - 167u^7 - 148u^6 - 90u^5 - 5u^4 + 54u^3 + 63u^2 + 2a + 50u + 14,\\
&u^{13} + 5u^{12} + 17u^{11} + 39u^{10} + 68u^9 + 91u^8 + 90u^7 + 62u^6 + 15u^5 - 24u^4 - 37u^3 - 30u^2 - 12u - 2\rangle\\
I_2^u = \langle &-u^3 - u^2 + b - u - 1,\ u^5 + 2u^4 + 4u^3 + 3u^2 + 2a + 3u + 2,\ u^6 + 2u^5 + 4u^4 + 5u^3 + 5u^2 + 4u + 2\rangle\\
I_3^u = \langle &-u^5 + u^4 - 2u^3 + au + u^2 + b - u + 1,\\
&u^5a - 2u^4a - 2u^5 + 4u^3a + 3u^4 - 4u^2a - 7u^3 + a^2 + 3au + 7u^2 - 2a - 6u + 4,\\
&u^6 - u^5 + 3u^4 - 2u^3 + 2u^2 - u - 1\rangle
\end{aligned}$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 31 representations.

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

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

I. $I_1^u =$ $\langle u^{12}+5u^{11}+\cdots+b-3,\ -3u^{12}-13u^{11}+\cdots+2a+14,\ u^{13}+5u^{12}+\cdots-12u-2\rangle$

(i) Arc colorings

$$a_1 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_5 = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_2 = \begin{pmatrix}1\\-u^2\end{pmatrix}$$
$$a_8 = \begin{pmatrix}\frac{3}{2}u^{12}+\frac{13}{2}u^{11}+\cdots-25u-7\\-u^{12}-5u^{11}+\cdots+11u+3\end{pmatrix}$$
$$a_6 = \begin{pmatrix}\frac{3}{2}u^{12}+\frac{13}{2}u^{11}+\cdots-20u-4\\-u^{12}-5u^{11}+\cdots+15u+3\end{pmatrix}$$
$$a_9 = \begin{pmatrix}\frac{1}{2}u^{12}+\frac{3}{2}u^{11}+\cdots-14u-4\\-u^{12}-5u^{11}+\cdots+11u+3\end{pmatrix}$$
$$a_4 = \begin{pmatrix}-u\\u^3+u\end{pmatrix}$$
$$a_3 = \begin{pmatrix}\frac{1}{2}u^{12}+\frac{5}{2}u^{11}+\cdots-4u-1\\u^{12}+4u^{11}+\cdots-5u-1\end{pmatrix}$$
$$a_7 = \begin{pmatrix}\frac{1}{2}u^{12}+\frac{5}{2}u^{11}+\cdots-26u-7\\-u^{12}-4u^{11}+\cdots+2u+1\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}\frac{1}{2}u^{12}+\frac{3}{2}u^{11}+\cdots-13u-4\\-u^{12}-5u^{11}+\cdots+10u+3\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $=$
$5u^{12}+24u^{11}+78u^{10}+170u^9+277u^8+342u^7+296u^6+161u^5-15u^4-125u^3-126u^2-82u-16$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4	$u^{13} + 5u^{12} + \cdots - 12u - 2$
c_2, c_3, c_9	$u^{13} + 10u^{11} + \cdots + 2u - 1$
c_5, c_8	$u^{13} + u^{12} + \cdots + 5u - 1$
c_6	$u^{13} - 8u^{12} + \cdots + 18u - 10$
c_7	$u^{13} - u^{12} + \cdots + 20u - 7$
c_{10}	$u^{13} + 12u^{12} + \cdots - 288u - 64$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$y^{13} + 9y^{12} + \cdots + 24y - 4$
c_2, c_3, c_9	$y^{13} + 20y^{12} + \cdots - 10y - 1$
c_5, c_8	$y^{13} + 7y^{12} + \cdots + 23y - 1$
c_6	$y^{13} - 16y^{12} + \cdots + 1284y - 100$
c_7	$y^{13} + 13y^{12} + \cdots + 64y - 49$
c_{10}	$y^{13} - 2y^{12} + \cdots + 1024y - 4096$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.152860 + 0.170520I$ $a = 0.717142 - 0.770562I$ $b = -0.695367 + 1.010640I$	$-6.75019 - 5.87953I$	$3.71309 + 4.79533I$
$u = -1.152860 - 0.170520I$ $a = 0.717142 + 0.770562I$ $b = -0.695367 - 1.010640I$	$-6.75019 + 5.87953I$	$3.71309 - 4.79533I$
$u = -0.034812 + 1.171400I$ $a = 0.739139 + 0.284263I$ $b = -0.358718 + 0.855935I$	$-3.39029 + 0.96735I$	$2.31477 - 3.00161I$
$u = -0.034812 - 1.171400I$ $a = 0.739139 - 0.284263I$ $b = -0.358718 - 0.855935I$	$-3.39029 - 0.96735I$	$2.31477 + 3.00161I$
$u = -0.175701 + 1.175030I$ $a = -1.067580 - 0.632688I$ $b = 0.93100 - 1.14328I$	$-2.32319 - 3.89550I$	$2.16216 + 1.95849I$
$u = -0.175701 - 1.175030I$ $a = -1.067580 + 0.632688I$ $b = 0.93100 + 1.14328I$	$-2.32319 + 3.89550I$	$2.16216 - 1.95849I$
$u = 0.773330$ $a = 0.244870$ $b = 0.189365$	1.09959	6.33360
$u = -0.48596 + 1.43258I$ $a = 1.058960 + 0.295073I$ $b = -0.93732 + 1.37365I$	$-11.8216 - 11.6031I$	$1.77641 + 5.73851I$
$u = -0.48596 - 1.43258I$ $a = 1.058960 - 0.295073I$ $b = -0.93732 - 1.37365I$	$-11.8216 + 11.6031I$	$1.77641 - 5.73851I$
$u = -0.363253 + 0.187651I$ $a = -0.56911 - 2.04054I$ $b = 0.589641 + 0.634441I$	$0.57483 + 1.68891I$	$3.43240 - 5.42565I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.363253 - 0.187651I$ $a = -0.56911 + 2.04054I$ $b = 0.589641 - 0.634441I$	$0.57483 - 1.68891I$	$3.43240 + 5.42565I$
$u = -0.67408 + 1.45370I$ $a = -0.500985 + 0.317553I$ $b = -0.123919 - 0.942337I$	$-10.56050 - 0.87235I$	$-1.56565 + 0.23907I$
$u = -0.67408 - 1.45370I$ $a = -0.500985 - 0.317553I$ $b = -0.123919 + 0.942337I$	$-10.56050 + 0.87235I$	$-1.56565 - 0.23907I$

II. $\boldsymbol{I_2^u = \langle -u^3 - u^2 + b - u - 1,\ u^5 + 2u^4 + 4u^3 + 3u^2 + 2a + 3u + 2,\ u^6 + 2u^5 + 4u^4 + 5u^3 + 5u^2 + 4u + 2\rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 5u^4 + 4u^3 + 9u^2 + 6u + 10$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$y^6 + 4y^5 + 6y^4 + 3y^3 + y^2 + 4y + 4$
c_2, c_3, c_9	$(y^3 + 2y^2 - 2y + 1)^2$
c_5, c_8, c_{10}	$y^6 - y^5 + 4y^4 - 4y^3 + 4y^2 - y + 1$
c_6	$y^6 - 5y^5 + 2y^4 + 20y^3 + 17y^2 + 8y + 4$
c_7	$y^6 + 5y^5 + 13y^4 + 11y^3 + 3y^2 - 2y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.862023 + 0.412869I$ $a = -0.233003 - 0.750879I$ $b = 0.510869 + 0.551075I$	$1.44750 + 0.78507I$	$8.28869 - 4.60495I$
$u = -0.862023 - 0.412869I$ $a = -0.233003 + 0.750879I$ $b = 0.510869 - 0.551075I$	$1.44750 - 0.78507I$	$8.28869 + 4.60495I$
$u = 0.238984 + 1.138460I$ $a = 0.176605 + 0.841305I$ $b = -0.915589 + 0.402116I$	$-8.28528 + 1.18132I$	$2.81561 - 0.13577I$
$u = 0.238984 - 1.138460I$ $a = 0.176605 - 0.841305I$ $b = -0.915589 - 0.402116I$	$-8.28528 - 1.18132I$	$2.81561 + 0.13577I$
$u = -0.376961 + 1.214800I$ $a = -0.943602 - 0.451942I$ $b = 0.904720 - 0.975923I$	$-1.38689 - 5.20040I$	$6.89570 + 6.16090I$
$u = -0.376961 - 1.214800I$ $a = -0.943602 + 0.451942I$ $b = 0.904720 + 0.975923I$	$-1.38689 + 5.20040I$	$6.89570 - 6.16090I$

III. $I_3^u = \langle -u^5 + u^4 - 2u^3 + au + u^2 + b - u + 1,\ u^5a - 2u^5 + \cdots - 2a + 4,\ u^6 - u^5 + 3u^4 - 2u^3 + 2u^2 - u - 1\rangle$

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} a \\ u^5 - u^4 + 2u^3 - au - u^2 + u - 1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} u^5a - u^4a - u^5 + 2u^3a + u^4 - u^2a - 3u^3 + au + 2u^2 - a - 2u + 2 \\ 1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u^5 - u^4 + 2u^3 - au - u^2 + a + u - 1 \\ u^5 - u^4 + 2u^3 - au - u^2 + u - 1 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u^5 - 3u^4 + 6u^3 - au - 7u^2 + a + 5u - 3 \\ u^3a - 2u^4 - u^2a + 3u^3 + au - 3u^2 + 2u + 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u^4a + u^5 + u^3a - u^4 - u^2a + u^3 + a - u \\ -u^4a + 2u^5 + u^3a - 2u^4 - u^2a + 4u^3 - 2u^2 + a + u - 1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -u^5a + u^4a + u^5 - 2u^3a - u^4 + u^2a + 3u^3 - au - 2u^2 + a + 2u - 1 \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

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

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4	$(u^6 - u^5 + 3u^4 - 2u^3 + 2u^2 - u - 1)^2$
c_2, c_3, c_9	$u^{12} + u^{11} + \cdots + 2u + 13$
c_5, c_8	$u^{12} + 5u^{11} + \cdots + 6u^2 + 1$
c_6	$(u^6 + 5u^5 + 7u^4 - 2u^2 + 3u - 1)^2$
c_7	$u^{12} - u^{11} + \cdots - 18u + 23$
c_{10}	$(u - 1)^{12}$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$(y^6 + 5y^5 + 9y^4 + 4y^3 - 6y^2 - 5y + 1)^2$
c_2, c_3, c_9	$y^{12} + 15y^{11} + \cdots + 360y + 169$
c_5, c_8	$y^{12} - y^{11} + \cdots + 12y + 1$
c_6	$(y^6 - 11y^5 + 45y^4 - 60y^3 - 10y^2 - 5y + 1)^2$
c_7	$y^{12} + 11y^{11} + \cdots - 416y + 529$
c_{10}	$(y - 1)^{12}$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.873214$ $a = 0.211090 + 0.348879I$ $b = 0.184327 - 0.304646I$	1.08035	4.26950
$u = 0.873214$ $a = 0.211090 - 0.348879I$ $b = 0.184327 + 0.304646I$	1.08035	4.26950
$u = -0.138835 + 1.234450I$ $a = 0.576096 + 0.033593I$ $b = -1.96628 - 1.27394I$	$-9.53998 - 1.97241I$	$-3.42428 + 3.68478I$
$u = -0.138835 + 1.234450I$ $a = -0.84220 + 1.68756I$ $b = -0.121451 + 0.706495I$	$-9.53998 - 1.97241I$	$-3.42428 + 3.68478I$
$u = -0.138835 - 1.234450I$ $a = 0.576096 - 0.033593I$ $b = -1.96628 + 1.27394I$	$-9.53998 + 1.97241I$	$-3.42428 - 3.68478I$
$u = -0.138835 - 1.234450I$ $a = -0.84220 - 1.68756I$ $b = -0.121451 - 0.706495I$	$-9.53998 + 1.97241I$	$-3.42428 - 3.68478I$
$u = 0.408802 + 1.276380I$ $a = 1.089440 - 0.275882I$ $b = -0.511061 - 0.781659I$	$-2.88416 + 4.59213I$	$0.58114 - 3.20482I$
$u = 0.408802 + 1.276380I$ $a = -0.671738 + 0.185253I$ $b = 0.79749 + 1.27775I$	$-2.88416 + 4.59213I$	$0.58114 - 3.20482I$
$u = 0.408802 - 1.276380I$ $a = 1.089440 + 0.275882I$ $b = -0.511061 + 0.781659I$	$-2.88416 - 4.59213I$	$0.58114 + 3.20482I$
$u = 0.408802 - 1.276380I$ $a = -0.671738 - 0.185253I$ $b = 0.79749 - 1.27775I$	$-2.88416 - 4.59213I$	$0.58114 + 3.20482I$

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.413150$ $a = \quad 2.13731 + 1.92634I$ $b = -0.883031 + 0.795869I$	-5.84089	5.41680
$u = -0.413150$ $a = \quad 2.13731 - 1.92634I$ $b = -0.883031 - 0.795869I$	-5.84089	5.41680

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$(u^6 - u^5 + 3u^4 - 2u^3 + 2u^2 - u - 1)^2$ $\cdot (u^6 + 2u^5 + \cdots + 4u + 2)(u^{13} + 5u^{12} + \cdots - 12u - 2)$
c_2, c_3, c_9	$(u^6 + 2u^4 - 2u^2 + 1)(u^{12} + u^{11} + \cdots + 2u + 13)$ $\cdot (u^{13} + 10u^{11} + \cdots + 2u - 1)$
c_4	$(u^6 - 2u^5 + 4u^4 - 5u^3 + 5u^2 - 4u + 2)$ $\cdot ((u^6 - u^5 + 3u^4 - 2u^3 + 2u^2 - u - 1)^2)(u^{13} + 5u^{12} + \cdots - 12u - 2)$
c_5, c_8	$(u^6 + u^5 - 2u^3 + u + 1)(u^{12} + 5u^{11} + \cdots + 6u^2 + 1)$ $\cdot (u^{13} + u^{12} + \cdots + 5u - 1)$
c_6	$(u^6 - 5u^5 + 10u^4 - 12u^3 + 11u^2 - 6u + 2)$ $\cdot ((u^6 + 5u^5 + 7u^4 - 2u^2 + 3u - 1)^2)(u^{13} - 8u^{12} + \cdots + 18u - 10)$
c_7	$(u^6 + u^5 + 3u^4 - u^3 + u^2 - 2u + 1)(u^{12} - u^{11} + \cdots - 18u + 23)$ $\cdot (u^{13} - u^{12} + \cdots + 20u - 7)$
c_{10}	$((u - 1)^{12})(u^6 + u^5 - 2u^3 + u + 1)(u^{13} + 12u^{12} + \cdots - 288u - 64)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_4	$(y^6+4y^5+6y^4+3y^3+y^2+4y+4)$ $\cdot\,((y^6+5y^5+\cdots-5y+1)^2)(y^{13}+9y^{12}+\cdots+24y-4)$
c_2, c_3, c_9	$((y^3+2y^2-2y+1)^2)(y^{12}+15y^{11}+\cdots+360y+169)$ $\cdot\,(y^{13}+20y^{12}+\cdots-10y-1)$
c_5, c_8	$(y^6-y^5+4y^4-4y^3+4y^2-y+1)(y^{12}-y^{11}+\cdots+12y+1)$ $\cdot\,(y^{13}+7y^{12}+\cdots+23y-1)$
c_6	$(y^6-11y^5+45y^4-60y^3-10y^2-5y+1)^2$ $\cdot\,(y^6-5y^5+2y^4+20y^3+17y^2+8y+4)$ $\cdot\,(y^{13}-16y^{12}+\cdots+1284y-100)$
c_7	$(y^6+5y^5+13y^4+11y^3+3y^2-2y+1)$ $\cdot\,(y^{12}+11y^{11}+\cdots-416y+529)(y^{13}+13y^{12}+\cdots+64y-49)$
c_{10}	$(y-1)^{12}(y^6-y^5+4y^4-4y^3+4y^2-y+1)$ $\cdot\,(y^{13}-2y^{12}+\cdots+1024y-4096)$