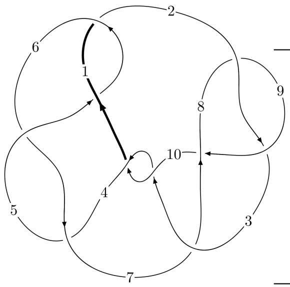
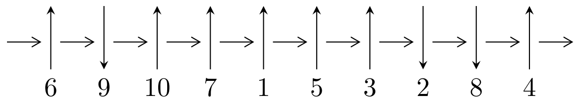
10_{40} ($K10a_{30}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I_1^u = \langle u^{32} + u^{31} + \cdots - u^2 + 1 \rangle$$
$$I_2^u = \langle u^4 + u^3 + 1 \rangle$$
$$I_3^u = \langle u - 1 \rangle$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 37 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. $I_1^u = \langle u^{32} + u^{31} + \cdots - u^2 + 1\rangle$

(i) Arc colorings

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

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

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

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

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

$$a_4 = \begin{pmatrix} u^8 - u^6 + u^4 + 1 \\ u^8 - 2u^6 + 2u^4 \end{pmatrix}$$

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

$$a_5 = \begin{pmatrix} -u^{16} + 3u^{14} - 5u^{12} + 4u^{10} - u^8 + 1 \\ -u^{18} + 4u^{16} - 9u^{14} + 12u^{12} - 11u^{10} + 8u^8 - 6u^6 + 4u^4 - u^2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} u^{29} - 6u^{27} + \cdots + 2u^3 - u \\ u^{31} - 7u^{29} + \cdots - 4u^5 + u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^{13} - 2u^{11} + 3u^9 - 2u^7 + 2u^5 - 2u^3 + u \\ u^{13} - 3u^{11} + 5u^9 - 4u^7 + 2u^5 - u^3 + u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= -4u^{31} + 32u^{29} + 4u^{28} - 128u^{27} - 28u^{26} + 324u^{25} + 104u^{24} - 564u^{23} - 248u^{22} + 696u^{21} + 412u^{20} - 616u^{19} - 484u^{18} + 404u^{17} + 400u^{16} - 228u^{15} - 232u^{14} + 136u^{13} + 112u^{12} - 68u^{11} - 68u^{10} + 4u^9 + 32u^8 + 20u^7 + 12u^6 - 16u^5 - 20u^4 + 8u^3 + 4u^2 + 6$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_5	$u^{32} + u^{31} + \cdots + 2u + 1$
c_2, c_8	$u^{32} + u^{31} + \cdots - u^2 + 1$
c_3, c_{10}	$u^{32} + 4u^{31} + \cdots + 28u + 4$
c_4, c_6	$u^{32} - 11u^{31} + \cdots - 2u + 1$
c_7	$u^{32} + 3u^{31} + \cdots + 2u + 3$
c_9	$u^{32} + 15u^{31} + \cdots + 2u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_5	$y^{32} - 11y^{31} + \cdots - 2y + 1$
c_2, c_8	$y^{32} - 15y^{31} + \cdots - 2y + 1$
c_3, c_{10}	$y^{32} - 20y^{31} + \cdots - 184y + 16$
c_4, c_6	$y^{32} + 21y^{31} + \cdots + 2y + 1$
c_7	$y^{32} + 5y^{31} + \cdots + 164y + 9$
c_9	$y^{32} + 5y^{31} + \cdots + 2y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.961241 + 0.329628I$	$-1.64326 + 1.19641I$	$-1.57525 - 0.85209I$
$u = -0.961241 - 0.329628I$	$-1.64326 - 1.19641I$	$-1.57525 + 0.85209I$
$u = 0.934575 + 0.495071I$	$0.10900 - 4.15286I$	$6.01286 + 7.18864I$
$u = 0.934575 - 0.495071I$	$0.10900 + 4.15286I$	$6.01286 - 7.18864I$
$u = -1.077140 + 0.188783I$	$-3.63561 - 0.05779I$	$-1.67435 - 0.61686I$
$u = -1.077140 - 0.188783I$	$-3.63561 + 0.05779I$	$-1.67435 + 0.61686I$
$u = -0.550946 + 0.717103I$	$3.03384 + 5.05352I$	$8.11469 - 5.31459I$
$u = -0.550946 - 0.717103I$	$3.03384 - 5.05352I$	$8.11469 + 5.31459I$
$u = 1.099030 + 0.150244I$	$-2.66422 + 5.49753I$	$0.37719 - 4.60034I$
$u = 1.099030 - 0.150244I$	$-2.66422 - 5.49753I$	$0.37719 + 4.60034I$
$u = -0.473676 + 0.749403I$	$6.73005 - 1.36697I$	$11.90065 + 0.55023I$
$u = -0.473676 - 0.749403I$	$6.73005 + 1.36697I$	$11.90065 - 0.55023I$
$u = -0.407410 + 0.774508I$	$2.26376 - 7.72193I$	$6.98438 + 5.32873I$
$u = -0.407410 - 0.774508I$	$2.26376 + 7.72193I$	$6.98438 - 5.32873I$
$u = 0.399421 + 0.743579I$	$0.98960 + 2.26361I$	$5.01894 - 0.67006I$
$u = 0.399421 - 0.743579I$	$0.98960 - 2.26361I$	$5.01894 + 0.67006I$
$u = -1.104760 + 0.408512I$	$-5.70053 + 0.95663I$	$-2.35494 - 0.97622I$
$u = -1.104760 - 0.408512I$	$-5.70053 - 0.95663I$	$-2.35494 + 0.97622I$
$u = 1.041040 + 0.566496I$	$0.08923 - 4.79464I$	$2.70911 + 5.61871I$
$u = 1.041040 - 0.566496I$	$0.08923 + 4.79464I$	$2.70911 - 5.61871I$
$u = 1.108350 + 0.436864I$	$-5.50827 - 6.53878I$	$-1.61404 + 6.99151I$
$u = 1.108350 - 0.436864I$	$-5.50827 + 6.53878I$	$-1.61404 - 6.99151I$
$u = -1.070770 + 0.603221I$	$4.95901 + 6.50568I$	$8.96918 - 5.51070I$
$u = -1.070770 - 0.603221I$	$4.95901 - 6.50568I$	$8.96918 + 5.51070I$
$u = 1.099670 + 0.582909I$	$-1.06972 - 7.30693I$	$1.82356 + 4.86883I$
$u = 1.099670 - 0.582909I$	$-1.06972 + 7.30693I$	$1.82356 - 4.86883I$
$u = -1.105460 + 0.595316I$	$0.19628 + 12.88870I$	$3.87677 - 9.41526I$
$u = -1.105460 - 0.595316I$	$0.19628 - 12.88870I$	$3.87677 + 9.41526I$
$u = 0.527868 + 0.394454I$	$1.169210 + 0.193186I$	$9.20830 - 0.78328I$
$u = 0.527868 - 0.394454I$	$1.169210 - 0.193186I$	$9.20830 + 0.78328I$

	Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u =$	$0.041447 + 0.613996I$	$-2.60826 + 2.66625I$	$2.22295 - 3.31297I$
$u =$	$0.041447 - 0.613996I$	$-2.60826 - 2.66625I$	$2.22295 + 3.31297I$

II. $I_2^u = \langle u^4 + u^3 + 1 \rangle$

(i) Arc colorings

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

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

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

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

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

$$a_4 = \begin{pmatrix} u^3 + 1 \\ u^3 + u^2 - u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u^3 \\ 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u \\ u^3 - u \end{pmatrix}$$

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

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 6$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \quad 0.518913 + 0.666610I$	1.64493	6.00000
$u = \quad 0.518913 - 0.666610I$	1.64493	6.00000
$u = -1.018910 + 0.602565I$	1.64493	6.00000
$u = -1.018910 - 0.602565I$	1.64493	6.00000

III. $I_3^u = \langle u - 1 \rangle$

(i) Arc colorings

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

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

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

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

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

$$a_4 = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$$

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

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

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

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 6$

(iv) u-Polynomials at the component

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

(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_8, c_9, c_{10}	$y-1$
c_7	y

(vi) Complex Volumes and Cusp Shapes

	Solutions to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u =$	1.00000	1.64493	6.00000

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_5	$(u-1)(u^4+u^3+1)(u^{32}+u^{31}+\cdots+2u+1)$
c_2, c_8	$(u-1)(u^4+u^3+1)(u^{32}+u^{31}+\cdots-u^2+1)$
c_3, c_{10}	$((u-1)^5)(u^{32}+4u^{31}+\cdots+28u+4)$
c_4, c_6	$(u-1)(u^4-u^3+2u^2+1)(u^{32}-11u^{31}+\cdots-2u+1)$
c_7	$u(u^4-u^2-2u+3)(u^{32}+3u^{31}+\cdots+2u+3)$
c_9	$(u+1)(u^4+u^3+2u^2+1)(u^{32}+15u^{31}+\cdots+2u+1)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_5	$(y-1)(y^4-y^3+2y^2+1)(y^{32}-11y^{31}+\cdots-2y+1)$
c_2, c_8	$(y-1)(y^4-y^3+2y^2+1)(y^{32}-15y^{31}+\cdots-2y+1)$
c_3, c_{10}	$((y-1)^5)(y^{32}-20y^{31}+\cdots-184y+16)$
c_4, c_6	$(y-1)(y^4+3y^3+\cdots+4y+1)(y^{32}+21y^{31}+\cdots+2y+1)$
c_7	$y(y^4-2y^3+\cdots-10y+9)(y^{32}+5y^{31}+\cdots+164y+9)$
c_9	$(y-1)(y^4+3y^3+\cdots+4y+1)(y^{32}+5y^{31}+\cdots+2y+1)$