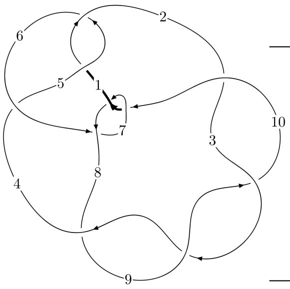
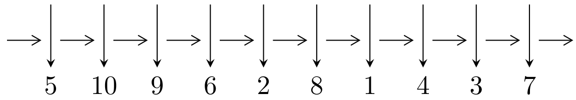
10_{63} $(K10a_{51})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u = \langle & u^{12} + 2u^{11} + 9u^{10} + 14u^9 + 29u^8 + 34u^7 + 40u^6 + 32u^5 + 20u^4 + 7u^3 - u^2 + b - 2u - 1, \\
& - u^{12} - 3u^{11} - 10u^{10} - 21u^9 - 35u^8 - 51u^7 - 52u^6 - 48u^5 - 29u^4 - 11u^3 - 2u^2 + 2a + 2u, \\
& u^{13} + 3u^{12} + 12u^{11} + 25u^{10} + 51u^9 + 75u^8 + 96u^7 + 96u^6 + 77u^5 + 45u^4 + 16u^3 - 4u - 2\rangle \\
I_2^u = \langle & -2u^8a + 2u^8 + \cdots - 4a + 3, \\
& - u^7 + u^5a + u^6 - 2u^4a - 5u^5 + 4u^3a + 5u^4 - 6u^2a - 8u^3 + a^2 + 3au + 7u^2 - 2a - 4u + 2, \\
& u^9 - u^8 + 6u^7 - 5u^6 + 11u^5 - 7u^4 + 6u^3 - 2u^2 + u - 1\rangle \\
I_3^u = \langle & b + 1,\ 2a - u,\ u^2 + 2\rangle
\end{aligned}$$

$$I_1^v = \langle a,\ b - 1,\ v + 1\rangle$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 34 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.

$$I_1^u = \langle u^{12}+2u^{11}+\cdots+b-1,\ -u^{12}-3u^{11}+\cdots+2a+2u,\ u^{13}+3u^{12}+\cdots-4u-2\rangle$$

(i) Arc colorings

$$a_4 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} u^2 + 1 \\ u^4 + 2u^2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} \frac{1}{2}u^{12} + \frac{3}{2}u^{11} + \cdots + u^2 - u \\ -u^{12} - 2u^{11} + \cdots + 2u + 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^3 + 2u \\ u^5 + 3u^3 + u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} \frac{1}{2}u^{12} + \frac{3}{2}u^{11} + \cdots - 2u - 1 \\ u^8 + u^7 + 5u^6 + 4u^5 + 7u^4 + 4u^3 + 2u^2 - 1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} \frac{1}{2}u^{12} + \frac{3}{2}u^{11} + \cdots - 2u - 2 \\ u^8 + u^7 + 5u^6 + 4u^5 + 7u^4 + 4u^3 + 2u^2 - 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} \frac{1}{2}u^{12} + \frac{3}{2}u^{11} + \cdots - 2u - 2 \\ u^9 + u^8 + 6u^7 + 5u^6 + 11u^5 + 7u^4 + 6u^3 + 2u^2 + u - 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= 2u^{12}+6u^{11}+24u^{10}+52u^9+100u^8+154u^7+174u^6+174u^5+108u^4+46u^3-4u^2-14u-16$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_5, c_7 c_{10}	$u^{13} + u^{12} + \cdots + u + 1$
c_2, c_3, c_8 c_9	$u^{13} - 3u^{12} + \cdots - 4u + 2$
c_4, c_6	$u^{13} + 5u^{12} + \cdots + 9u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_5, c_7 c_{10}	$y^{13} - 5y^{12} + \cdots + 9y - 1$
c_2, c_3, c_8 c_9	$y^{13} + 15y^{12} + \cdots + 16y - 4$
c_4, c_6	$y^{13} + 11y^{12} + \cdots + 25y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.138146 + 0.948701I$ $a = 0.317222 + 0.611463I$ $b = -0.644264 - 0.592137I$	$2.65637 - 1.35876I$	$-4.47319 + 3.17078I$
$u = -0.138146 - 0.948701I$ $a = 0.317222 - 0.611463I$ $b = -0.644264 + 0.592137I$	$2.65637 + 1.35876I$	$-4.47319 - 3.17078I$
$u = -0.578420 + 0.729059I$ $a = -0.85431 - 1.51986I$ $b = -1.089570 + 0.623417I$	$-0.00714 + 8.67404I$	$-9.53036 - 8.43648I$
$u = -0.578420 - 0.729059I$ $a = -0.85431 + 1.51986I$ $b = -1.089570 - 0.623417I$	$-0.00714 - 8.67404I$	$-9.53036 + 8.43648I$
$u = -0.694065 + 0.222366I$ $a = 0.835992 + 0.144863I$ $b = 0.982157 + 0.559210I$	$-1.52198 - 4.38846I$	$-11.77625 + 4.32757I$
$u = -0.694065 - 0.222366I$ $a = 0.835992 - 0.144863I$ $b = 0.982157 - 0.559210I$	$-1.52198 + 4.38846I$	$-11.77625 - 4.32757I$
$u = -0.063059 + 1.278080I$ $a = -0.069487 + 0.291937I$ $b = -0.750183 - 0.366139I$	$2.83101 - 1.40076I$	$-6.04773 + 4.90140I$
$u = -0.063059 - 1.278080I$ $a = -0.069487 - 0.291937I$ $b = -0.750183 + 0.366139I$	$2.83101 + 1.40076I$	$-6.04773 - 4.90140I$
$u = 0.400549$ $a = 0.898581$ $b = 0.421510$	-0.714503	-13.6630
$u = -0.17430 + 1.61896I$ $a = -0.03628 + 1.72509I$ $b = 1.168160 - 0.683587I$	$7.93590 + 11.51170I$	$-7.17210 - 6.84034I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.17430-1.61896I$ $a=-0.03628-1.72509I$ $b=\;\;1.168160+0.683587I$	$7.93590-11.51170I$	$-7.17210+6.84034I$
$u=-0.05229+1.64838I$ $a=-0.642426-1.259340I$ $b=\;\;0.622947+0.904317I$	$11.49220-0.51506I$	$-3.16885+2.03529I$
$u=-0.05229-1.64838I$ $a=-0.642426+1.259340I$ $b=\;\;0.622947-0.904317I$	$11.49220+0.51506I$	$-3.16885-2.03529I$

II.

$$\boldsymbol{I_2^u = \langle -2u^8a+2u^8+\cdots-4a+3,\ -u^7+u^6+\cdots-2a+2,\ u^9-u^8+\cdots+u-1\rangle}$$

(i) Arc colorings

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

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

$$a_9 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} u \\ u^3+u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} u^2+1 \\ u^4+2u^2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} a \\ 2u^8a-2u^8+\cdots+4a-3 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} u^3+2u \\ u^5+3u^3+u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -2u^8a+2u^8+\cdots-3a+3 \\ -3u^8a+3u^8+\cdots-5a+4 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -5u^8a+5u^8+\cdots-8a+7 \\ -3u^8a+3u^8+\cdots-5a+4 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 2u^8a-2u^8+\cdots+3a-2 \\ 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^7+4u^6-20u^5+16u^4-28u^3+16u^2-8u-6$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_5, c_7 c_{10}	$u^{18} + u^{17} + \cdots + 4u + 3$
c_2, c_3, c_8 c_9	$(u^9 + u^8 + 6u^7 + 5u^6 + 11u^5 + 7u^4 + 6u^3 + 2u^2 + u + 1)^2$
c_4, c_6	$u^{18} + 9u^{17} + \cdots + 40u + 9$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_5, c_7 c_{10}	$y^{18} - 9y^{17} + \cdots - 40y + 9$
c_2, c_3, c_8 c_9	$(y^9 + 11y^8 + 48y^7 + 105y^6 + 121y^5 + 73y^4 + 20y^3 - 6y^2 - 3y - 1)^2$
c_4, c_6	$y^{18} - y^{17} + \cdots + 524y + 81$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.429032 + 0.787939I$ $a = 0.559116 - 0.339074I$ $b = -0.444651 + 0.766223I$	$1.87293 - 3.41073I$	$-6.11762 + 4.39642I$
$u = 0.429032 + 0.787939I$ $a = -0.47019 + 1.53024I$ $b = -0.935577 - 0.603792I$	$1.87293 - 3.41073I$	$-6.11762 + 4.39642I$
$u = 0.429032 - 0.787939I$ $a = 0.559116 + 0.339074I$ $b = -0.444651 - 0.766223I$	$1.87293 + 3.41073I$	$-6.11762 - 4.39642I$
$u = 0.429032 - 0.787939I$ $a = -0.47019 - 1.53024I$ $b = -0.935577 + 0.603792I$	$1.87293 + 3.41073I$	$-6.11762 - 4.39642I$
$u = 0.590618$ $a = 0.834260 + 0.039950I$ $b = 0.640279 + 0.479450I$	-0.453072	-10.3330
$u = 0.590618$ $a = 0.834260 - 0.039950I$ $b = 0.640279 - 0.479450I$	-0.453072	-10.3330
$u = -0.290170 + 0.487341I$ $a = 1.066630 + 0.144171I$ $b = 1.174710 + 0.153689I$	$-3.25448 + 1.10969I$	$-11.44626 - 6.23947I$
$u = -0.290170 + 0.487341I$ $a = 0.06769 - 3.10644I$ $b = -0.943806 + 0.303030I$	$-3.25448 + 1.10969I$	$-11.44626 - 6.23947I$
$u = -0.290170 - 0.487341I$ $a = 1.066630 - 0.144171I$ $b = 1.174710 - 0.153689I$	$-3.25448 - 1.10969I$	$-11.44626 + 6.23947I$
$u = -0.290170 - 0.487341I$ $a = 0.06769 + 3.10644I$ $b = -0.943806 - 0.303030I$	$-3.25448 - 1.10969I$	$-11.44626 + 6.23947I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.05587 + 1.55975I$ $a = \ \ 0.1256620 + 0.0280657I$ $b = -1.339950 - 0.113954I$	$3.77376 + 2.21388I$	$-7.75885 - 3.04598I$
$u = -0.05587 + 1.55975I$ $a = -0.77131 + 1.94759I$ $b = \ \ 0.857711 - 0.553032I$	$3.77376 + 2.21388I$	$-7.75885 - 3.04598I$
$u = -0.05587 - 1.55975I$ $a = \ \ 0.1256620 - 0.0280657I$ $b = -1.339950 + 0.113954I$	$3.77376 - 2.21388I$	$-7.75885 + 3.04598I$
$u = -0.05587 - 1.55975I$ $a = -0.77131 - 1.94759I$ $b = \ \ 0.857711 + 0.553032I$	$3.77376 - 2.21388I$	$-7.75885 + 3.04598I$
$u = \ \ 0.12170 + 1.63384I$ $a = -0.664164 + 1.104630I$ $b = \ \ 0.437217 - 0.966793I$	$10.17130 - 5.50049I$	$-4.51063 + 2.97298I$
$u = \ \ 0.12170 + 1.63384I$ $a = -0.24771 - 1.68585I$ $b = \ \ 1.054070 + 0.732497I$	$10.17130 - 5.50049I$	$-4.51063 + 2.97298I$
$u = \ \ 0.12170 - 1.63384I$ $a = -0.664164 - 1.104630I$ $b = \ \ 0.437217 + 0.966793I$	$10.17130 + 5.50049I$	$-4.51063 - 2.97298I$
$u = \ \ 0.12170 - 1.63384I$ $a = -0.24771 + 1.68585I$ $b = \ \ 1.054070 - 0.732497I$	$10.17130 + 5.50049I$	$-4.51063 - 2.97298I$

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u		$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u =$	$1.414210I$		
$a =$	$0.707107I$	1.64493	−12.0000
$b = -1.00000$			
$u =$	$-\ 1.414210I$		
$a =$	$-\ 0.707107I$	1.64493	−12.0000
$b = -1.00000$			

IV. $I_1^v = \langle a,\ b-1,\ v+1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(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

V. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_7	$(u-1)(u+1)^2(u^{13}+u^{12}+\cdots+u+1)(u^{18}+u^{17}+\cdots+4u+3)$
c_2, c_3, c_8 c_9	$u(u^2+2)(u^9+u^8+6u^7+5u^6+11u^5+7u^4+6u^3+2u^2+u+1)^2$ $\cdot(u^{13}-3u^{12}+\cdots-4u+2)$
c_4, c_6	$((u-1)^3)(u^{13}+5u^{12}+\cdots+9u+1)(u^{18}+9u^{17}+\cdots+40u+9)$
c_5, c_{10}	$((u-1)^2)(u+1)(u^{13}+u^{12}+\cdots+u+1)(u^{18}+u^{17}+\cdots+4u+3)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_5, c_7 c_{10}	$((y-1)^3)(y^{13}-5y^{12}+\cdots+9y-1)(y^{18}-9y^{17}+\cdots-40y+9)$
c_2, c_3, c_8 c_9	$y(y+2)^2$ $\cdot\,(y^9+11y^8+48y^7+105y^6+121y^5+73y^4+20y^3-6y^2-3y-1)^2$ $\cdot\,(y^{13}+15y^{12}+\cdots+16y-4)$
c_4, c_6	$((y-1)^3)(y^{13}+11y^{12}+\cdots+25y-1)(y^{18}-y^{17}+\cdots+524y+81)$