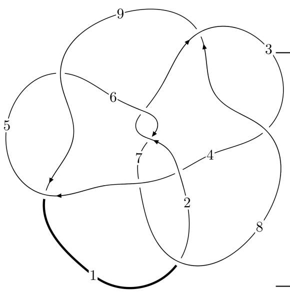
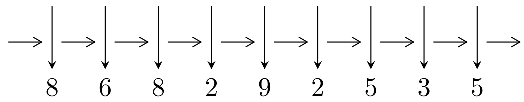
9_{49} $(K9n_8)$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I_1^u = \langle b+u,\ a-1,\ u^3-3u^2+2u+1\rangle$$
$$I_2^u = \langle b+u,\ a^2-au+2u+4,\ u^2+u-1\rangle$$
$$I_3^u = \langle u^3-3u^2+2b+3u-4,\ -u^3+2u^2+2a-2u+3,\ u^4-3u^3+5u^2-6u+4\rangle$$
$$I_4^u = \langle b^2-bu+b+2,\ a-1,\ u^2+u-1\rangle$$
$$I_5^u = \langle b+u,\ a+1,\ u^3+u^2+1\rangle$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 18 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. $I_1^u = \langle b + u,\ a - 1,\ u^3 - 3u^2 + 2u + 1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 3u^2 - 15$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4, c_7	$u^3 - 3u^2 + 2u + 1$
c_2, c_3, c_5 c_6, c_8, c_9	$u^3 + 2u^2 + 3u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_7	$y^3 - 5y^2 + 10y - 1$
c_2, c_3, c_5 c_6, c_8, c_9	$y^3 + 2y^2 + 5y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.324718$ $a = 1.00000$ $b = 0.324718$	-0.674976	-14.6840
$u = 1.66236 + 0.56228I$ $a = 1.00000$ $b = -1.66236 - 0.56228I$	$-1.30745 - 9.42707I$	$-7.65816 + 5.60826I$
$u = 1.66236 - 0.56228I$ $a = 1.00000$ $b = -1.66236 + 0.56228I$	$-1.30745 + 9.42707I$	$-7.65816 - 5.60826I$

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

(i) Arc colorings

$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 1 \\ u - 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} a \\ -u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} a - u \\ -u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} a - u \\ au - a + u - 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -au + a - 2u - 2 \\ au - a + u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u - 2 \\ au - a + u \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -au + a + 3 \\ 2au - a + 2u - 2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -au + a + 3 \\ 2au - a + 2u - 2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4au - 4a + 4u - 10$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4	$(u^2 + u - 1)^2$
c_2, c_5, c_6 c_9	$(u^2 - u + 1)^2$
c_3, c_8	$u^4 + 3u^3 + 5u^2 + 6u + 4$
c_7	$u^4 - 3u^3 + 5u^2 - 6u + 4$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$(y^2 - 3y + 1)^2$
c_2, c_5, c_6 c_9	$(y^2 + y + 1)^2$
c_3, c_7, c_8	$y^4 + y^3 - 3y^2 + 4y + 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.618034$ $a = 0.30902 + 2.26728I$ $b = -0.618034$	$3.94784 + 2.02988I$	$-8.00000 - 3.46410I$
$u = 0.618034$ $a = 0.30902 - 2.26728I$ $b = -0.618034$	$3.94784 - 2.02988I$	$-8.00000 + 3.46410I$
$u = -1.61803$ $a = -0.809017 + 0.330792I$ $b = 1.61803$	$-3.94784 + 2.02988I$	$-8.00000 - 3.46410I$
$u = -1.61803$ $a = -0.809017 - 0.330792I$ $b = 1.61803$	$-3.94784 - 2.02988I$	$-8.00000 + 3.46410I$

III.

$$\boldsymbol{I_3^u = \langle u^3-3u^2+2b+3u-4,\ -u^3+2u^2+2a-2u+3,\ u^4-3u^3+5u^2-6u+4\rangle}$$

(i) Arc colorings

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

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

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

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

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

$$a_3 = \begin{pmatrix}\frac{1}{2}u^2-\frac{1}{2}u+\frac{1}{2}\\-\frac{3}{2}u^3+\frac{7}{2}u^2-\frac{9}{2}u+4\end{pmatrix}$$

$$a_7 = \begin{pmatrix}-\frac{3}{4}u^3+\frac{7}{4}u^2-\frac{9}{4}u+3\\\frac{1}{2}u^3-\frac{3}{2}u^2+\frac{5}{2}u-3\end{pmatrix}$$

$$a_6 = \begin{pmatrix}-\frac{1}{4}u^3+\frac{1}{4}u^2+\frac{1}{4}u\\\frac{1}{2}u^3-\frac{3}{2}u^2+\frac{5}{2}u-3\end{pmatrix}$$

$$a_9 = \begin{pmatrix}-\frac{1}{4}u^3+\frac{1}{4}u^2-\frac{3}{4}u+1\\\frac{1}{2}u^3-\frac{3}{2}u^2+\frac{3}{2}u-1\end{pmatrix}$$

$$a_9 = \begin{pmatrix}-\frac{1}{4}u^3+\frac{1}{4}u^2-\frac{3}{4}u+1\\\frac{1}{2}u^3-\frac{3}{2}u^2+\frac{3}{2}u-1\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 2u^3-2u^2+2u-10$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^4 - 3u^3 + 5u^2 - 6u + 4$
c_2, c_6	$u^4 + 3u^3 + 5u^2 + 6u + 4$
c_3, c_5, c_8 c_9	$(u^2 - u + 1)^2$
c_4, c_7	$(u^2 + u - 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6	$y^4 + y^3 - 3y^2 + 4y + 16$
c_3, c_5, c_8 c_9	$(y^2 + y + 1)^2$
c_4, c_7	$(y^2 - 3y + 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.30902 + 0.53523I$ $a = -1.059020 + 0.433013I$ $b = 1.61803$	$-3.94784 - 2.02988I$	$-8.00000 + 3.46410I$
$u = 1.30902 - 0.53523I$ $a = -1.059020 - 0.433013I$ $b = 1.61803$	$-3.94784 + 2.02988I$	$-8.00000 - 3.46410I$
$u = 0.19098 + 1.40126I$ $a = 0.059017 - 0.433013I$ $b = -0.618034$	$3.94784 + 2.02988I$	$-8.00000 - 3.46410I$
$u = 0.19098 - 1.40126I$ $a = 0.059017 + 0.433013I$ $b = -0.618034$	$3.94784 - 2.02988I$	$-8.00000 + 3.46410I$

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

(i) Arc colorings

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

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

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

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

$$a_4 = \begin{pmatrix} b + 1 \\ b \end{pmatrix}$$

$$a_3 = \begin{pmatrix} b + 1 \\ bu + u - 1 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u \\ bu + u \end{pmatrix}$$

$$a_6 = \begin{pmatrix} bu + 2u \\ bu + u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -b + u \\ u + 1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -b + u \\ u + 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4bu + 4u - 10$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_7	$(u^2+u-1)^2$
c_2, c_3, c_6 c_8	$(u^2-u+1)^2$
c_4	$u^4-3u^3+5u^2-6u+4$
c_5, c_9	$u^4+3u^3+5u^2+6u+4$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_7	$(y^2 - 3y + 1)^2$
c_2, c_3, c_6 c_8	$(y^2 + y + 1)^2$
c_4, c_5, c_9	$y^4 + y^3 - 3y^2 + 4y + 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.618034$ $a = 1.00000$ $b = -0.19098 + 1.40126I$	$3.94784 - 2.02988I$	$-8.00000 + 3.46410I$
$u = 0.618034$ $a = 1.00000$ $b = -0.19098 - 1.40126I$	$3.94784 + 2.02988I$	$-8.00000 - 3.46410I$
$u = -1.61803$ $a = 1.00000$ $b = -1.30902 + 0.53523I$	$-3.94784 + 2.02988I$	$-8.00000 - 3.46410I$
$u = -1.61803$ $a = 1.00000$ $b = -1.30902 - 0.53523I$	$-3.94784 - 2.02988I$	$-8.00000 + 3.46410I$

V. $I_5^u = \langle b+u,\ a+1,\ u^3+u^2+1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

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

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4, c_7	$u^3 + u^2 + 1$
c_2, c_5, c_8	$u^3 + u - 1$
c_3, c_6, c_9	$u^3 + u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_7	$y^3 - y^2 - 2y - 1$
c_2, c_3, c_5 c_6, c_8, c_9	$y^3 + 2y^2 + y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_5^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \quad 0.232786 + 0.792552I$ $a = -1.00000$ $b = -0.232786 - 0.792552I$	$5.50124 + 1.58317I$	$-1.27815 - 1.10697I$
$u = \quad 0.232786 - 0.792552I$ $a = -1.00000$ $b = -0.232786 + 0.792552I$	$5.50124 - 1.58317I$	$-1.27815 + 1.10697I$
$u = -1.46557$ $a = -1.00000$ $b = \quad 1.46557$	-4.42273	-9.44370

VI. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_4, c_7	$((u^2+u-1)^4)(u^3-3u^2+2u+1)(u^3+u^2+1)(u^4-3u^3+\cdots-6u+4)$
c_2, c_5, c_8	$((u^2-u+1)^4)(u^3+u-1)(u^3+2u^2+3u+1)(u^4+3u^3+\cdots+6u+4)$
c_3, c_6, c_9	$((u^2-u+1)^4)(u^3+u+1)(u^3+2u^2+3u+1)(u^4+3u^3+\cdots+6u+4)$

VII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_7	$(y^2 - 3y + 1)^4(y^3 - 5y^2 + 10y - 1)(y^3 - y^2 - 2y - 1)$ $\cdot\,(y^4 + y^3 - 3y^2 + 4y + 16)$
c_2, c_3, c_5 c_6, c_8, c_9	$(y^2 + y + 1)^4(y^3 + 2y^2 + y - 1)(y^3 + 2y^2 + 5y - 1)$ $\cdot\,(y^4 + y^3 - 3y^2 + 4y + 16)$