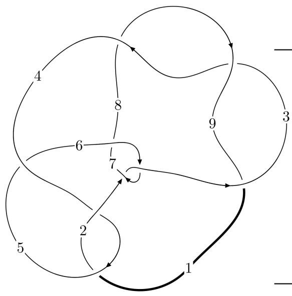
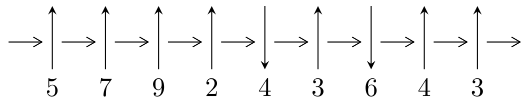
9_{48} ($K9n_6$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

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

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 17 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. $\boldsymbol{I_1^u = \langle b - u,\ -u^2 + a,\ u^3 - u^2 + u + 1 \rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_7 = \begin{pmatrix} u^2 \\ u \end{pmatrix}$$

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

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

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

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

$$a_8 = \begin{pmatrix} -u \\ u^2 - 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u \\ u^2 - 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -6u + 8$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_4, c_6, c_8 c_9	$y^3 + y^2 + 3y - 1$
c_5, c_7	$y^3 + 5y^2 + 11y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.771845 + 1.115140I$ $a = -0.64780 + 1.72143I$ $b = 0.771845 + 1.115140I$	$2.02941 + 9.53188I$	$3.36893 - 6.69086I$
$u = 0.771845 - 1.115140I$ $a = -0.64780 - 1.72143I$ $b = 0.771845 - 1.115140I$	$2.02941 - 9.53188I$	$3.36893 + 6.69086I$
$u = -0.543689$ $a = 0.295598$ $b = -0.543689$	0.875992	11.2620

II. $I_2^u = \langle b - u,\ -u^3 + a + 1,\ u^4 + u^3 + u^2 + 1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

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

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$y^4 + 2y^3 + y^2 + 3y + 4$
c_2, c_3, c_6 c_8, c_9	$y^4 + y^3 + 3y^2 + 2y + 1$
c_5	$y^4 - 2y^3 - 3y^2 - y + 16$
c_7	$y^4 + 5y^3 + 7y^2 + 2y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.351808 + 0.720342I$ $a = -1.50411 - 0.10631I$ $b = 0.351808 + 0.720342I$	$-3.50087 + 1.41510I$	$2.17326 - 4.90874I$
$u = 0.351808 - 0.720342I$ $a = -1.50411 + 0.10631I$ $b = 0.351808 - 0.720342I$	$-3.50087 - 1.41510I$	$2.17326 + 4.90874I$
$u = -0.851808 + 0.911292I$ $a = 0.504108 + 1.226850I$ $b = -0.851808 + 0.911292I$	$3.50087 - 3.16396I$	$5.82674 + 2.56480I$
$u = -0.851808 - 0.911292I$ $a = 0.504108 - 1.226850I$ $b = -0.851808 - 0.911292I$	$3.50087 + 3.16396I$	$5.82674 - 2.56480I$

III. $\boldsymbol{I_3^u = \langle u^2 + b + u,\ u^3 + 2u^2 + a + 2u,\ u^4 + u^3 + u^2 + 1\rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_7 = \begin{pmatrix} -u^3 - 2u^2 - 2u \\ -u^2 - u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} u^3 - u - 1 \\ u^3 - 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u^3 - u^2 - u \\ -u^2 - u \end{pmatrix}$$

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

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

$$a_8 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

(ii) Obstruction class $= -1$

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

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_4 c_8, c_9	$y^4 + y^3 + 3y^2 + 2y + 1$
c_2, c_6	$y^4 + 2y^3 + y^2 + 3y + 4$
c_5	$y^4 + 5y^3 + 7y^2 + 2y + 1$
c_7	$y^4 - 2y^3 - 3y^2 - y + 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.351808 + 0.720342I$ $a = 0.59074 - 2.34806I$ $b = 0.043315 - 1.227190I$	$-3.50087 + 1.41510I$	$2.17326 - 4.90874I$
$u = 0.351808 - 0.720342I$ $a = 0.59074 + 2.34806I$ $b = 0.043315 + 1.227190I$	$-3.50087 - 1.41510I$	$2.17326 + 4.90874I$
$u = -0.851808 + 0.911292I$ $a = 0.409261 + 0.055548I$ $b = 0.956685 + 0.641200I$	$3.50087 - 3.16396I$	$5.82674 + 2.56480I$
$u = -0.851808 - 0.911292I$ $a = 0.409261 - 0.055548I$ $b = 0.956685 - 0.641200I$	$3.50087 + 3.16396I$	$5.82674 - 2.56480I$

IV. $\boldsymbol{I_4^u = \langle -u^3 + u^2 + b - u + 1,\ -u^3 + 2a + u - 1,\ u^4 - 2u^3 + 3u^2 - 3u + 2\rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

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

$$a_2 = \begin{pmatrix} -\frac{1}{2}u^3 + u^2 - \frac{3}{2}u + \frac{3}{2} \\ -u^3 + u^2 - 2u + 1 \end{pmatrix}$$

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

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

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

$$a_8 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u + 2$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_4 c_6	$y^4 + y^3 + 3y^2 + 2y + 1$
c_3, c_8, c_9	$y^4 + 2y^3 + y^2 + 3y + 4$
c_5, c_7	$y^4 + 5y^3 + 7y^2 + 2y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.956685 + 0.641200I$ $a = -0.130534 + 0.427872I$ $b = -0.851808 + 0.911292I$	$3.50087 - 3.16396I$	$5.82674 + 2.56480I$
$u = 0.956685 - 0.641200I$ $a = -0.130534 - 0.427872I$ $b = -0.851808 - 0.911292I$	$3.50087 + 3.16396I$	$5.82674 - 2.56480I$
$u = 0.043315 + 1.227190I$ $a = 0.38053 - 1.53420I$ $b = 0.351808 - 0.720342I$	$-3.50087 - 1.41510I$	$2.17326 + 4.90874I$
$u = 0.043315 - 1.227190I$ $a = 0.38053 + 1.53420I$ $b = 0.351808 + 0.720342I$	$-3.50087 + 1.41510I$	$2.17326 - 4.90874I$

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

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_7 = \begin{pmatrix} -2u-1 \\ -u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} u-1 \\ -1 \end{pmatrix}$$

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

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

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

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -4$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_5^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.000000I$ $a = -1.00000 - 2.00000I$ $b = -1.000000I$	-4.93480	-4.00000
$u = -1.000000I$ $a = -1.00000 + 2.00000I$ $b = 1.000000I$	-4.93480	-4.00000

VI. u-Polynomials

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

VII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_4, c_6, c_8 c_9	$(y+1)^2(y^3+y^2+3y-1)(y^4+y^3+3y^2+2y+1)^2$ $\cdot (y^4+2y^3+y^2+3y+4)$
c_5, c_7	$(y-1)^2(y^3+5y^2+11y-1)(y^4-2y^3-3y^2-y+16)$ $\cdot (y^4+5y^3+7y^2+2y+1)^2$