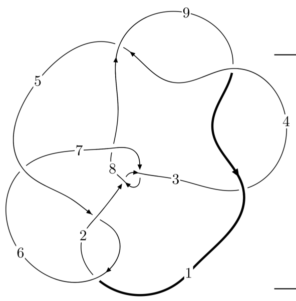
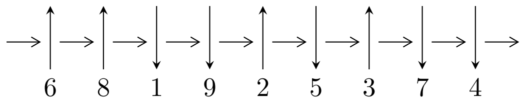
9_{37} $(K9a_{18})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I_1^u = \langle b-u,\ -u^7-2u^3-u^2+2a+u-1,\ u^8-u^7+2u^6-2u^5+4u^4-3u^3+2u^2+1\rangle$$
$$I_2^u = \langle -u^3+b-1,\ u^5-u^3+2u^2+2a+u-1,\ u^6+u^4+2u^3+u^2+u+2\rangle$$
$$I_3^u = \langle -u^3+b-u+1,\ -u^2+a+u-1,\ u^4-u^3+2u^2-2u+1\rangle$$
$$I_4^u = \langle b-a-u-1,\ a^2+3au+2a-1,\ u^2+u+1\rangle$$
$$I_5^u = \langle b-u,\ a-u-2,\ u^2+u+1\rangle$$
$$I_6^u = \langle b+u,\ a+2u-1,\ u^2+1\rangle$$

* 6 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 26 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.

$$I_1^u = \langle b-u,\ -u^7-2u^3-u^2+2a+u-1,\ u^8-u^7+2u^6-2u^5+4u^4-3u^3+2u^2+1\rangle$$

(i) Arc colorings

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

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

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

$$a_6 = \begin{pmatrix} \frac{1}{2}u^7 + u^3 + \frac{1}{2}u^2 - \frac{1}{2}u + \frac{1}{2} \\ u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} \frac{1}{2}u^7 - u^6 + \cdots + \frac{1}{2}u + \frac{1}{2} \\ u^2 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} \frac{1}{2}u^7 + u^3 + \frac{1}{2}u^2 - \frac{3}{2}u + \frac{1}{2} \\ u \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} -u^3 \\ u^5 + u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^2 - u + 1 \\ \frac{1}{2}u^7 + u^5 + \cdots + \frac{1}{2}u - \frac{1}{2} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^2 - u + 1 \\ \frac{1}{2}u^7 + u^5 + \cdots + \frac{1}{2}u - \frac{1}{2} \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^6 + 2u^5 - 4u^4 + 6u^3 - 12u^2 + 6u$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_5 c_7	$u^8 + u^7 + 2u^6 + 2u^5 + 4u^4 + 3u^3 + 2u^2 + 1$
c_3, c_4, c_9	$u^8 - 2u^7 + 6u^6 - 8u^5 + 10u^4 - 9u^3 + 5u^2 - 3u + 2$
c_6, c_8	$u^8 + 3u^7 + 8u^6 + 10u^5 + 14u^4 + 11u^3 + 12u^2 + 4u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_5 c_7	$y^8 + 3y^7 + 8y^6 + 10y^5 + 14y^4 + 11y^3 + 12y^2 + 4y + 1$
c_3, c_4, c_9	$y^8 + 8y^7 + 24y^6 + 30y^5 + 8y^4 - 5y^3 + 11y^2 + 11y + 4$
c_6, c_8	$y^8 + 7y^7 + 32y^6 + 82y^5 + 146y^4 + 151y^3 + 84y^2 + 8y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.862697 + 0.615401I$ $a = -0.361509 + 0.665983I$ $b = 0.862697 + 0.615401I$	$7.44069 + 0.66722I$	$4.81639 - 2.10627I$
$u = 0.862697 - 0.615401I$ $a = -0.361509 - 0.665983I$ $b = 0.862697 - 0.615401I$	$7.44069 - 0.66722I$	$4.81639 + 2.10627I$
$u = 0.578102 + 1.055330I$ $a = -1.26281 + 1.67027I$ $b = 0.578102 + 1.055330I$	$-1.73404 + 6.79402I$	$-3.11839 - 7.09473I$
$u = 0.578102 - 1.055330I$ $a = -1.26281 - 1.67027I$ $b = 0.578102 - 1.055330I$	$-1.73404 - 6.79402I$	$-3.11839 + 7.09473I$
$u = -0.666851 + 1.155530I$ $a = 0.88635 + 1.91065I$ $b = -0.666851 + 1.155530I$	$3.94193 - 10.98940I$	$0.47099 + 7.14773I$
$u = -0.666851 - 1.155530I$ $a = 0.88635 - 1.91065I$ $b = -0.666851 - 1.155530I$	$3.94193 + 10.98940I$	$0.47099 - 7.14773I$
$u = -0.273948 + 0.520074I$ $a = 0.737965 - 0.414347I$ $b = -0.273948 + 0.520074I$	$0.221012 - 1.276800I$	$1.83102 + 5.88514I$
$u = -0.273948 - 0.520074I$ $a = 0.737965 + 0.414347I$ $b = -0.273948 - 0.520074I$	$0.221012 + 1.276800I$	$1.83102 - 5.88514I$

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

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^4 - 4u^3 - 8u - 6$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_5 c_7	$y^6 + 2y^5 + 3y^4 + 2y^3 + y^2 + 3y + 4$
c_3, c_4, c_9	$(y^3 + 4y^2 + 4y - 1)^2$
c_6, c_8	$y^6 + 2y^5 + 3y^4 - 2y^3 + 13y^2 - y + 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.931903 + 0.428993I$ $a = -0.180233 + 0.631115I$ $b = 0.705204 + 1.038720I$	$6.15087 + 5.13794I$	$3.31793 - 3.20902I$
$u = -0.931903 - 0.428993I$ $a = -0.180233 - 0.631115I$ $b = 0.705204 - 1.038720I$	$6.15087 - 5.13794I$	$3.31793 + 3.20902I$
$u = 0.226699 + 1.074330I$ $a = 0.41474 - 1.96546I$ $b = 0.226699 - 1.074330I$	-4.07707	$-8.63587 + 0.I$
$u = 0.226699 - 1.074330I$ $a = 0.41474 + 1.96546I$ $b = 0.226699 + 1.074330I$	-4.07707	$-8.63587 + 0.I$
$u = 0.705204 + 1.038720I$ $a = -0.484509 - 0.229988I$ $b = -0.931903 + 0.428993I$	$6.15087 + 5.13794I$	$3.31793 - 3.20902I$
$u = 0.705204 - 1.038720I$ $a = -0.484509 + 0.229988I$ $b = -0.931903 - 0.428993I$	$6.15087 - 5.13794I$	$3.31793 + 3.20902I$

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

(i) Arc colorings

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

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

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

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

$$a_1 = \begin{pmatrix} u \\ -u^3 - u \end{pmatrix}$$

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

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

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

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

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

(ii) Obstruction class $= -1$

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

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.621744 + 0.440597I$ $a = 0.570696 + 0.107280I$ $b = -0.500000 + 0.866025I$	$-2.02988I$	$0. + 3.46410I$
$u = 0.621744 - 0.440597I$ $a = 0.570696 - 0.107280I$ $b = -0.500000 - 0.866025I$	$2.02988I$	$0. - 3.46410I$
$u = -0.121744 + 1.306620I$ $a = -0.57070 - 1.62477I$ $b = -0.500000 - 0.866025I$	$2.02988I$	$0. - 3.46410I$
$u = -0.121744 - 1.306620I$ $a = -0.57070 + 1.62477I$ $b = -0.500000 + 0.866025I$	$-2.02988I$	$0. + 3.46410I$

IV. $I_4^u = \langle b - a - u - 1,\ a^2 + 3au + 2a - 1,\ u^2 + u + 1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

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

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = \quad 0.121744 - 0.425428I$ $b = \quad 0.621744 + 0.440597I$	$-2.02988I$	$0. + 3.46410I$
$u = -0.500000 + 0.866025I$ $a = -0.62174 - 2.17265I$ $b = -0.121744 - 1.306620I$	$-2.02988I$	$0. + 3.46410I$
$u = -0.500000 - 0.866025I$ $a = \quad 0.121744 + 0.425428I$ $b = \quad 0.621744 - 0.440597I$	$2.02988I$	$0. - 3.46410I$
$u = -0.500000 - 0.866025I$ $a = -0.62174 + 2.17265I$ $b = -0.121744 + 1.306620I$	$2.02988I$	$0. - 3.46410I$

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

(i) Arc colorings

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

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

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

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

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

$$a_5 = \begin{pmatrix} 2 \\ u \end{pmatrix}$$

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

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

$$a_4 = \begin{pmatrix} u+2 \\ u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u+2 \\ u \end{pmatrix}$$

(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_3 c_4, c_5, c_7 c_9	$u^2 - u + 1$
c_6, c_8	$u^2 + u + 1$

(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_7, c_8, c_9	$y^2 + y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_5^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = 1.50000 + 0.86603I$ $b = -0.500000 + 0.866025I$	$-2.02988I$	$0. + 3.46410I$
$u = -0.500000 - 0.866025I$ $a = 1.50000 - 0.86603I$ $b = -0.500000 - 0.866025I$	$2.02988I$	$0. - 3.46410I$

VI. $I_6^u = \langle b + u,\ a + 2u - 1,\ u^2 + 1 \rangle$

(i) Arc colorings

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

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

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

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

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

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

$$a_7 = \begin{pmatrix} -u \\ 0 \end{pmatrix}$$

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

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

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

(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_5, c_7 c_9	$u^2 + 1$
c_6, c_8	$(u+1)^2$

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

	Solutions to I_6^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u =$	$1.000000I$		
$a =$	$1.00000 - 2.00000I$	-1.64493	-4.00000
$b =$	$-\,1.000000I$		
$u =$	$-\,1.000000I$		
$a =$	$1.00000 + 2.00000I$	-1.64493	-4.00000
$b =$	$1.000000I$		

VII. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_2, c_5 c_7	$(u^2+1)(u^2-u+1)^3(u^4+u^3+\cdots+2u+1)(u^6+u^4+\cdots-u+2)$ $\cdot\,(u^8+u^7+2u^6+2u^5+4u^4+3u^3+2u^2+1)$
c_3, c_4, c_9	$(u^2+1)(u^2-u+1)(u^3+2u-1)^2(u^4+u^3+2u^2+2u+1)^2$ $\cdot\,(u^8-2u^7+6u^6-8u^5+10u^4-9u^3+5u^2-3u+2)$
c_6, c_8	$(u+1)^2(u^2+u+1)^3(u^4+3u^3+2u^2+1)$ $\cdot\,(u^6+2u^5+3u^4+2u^3+u^2+3u+4)$ $\cdot\,(u^8+3u^7+8u^6+10u^5+14u^4+11u^3+12u^2+4u+1)$

VIII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_5 c_7	$(y+1)^2(y^2+y+1)^3(y^4+3y^3+2y^2+1)$ $\cdot(y^6+2y^5+3y^4+2y^3+y^2+3y+4)$ $\cdot(y^8+3y^7+8y^6+10y^5+14y^4+11y^3+12y^2+4y+1)$
c_3, c_4, c_9	$(y+1)^2(y^2+y+1)(y^3+4y^2+4y-1)^2(y^4+3y^3+2y^2+1)^2$ $\cdot(y^8+8y^7+24y^6+30y^5+8y^4-5y^3+11y^2+11y+4)$
c_6, c_8	$(y-1)^2(y^2+y+1)^3(y^4-5y^3+6y^2+4y+1)$ $\cdot(y^6+2y^5+3y^4-2y^3+13y^2-y+16)$ $\cdot(y^8+7y^7+32y^6+82y^5+146y^4+151y^3+84y^2+8y+1)$