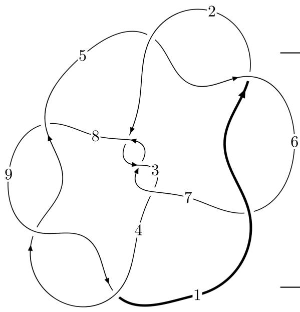
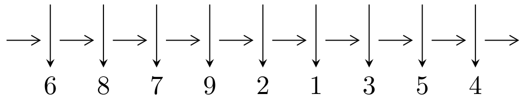
9_{35} ($K9a_{40}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u &= \langle b-u,\ a-1,\ u^3-u^2+3u-1\rangle \\
I_2^u &= \langle b-u,\ -u^3+a-2u+1,\ u^4+u^3+3u^2+2u+1\rangle \\
I_3^u &= \langle u^3-u^2+b+2u-1,\ u^3+2a+u+1,\ u^4-2u^3+3u^2-3u+2\rangle \\
I_4^u &= \langle u^3+u^2+b+3u+1,\ a-1,\ u^4+u^3+3u^2+2u+1\rangle \\
I_5^u &= \langle b+u,\ a+1,\ u^2+1\rangle
\end{aligned}$$

* 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. $I_1^u = \langle b - u,\ a - 1,\ u^3 - u^2 + 3u - 1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -6u^2 + 6u - 18$

(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_7, c_8, c_9	$u^3 + u^2 + 3u + 1$

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.361103$ $a = 1.00000$ $b = 0.361103$	-0.595615	-16.6160
$u = 0.31945 + 1.63317I$ $a = 1.00000$ $b = 0.31945 + 1.63317I$	$17.5696 - 7.9406I$	$-0.69212 + 3.53846I$
$u = 0.31945 - 1.63317I$ $a = 1.00000$ $b = 0.31945 - 1.63317I$	$17.5696 + 7.9406I$	$-0.69212 - 3.53846I$

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

(i) Arc colorings

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

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

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

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

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

$$a_9 = \begin{pmatrix} -2u^3 - 2u^2 - 5u - 3 \\ -1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^3 + 2u^2 + 3u + 2 \\ -u^2 \end{pmatrix}$$

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

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

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^3 - 4u^2 - 12u - 10$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.395123 + 0.506844I$ $a = -1.54742 + 1.12087I$ $b = -0.395123 + 0.506844I$	$3.07886 + 1.41510I$	$-5.82674 - 4.90874I$
$u = -0.395123 - 0.506844I$ $a = -1.54742 - 1.12087I$ $b = -0.395123 - 0.506844I$	$3.07886 - 1.41510I$	$-5.82674 + 4.90874I$
$u = -0.10488 + 1.55249I$ $a = -0.452576 - 0.585652I$ $b = -0.10488 + 1.55249I$	$10.08060 + 3.16396I$	$-2.17326 - 2.56480I$
$u = -0.10488 - 1.55249I$ $a = -0.452576 + 0.585652I$ $b = -0.10488 - 1.55249I$	$10.08060 - 3.16396I$	$-2.17326 + 2.56480I$

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

(i) Arc colorings

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

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

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

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

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

$$a_9 = \begin{pmatrix} -\frac{3}{2}u^3 + 2u^2 - \frac{5}{2}u + \frac{5}{2} \\ -u^3 + 2u^2 - u + 3 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -\frac{1}{2}u^3 - \frac{1}{2}u + \frac{1}{2} \\ -u^3 + 2u^2 - 2u + 3 \end{pmatrix}$$

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

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

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u - 6$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \quad 0.956685 + 0.641200I$ $a = -0.826150 - 1.069070I$ $b = -0.10488 - 1.55249I$	$10.08060 - 3.16396I$	$-2.17326 + 2.56480I$
$u = \quad 0.956685 - 0.641200I$ $a = -0.826150 + 1.069070I$ $b = -0.10488 + 1.55249I$	$10.08060 + 3.16396I$	$-2.17326 - 2.56480I$
$u = \quad 0.043315 + 1.227190I$ $a = -0.423850 + 0.307015I$ $b = -0.395123 - 0.506844I$	$3.07886 - 1.41510I$	$-5.82674 + 4.90874I$
$u = \quad 0.043315 - 1.227190I$ $a = -0.423850 - 0.307015I$ $b = -0.395123 + 0.506844I$	$3.07886 + 1.41510I$	$-5.82674 - 4.90874I$

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

(i) Arc colorings

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

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

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

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

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

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

$$a_1 = \begin{pmatrix} u^3 + 2u \\ u^2 + u + 2 \end{pmatrix}$$

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

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

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^3 - 4u^2 - 12u - 10$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.395123 + 0.506844I$ $a = 1.00000$ $b = 0.043315 - 1.227190I$	$3.07886 + 1.41510I$	$-5.82674 - 4.90874I$
$u = -0.395123 - 0.506844I$ $a = 1.00000$ $b = 0.043315 + 1.227190I$	$3.07886 - 1.41510I$	$-5.82674 + 4.90874I$
$u = -0.10488 + 1.55249I$ $a = 1.00000$ $b = 0.956685 - 0.641200I$	$10.08060 + 3.16396I$	$-2.17326 - 2.56480I$
$u = -0.10488 - 1.55249I$ $a = 1.00000$ $b = 0.956685 + 0.641200I$	$10.08060 - 3.16396I$	$-2.17326 + 2.56480I$

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

(i) Arc colorings

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

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

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

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

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

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

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

$$a_4 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

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

(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	$(y+1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_5^u		$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u =$	$1.000000I$		
$a = -1.00000$		4.93480	0
$b =$	$-\ 1.000000I$		
$u =$	$-\ 1.000000I$		
$a = -1.00000$		4.93480	0
$b =$	$1.000000I$		

VI. u-Polynomials

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

VII. Riley Polynomials

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