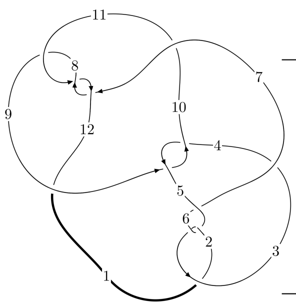
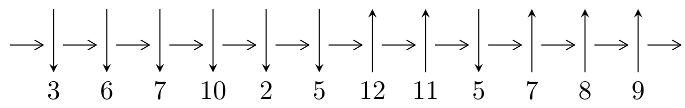
$12n_{0310}$ $(K12n_{0310})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

$$2,5 \xrightarrow[c_5]{} 6 \xrightarrow[c_2]{} 3 \xrightarrow[c_6]{} 7,9 \xrightarrow[c_9]{} 10 \xrightarrow[c_{10}]{} 11 \xrightarrow[c_1]{} 1 \xrightarrow[c_4]{} 4 \xrightarrow[c_8]{} 8 \xrightarrow[c_{12}]{} 12 \twoheadrightarrow c_3, c_7, c_{11}$$

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

$$I_1^u = \langle -u^{18} - 4u^{17} + \cdots + 2b - 1,\ -u^{18} - 2u^{17} + \cdots + 4a - 1,\ u^{19} + 4u^{18} + \cdots + u + 1 \rangle$$
$$I_2^u = \langle b,\ u^2a + a^2 - 2au + u^2 + a - 2u + 2,\ u^3 - u^2 + 1 \rangle$$
$$I_3^u = \langle b,\ -u^2 + a + u,\ u^3 - u^2 + 1 \rangle$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 28 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.

$$\boldsymbol{I_1^u = \langle -u^{18} - 4u^{17} + \cdots + 2b - 1,\ -u^{18} - 2u^{17} + \cdots + 4a - 1,\ u^{19} + 4u^{18} + \cdots + u + 1 \rangle}$$

(i) Arc colorings

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

$$a_5 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

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

$$a_9 = \begin{pmatrix} \frac{1}{4}u^{18} + \frac{1}{2}u^{17} + \cdots - \frac{1}{2}u + \frac{1}{4} \\ \frac{1}{2}u^{18} + 2u^{17} + \cdots + \frac{1}{2}u^2 + \frac{1}{2} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -\frac{1}{4}u^{18} - \frac{3}{2}u^{17} + \cdots - \frac{1}{2}u - \frac{1}{4} \\ \frac{1}{2}u^{18} + 2u^{17} + \cdots + \frac{1}{2}u^2 + \frac{1}{2} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{1}{4}u^{17} + \frac{1}{2}u^{16} + \cdots - \frac{1}{2}u + \frac{1}{4} \\ -\frac{1}{4}u^{17} - \frac{1}{4}u^{16} + \cdots + \frac{3}{4}u^2 - \frac{1}{4}u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^3 \\ u^5 - u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^7 - 2u^5 + 2u^3 - 2u \\ -u^7 + u^5 - 2u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} \frac{1}{4}u^{18} + \frac{5}{4}u^{17} + \cdots - \frac{5}{4}u + \frac{1}{4} \\ -\frac{1}{4}u^{18} - u^{17} + \cdots + \frac{5}{4}u^2 - \frac{1}{4} \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} \frac{1}{4}u^{16} + \frac{3}{4}u^{15} + \cdots + \frac{7}{4}u + \frac{3}{4} \\ -u^2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{21}{4}u^{18} - \frac{35}{2}u^{17} - \frac{95}{4}u^{16} - \frac{1}{4}u^{15} + 4u^{14} - 59u^{13} - \frac{497}{4}u^{12} - \frac{87}{2}u^{11} + \frac{193}{4}u^{10} - \frac{67}{2}u^9 - \frac{659}{4}u^8 - 90u^7 + \frac{105}{2}u^6 + \frac{97}{2}u^5 + \frac{5}{4}u^4 - \frac{13}{2}u^3 - \frac{3}{2}u^2 + \frac{31}{4}u - \frac{13}{2}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_6	$u^{19} + 2u^{18} + \cdots + u + 1$
c_2, c_5	$u^{19} + 4u^{18} + \cdots + u + 1$
c_3	$u^{19} - 4u^{18} + \cdots + 10539u + 33529$
c_4, c_9	$u^{19} + u^{18} + \cdots + 1024u + 512$
c_7, c_8, c_{11}	$u^{19} + 4u^{18} + \cdots + 9u + 1$
c_{10}, c_{12}	$u^{19} - 4u^{18} + \cdots + 19u + 2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_6	$y^{19} + 34y^{18} + \cdots + y - 1$
c_2, c_5	$y^{19} - 2y^{18} + \cdots + y - 1$
c_3	$y^{19} + 182y^{18} + \cdots + 14622555837y - 1124193841$
c_4, c_9	$y^{19} + 49y^{18} + \cdots + 917504y - 262144$
c_7, c_8, c_{11}	$y^{19} + 14y^{18} + \cdots + 57y - 1$
c_{10}, c_{12}	$y^{19} - 42y^{18} + \cdots + 193y - 4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.912718 + 0.242073I$ $a = -0.605722 - 0.847563I$ $b = -0.688530 - 0.629214I$	$-3.61234 + 0.24752I$	$-6.49775 - 1.24505I$
$u = -0.912718 - 0.242073I$ $a = -0.605722 + 0.847563I$ $b = -0.688530 + 0.629214I$	$-3.61234 - 0.24752I$	$-6.49775 + 1.24505I$
$u = 0.815575 + 0.877596I$ $a = -0.144284 - 0.906002I$ $b = 1.173140 + 0.647275I$	$3.20435 - 1.33478I$	$-0.465469 + 0.575891I$
$u = 0.815575 - 0.877596I$ $a = -0.144284 + 0.906002I$ $b = 1.173140 - 0.647275I$	$3.20435 + 1.33478I$	$-0.465469 - 0.575891I$
$u = -0.314616 + 0.672401I$ $a = 0.306559 + 0.532855I$ $b = 1.170880 - 0.267606I$	$-1.32909 + 2.90393I$	$-0.75358 - 3.65471I$
$u = -0.314616 - 0.672401I$ $a = 0.306559 - 0.532855I$ $b = 1.170880 + 0.267606I$	$-1.32909 - 2.90393I$	$-0.75358 + 3.65471I$
$u = 1.023690 + 0.762858I$ $a = 0.911797 + 0.469844I$ $b = -0.93096 + 1.09132I$	$2.47335 - 4.87674I$	$-0.88643 + 4.00302I$
$u = 1.023690 - 0.762858I$ $a = 0.911797 - 0.469844I$ $b = -0.93096 - 1.09132I$	$2.47335 + 4.87674I$	$-0.88643 - 4.00302I$
$u = -0.683274$ $a = 0.475212$ $b = 0.353102$	-0.926928	-11.6640
$u = 0.580344 + 0.259618I$ $a = -0.91642 + 2.18155I$ $b = -0.114009 - 0.652352I$	$-3.71810 - 3.34728I$	$-0.40454 + 7.55184I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.580344 - 0.259618I$ $a = -0.91642 - 2.18155I$ $b = -0.114009 + 0.652352I$	$-3.71810 + 3.34728I$	$-0.40454 - 7.55184I$
$u = 0.217095 + 0.536747I$ $a = -0.01996 - 1.43982I$ $b = -0.369486 + 0.882626I$	$1.37613 - 0.79780I$	$4.12075 + 2.79421I$
$u = 0.217095 - 0.536747I$ $a = -0.01996 + 1.43982I$ $b = -0.369486 - 0.882626I$	$1.37613 + 0.79780I$	$4.12075 - 2.79421I$
$u = -0.95754 + 1.07145I$ $a = 1.23432 + 1.19343I$ $b = -0.47811 - 3.01384I$	$16.9874 - 2.3515I$	$-0.326728 + 0.639267I$
$u = -0.95754 - 1.07145I$ $a = 1.23432 - 1.19343I$ $b = -0.47811 + 3.01384I$	$16.9874 + 2.3515I$	$-0.326728 - 0.639267I$
$u = -1.07089 + 0.97401I$ $a = 1.36374 + 1.53260I$ $b = 0.88181 - 2.70786I$	$16.5659 + 9.8325I$	$-0.83634 - 4.64715I$
$u = -1.07089 - 0.97401I$ $a = 1.36374 - 1.53260I$ $b = 0.88181 + 2.70786I$	$16.5659 - 9.8325I$	$-0.83634 + 4.64715I$
$u = -1.03929 + 1.04464I$ $a = -1.36765 - 1.36775I$ $b = -0.32129 + 3.19553I$	$-18.3247 + 3.8317I$	$1.88207 - 2.04996I$
$u = -1.03929 - 1.04464I$ $a = -1.36765 + 1.36775I$ $b = -0.32129 - 3.19553I$	$-18.3247 - 3.8317I$	$1.88207 + 2.04996I$

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

(i) Arc colorings

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

$$a_5 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

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

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

$$a_{10} = \begin{pmatrix} a \\ 0 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -au \\ -u^2a + au + a \end{pmatrix}$$

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

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

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

$$a_{12} = \begin{pmatrix} au - a + u - 2 \\ -u^2 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 2u^2a + au - a + 5u - 5$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3, c_{11}	$(u^3 - u^2 + 2u - 1)^2$
c_2, c_{10}, c_{12}	$(u^3 + u^2 - 1)^2$
c_4, c_9	u^6
c_5	$(u^3 - u^2 + 1)^2$
c_6, c_7, c_8	$(u^3 + u^2 + 2u + 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_6 c_7, c_8, c_{11}	$(y^3 + 3y^2 + 2y - 1)^2$
c_2, c_5, c_{10} c_{12}	$(y^3 - y^2 + 2y - 1)^2$
c_4, c_9	y^6

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.877439 + 0.744862I$ $a = 0.447279 + 0.744862I$ $b = 0$	$-5.65624I$	$-2.97732 + 5.45590I$
$u = 0.877439 + 0.744862I$ $a = 0.092519 - 0.562280I$ $b = 0$	$4.13758 - 2.82812I$	$1.30443 + 3.86214I$
$u = 0.877439 - 0.744862I$ $a = 0.447279 - 0.744862I$ $b = 0$	$5.65624I$	$-2.97732 - 5.45590I$
$u = 0.877439 - 0.744862I$ $a = 0.092519 + 0.562280I$ $b = 0$	$4.13758 + 2.82812I$	$1.30443 - 3.86214I$
$u = -0.754878$ $a = -1.53980 + 1.30714I$ $b = 0$	$-4.13758 - 2.82812I$	$-7.82711 - 0.80415I$
$u = -0.754878$ $a = -1.53980 - 1.30714I$ $b = 0$	$-4.13758 + 2.82812I$	$-7.82711 + 0.80415I$

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

(i) Arc colorings

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

$$a_5 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

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

$$a_9 = \begin{pmatrix} u^2 - u \\ 0 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} u^2 - u \\ 0 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 1 \\ u^2 - 1 \end{pmatrix}$$

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

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

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

$$a_{12} = \begin{pmatrix} u^2 \\ -u^2 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= u^2 - u - 1$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3, c_{11}	$u^3 - u^2 + 2u - 1$
c_2, c_{10}, c_{12}	$u^3 + u^2 - 1$
c_4, c_9	u^3
c_5	$u^3 - u^2 + 1$
c_6, c_7, c_8	$u^3 + u^2 + 2u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_6 c_7, c_8, c_{11}	$y^3 + 3y^2 + 2y - 1$
c_2, c_5, c_{10} c_{12}	$y^3 - y^2 + 2y - 1$
c_4, c_9	y^3

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.877439 + 0.744862I$ $a = -0.662359 + 0.562280I$ $b = 0$	0	$-1.66236 + 0.56228I$
$u = 0.877439 - 0.744862I$ $a = -0.662359 - 0.562280I$ $b = 0$	0	$-1.66236 - 0.56228I$
$u = -0.754878$ $a = 1.32472$ $b = 0$	0	0.324720

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u^3 - u^2 + 2u - 1)^3)(u^{19} + 2u^{18} + \cdots + u + 1)$
c_2	$((u^3 + u^2 - 1)^3)(u^{19} + 4u^{18} + \cdots + u + 1)$
c_3	$((u^3 - u^2 + 2u - 1)^3)(u^{19} - 4u^{18} + \cdots + 10539u + 33529)$
c_4, c_9	$u^9(u^{19} + u^{18} + \cdots + 1024u + 512)$
c_5	$((u^3 - u^2 + 1)^3)(u^{19} + 4u^{18} + \cdots + u + 1)$
c_6	$((u^3 + u^2 + 2u + 1)^3)(u^{19} + 2u^{18} + \cdots + u + 1)$
c_7, c_8	$((u^3 + u^2 + 2u + 1)^3)(u^{19} + 4u^{18} + \cdots + 9u + 1)$
c_{10}, c_{12}	$((u^3 + u^2 - 1)^3)(u^{19} - 4u^{18} + \cdots + 19u + 2)$
c_{11}	$((u^3 - u^2 + 2u - 1)^3)(u^{19} + 4u^{18} + \cdots + 9u + 1)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_6	$((y^3+3y^2+2y-1)^3)(y^{19}+34y^{18}+\cdots+y-1)$
c_2, c_5	$((y^3-y^2+2y-1)^3)(y^{19}-2y^{18}+\cdots+y-1)$
c_3	$(y^3+3y^2+2y-1)^3$ $\cdot\,(y^{19}+182y^{18}+\cdots+14622555837y-1124193841)$
c_4, c_9	$y^9(y^{19}+49y^{18}+\cdots+917504y-262144)$
c_7, c_8, c_{11}	$((y^3+3y^2+2y-1)^3)(y^{19}+14y^{18}+\cdots+57y-1)$
c_{10}, c_{12}	$((y^3-y^2+2y-1)^3)(y^{19}-42y^{18}+\cdots+193y-4)$