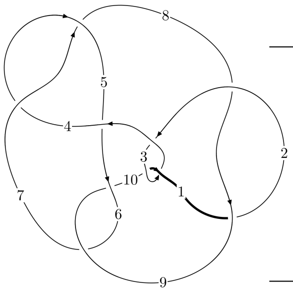
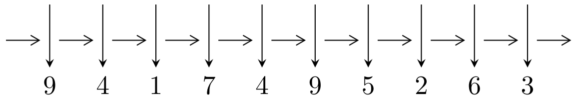
10_{154} $(K10n_7)$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

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

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 18 representations.

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

(i) Arc colorings

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ -u^3+u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^3 \\ u^5-u^3+u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u^3-2u^2-2u \\ -u^5-2u^4-u^3+2u^2+u \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -2u^3-2u^2-2u \\ -2u^5-2u^4+2u^2+u \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^3-2u^2+2 \\ u^3-u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -2u^2-2u-1 \\ -2u^4-2u^3+u^2+2u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 2u^4+2u^3-2u-1 \\ -4u^5-8u^4+8u^2+4u-2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -8u^5-24u^4-32u^3-8u^2-6$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_6, c_8 c_9	$u^6 - u^5 + 5u^4 + 2u^3 + 4u^2 + u - 1$
c_2, c_5	$u^6 + 3u^5 + 13u^4 + 20u^3 + 18u^2 + 9u + 1$
c_3, c_4, c_7 c_{10}	$u^6 - 3u^5 + 3u^4 + 2u^3 - 4u^2 + u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_6, c_8 c_9	$y^6 + 9y^5 + 37y^4 + 36y^3 + 2y^2 - 9y + 1$
c_2, c_5	$y^6 + 17y^5 + 85y^4 + 16y^3 - 10y^2 - 45y + 1$
c_3, c_4, c_7 c_{10}	$y^6 - 3y^5 + 13y^4 - 20y^3 + 18y^2 - 9y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.822978+0.498752I$ $a=\ \ 0.732119-0.244993I$ $b=\ \ 0.203480-0.959760I$	$1.78286+4.10821I$	$-5.51333-7.68125I$
$u=-0.822978-0.498752I$ $a=\ \ 0.732119+0.244993I$ $b=\ \ 0.203480+0.959760I$	$1.78286-4.10821I$	$-5.51333+7.68125I$
$u=\ \ 0.931750$ $a=-4.40872$ $b=-0.350492$	-3.00199	-62.5370
$u=\ \ 0.385643$ $a=-1.12608$ $b=\ \ 0.572966$	-0.943503	-9.62410
$u=-1.33572+1.10504I$ $a=-0.964719-0.871256I$ $b=-0.81472+2.12358I$	$14.9943+9.2499I$	$-8.40611-3.97593I$
$u=-1.33572-1.10504I$ $a=-0.964719+0.871256I$ $b=-0.81472-2.12358I$	$14.9943-9.2499I$	$-8.40611+3.97593I$

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

(i) Arc colorings

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ u^2 + u - 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -u^2 + 1 \\ u^2 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u^2 - 2u - 1 \\ 0 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u^2 - 3u - 1 \\ u^2 + u - 1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u^2 - 2u - 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ -u^2 - u + 1 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= u^2 - 8$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.877439 + 0.744862I$ $a = 0.539798 - 0.182582I$ $b = 0$	$1.37919 + 2.82812I$	$-7.78492 - 1.30714I$
$u = -0.877439 - 0.744862I$ $a = 0.539798 + 0.182582I$ $b = 0$	$1.37919 - 2.82812I$	$-7.78492 + 1.30714I$
$u = 0.754878$ $a = -3.07960$ $b = 0$	-2.75839	-7.43020

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

(i) Arc colorings

$$a_3 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} a \\ a^2 + 3a + 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} a^2 + 4a + 1 \\ a^2 + 3a + 1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} a + 2 \\ a + 2 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -2a^2 - 4a - 1 \\ -a^2 - 2a \end{pmatrix}$$
$$a_8 = \begin{pmatrix} a + 2 \\ a + 2 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -a^2 - 3a - 9$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -0.337641 + 0.562280I$ $b = -0.215080 + 1.307140I$	$1.37919 + 2.82812I$	$-7.78492 - 1.30714I$
$u = 1.00000$ $a = -0.337641 - 0.562280I$ $b = -0.215080 - 1.307140I$	$1.37919 - 2.82812I$	$-7.78492 + 1.30714I$
$u = 1.00000$ $a = -2.32472$ $b = -0.569840$	-2.75839	-7.43020

IV. $\boldsymbol{I^u_4 = \langle u^4 + 2u^3 + u^2 + 2b - u - 1,\ -u^5 - 3u^4 - 7u^3 - 4u^2 + 4a - 2u + 5,\ u^6 + 2u^5 + 4u^4 + u^3 + 2u^2 - 3u + 1\rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^3 \\ u^5 - u^3 + u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} \frac{1}{4}u^5 + \frac{3}{4}u^4 + \cdots + \frac{1}{2}u - \frac{5}{4} \\ -\frac{1}{2}u^4 - u^3 - \frac{1}{2}u^2 + \frac{1}{2}u + \frac{1}{2} \end{pmatrix}$$
$$a_5 = \begin{pmatrix} \frac{1}{4}u^5 + \frac{1}{4}u^4 + \cdots + 2u - \frac{7}{4} \\ u^5 + \frac{1}{2}u^4 + \cdots - \frac{5}{2}u + \frac{3}{2} \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -\frac{3}{4}u^5 - \frac{5}{4}u^4 + \cdots - \frac{1}{2}u + \frac{7}{4} \\ \frac{3}{4}u^5 + \frac{1}{4}u^4 + \cdots + \frac{3}{2}u - \frac{3}{4} \end{pmatrix}$$
$$a_7 = \begin{pmatrix} \frac{1}{2}u^5 + \frac{3}{2}u^4 + \cdots + u - \frac{5}{2} \\ -\frac{1}{4}u^5 - \frac{1}{4}u^4 + \cdots + u + \frac{3}{4} \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -\frac{3}{4}u^5 - \frac{1}{4}u^4 + \cdots + \frac{3}{2}u - \frac{9}{4} \\ \frac{7}{4}u^5 - \frac{3}{4}u^4 + \cdots + \frac{5}{2}u + \frac{1}{4} \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= \frac{1}{2}u^5 + u^4 + \frac{3}{2}u^3 - \frac{1}{2}u^2 - \frac{1}{2}u - 9$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_6, c_8 c_9	$u^6 - u^5 + 8u^4 - u^3 + 8u^2 + 20u + 8$
c_2, c_5	$u^6 - 4u^5 + 16u^4 - 29u^3 + 18u^2 + 5u + 1$
c_3, c_4, c_7 c_{10}	$u^6 - 2u^5 + 4u^4 - u^3 + 2u^2 + 3u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_6, c_8 c_9	$y^6 + 15y^5 + 78y^4 + 183y^3 + 232y^2 - 272y + 64$
c_2, c_5	$y^6 + 16y^5 + 60y^4 - 223y^3 + 646y^2 + 11y + 1$
c_3, c_4, c_7 c_{10}	$y^6 + 4y^5 + 16y^4 + 29y^3 + 18y^2 - 5y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.277479 + 1.215720I$ $a = -0.222521 - 0.974928I$ $b = -0.90097 + 1.51597I$	4.69981	$-6.19806 + 0.I$
$u = -0.277479 - 1.215720I$ $a = -0.222521 + 0.974928I$ $b = -0.90097 - 1.51597I$	4.69981	$-6.19806 + 0.I$
$u = 0.400969 + 0.193096I$ $a = -0.900969 + 0.433884I$ $b = 0.623490 - 0.085936I$	-0.939962	$-9.24698 + 0.I$
$u = 0.400969 - 0.193096I$ $a = -0.900969 - 0.433884I$ $b = 0.623490 + 0.085936I$	-0.939962	$-9.24698 + 0.I$
$u = -1.12349 + 1.40881I$ $a = 0.623490 + 0.781831I$ $b = -0.22252 - 2.53859I$	15.9794	$-7.55496 + 0.I$
$u = -1.12349 - 1.40881I$ $a = 0.623490 - 0.781831I$ $b = -0.22252 + 2.53859I$	15.9794	$-7.55496 + 0.I$

V. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_9	$u^3(u^3+u^2+2u+1)(u^6-u^5+5u^4+2u^3+4u^2+u-1)$ $\cdot(u^6-u^5+8u^4-u^3+8u^2+20u+8)$
c_2	$((u-1)^3)(u^3-u^2+2u-1)(u^6-4u^5+\cdots+5u+1)$ $\cdot(u^6+3u^5+13u^4+20u^3+18u^2+9u+1)$
c_3, c_7	$(u+1)^3(u^3-u^2+1)(u^6-3u^5+3u^4+2u^3-4u^2+u+1)$ $\cdot(u^6-2u^5+4u^4-u^3+2u^2+3u+1)$
c_4, c_{10}	$(u-1)^3(u^3+u^2-1)(u^6-3u^5+3u^4+2u^3-4u^2+u+1)$ $\cdot(u^6-2u^5+4u^4-u^3+2u^2+3u+1)$
c_5	$((u+1)^3)(u^3+u^2+2u+1)(u^6-4u^5+\cdots+5u+1)$ $\cdot(u^6+3u^5+13u^4+20u^3+18u^2+9u+1)$
c_6, c_8	$u^3(u^3-u^2+2u-1)(u^6-u^5+5u^4+2u^3+4u^2+u-1)$ $\cdot(u^6-u^5+8u^4-u^3+8u^2+20u+8)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_6, c_8 c_9	$y^3(y^3+3y^2+2y-1)(y^6+9y^5+37y^4+36y^3+2y^2-9y+1)$ $\cdot(y^6+15y^5+78y^4+183y^3+232y^2-272y+64)$
c_2, c_5	$(y-1)^3(y^3+3y^2+2y-1)$ $\cdot(y^6+16y^5+60y^4-223y^3+646y^2+11y+1)$ $\cdot(y^6+17y^5+85y^4+16y^3-10y^2-45y+1)$
c_3, c_4, c_7 c_{10}	$((y-1)^3)(y^3-y^2+2y-1)(y^6-3y^5+\cdots-9y+1)$ $\cdot(y^6+4y^5+16y^4+29y^3+18y^2-5y+1)$