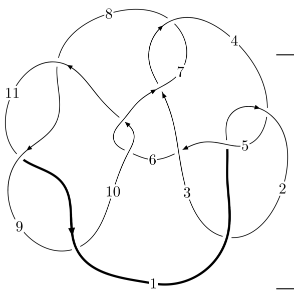
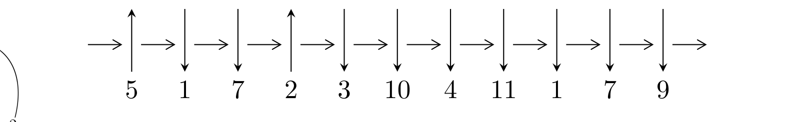
$11n_9$ ($K11n_9$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u = \langle & 7u^{10} - 25u^9 + 49u^8 - 40u^7 + 18u^6 - 11u^5 + 35u^4 + u^2 + 46b - 21u + 24, \\
& -31u^{10} + 114u^9 - 240u^8 + 279u^7 - 290u^6 + 305u^5 - 408u^4 + 253u^3 - 241u^2 + 46a + 116u - 241, \\
& u^{11} - 4u^{10} + 9u^9 - 12u^8 + 13u^7 - 13u^6 + 16u^5 - 12u^4 + 10u^3 - 4u^2 + 8u - 1\rangle \\
I_2^u = \langle & b + 1,\ -u^4 + u^3 - 2u^2 + a + u - 1,\ u^5 - u^4 + 2u^3 - u^2 + u - 1\rangle \\
I_3^u = \langle & -au + 3b + a + u - 1,\ a^2 + au - 4u - 4,\ u^2 + u + 1\rangle
\end{aligned}$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 20 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. $I^u_1 = \langle 7u^{10} - 25u^9 + \cdots + 46b + 24,\ -31u^{10} + 114u^9 + \cdots + 46a - 241,\ u^{11} - 4u^{10} + \cdots + 8u - 1\rangle$

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u^2 + 1 \\ -u^2 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u^5 - 2u^3 - u \\ u^5 + u^3 + u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 0.673913u^{10} - 2.47826u^9 + \cdots - 2.52174u + 5.23913 \\ -0.152174u^{10} + 0.543478u^9 + \cdots + 0.456522u - 0.521739 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -0.173913u^{10} + 0.978261u^9 + \cdots + 1.02174u - 3.23913 \\ -0.282609u^{10} + 1.15217u^9 + \cdots + 1.84783u + 0.173913 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0.260870u^{10} - 0.717391u^9 + \cdots - 1.28261u - 2.89130 \\ -0.0217391u^{10} + 0.934783u^9 + \cdots + 4.06522u - 0.217391 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 0.521739u^{10} - 1.93478u^9 + \cdots - 2.06522u + 4.71739 \\ -0.152174u^{10} + 0.543478u^9 + \cdots + 0.456522u - 0.521739 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 0.0652174u^{10} - 0.304348u^9 + \cdots - 0.695652u + 3.15217 \\ 0.108696u^{10} - 0.673913u^9 + \cdots - 2.32609u + 0.0869565 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 0.0652174u^{10} - 0.304348u^9 + \cdots - 0.695652u + 3.15217 \\ 0.108696u^{10} - 0.673913u^9 + \cdots - 2.32609u + 0.0869565 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= -\frac{13}{46}u^{10} + \frac{53}{46}u^9 - \frac{137}{46}u^8 + \frac{93}{23}u^7 - \frac{89}{23}u^6 + \frac{119}{46}u^5 - \frac{203}{46}u^4 + 6u^3 - \frac{337}{46}u^2 + \frac{39}{46}u - \frac{272}{23}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4	$u^{11} + 4u^{10} + \cdots + 8u + 1$
c_2	$u^{11} + 2u^{10} + \cdots + 56u - 1$
c_3, c_7	$u^{11} - 3u^{10} + \cdots + 16u + 16$
c_5	$u^{11} - 4u^{10} + \cdots + 790u + 97$
c_6, c_{10}	$u^{11} + 3u^{10} + \cdots - 96u + 32$
c_8, c_9, c_{11}	$u^{11} - 8u^{10} + \cdots - 2u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$y^{11} + 2y^{10} + \cdots + 56y - 1$
c_2	$y^{11} + 18y^{10} + \cdots + 3376y - 1$
c_3, c_7	$y^{11} + 15y^{10} + \cdots + 1152y - 256$
c_5	$y^{11} + 34y^{10} + \cdots + 507312y - 9409$
c_6, c_{10}	$y^{11} + 27y^{10} + \cdots - 2560y - 1024$
c_8, c_9, c_{11}	$y^{11} - 14y^{10} + \cdots - 114y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.370726+0.886061I$ $a=\ \ 0.869101-0.048452I$ $b=\ \ 0.0248083+0.1208390I$	$-0.37744-1.65887I$	$-3.08713+3.12324I$
$u=-0.370726-0.886061I$ $a=\ \ 0.869101+0.048452I$ $b=\ \ 0.0248083-0.1208390I$	$-0.37744+1.65887I$	$-3.08713-3.12324I$
$u=-0.619363+0.675074I$ $a=\ \ 1.22270-1.02577I$ $b=-1.234510+0.125378I$	$-1.43681-1.43186I$	$-8.27132+5.43285I$
$u=-0.619363-0.675074I$ $a=\ \ 1.22270+1.02577I$ $b=-1.234510-0.125378I$	$-1.43681+1.43186I$	$-8.27132-5.43285I$
$u=\ \ 0.684593+1.110730I$ $a=-1.60080+0.55358I$ $b=\ \ 1.67575+0.38496I$	$-8.43909+3.01365I$	$-11.25510-3.03574I$
$u=\ \ 0.684593-1.110730I$ $a=-1.60080-0.55358I$ $b=\ \ 1.67575-0.38496I$	$-8.43909-3.01365I$	$-11.25510+3.03574I$
$u=\ \ 0.85960+1.26321I$ $a=-0.91455+2.45311I$ $b=\ \ 1.82324-1.07192I$	$10.9219+10.3175I$	$-9.91350-4.19094I$
$u=\ \ 0.85960-1.26321I$ $a=-0.91455-2.45311I$ $b=\ \ 1.82324+1.07192I$	$10.9219-10.3175I$	$-9.91350+4.19094I$
$u=\ \ 1.38032+0.75647I$ $a=-2.57070-2.19582I$ $b=\ \ 1.94194+1.79095I$	$12.91330-2.44000I$	$-8.55865+0.24092I$
$u=\ \ 1.38032-0.75647I$ $a=-2.57070+2.19582I$ $b=\ \ 1.94194-1.79095I$	$12.91330+2.44000I$	$-8.55865-0.24092I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.131154$ $a = 4.98850$ $b = -0.462456$	-0.844734	-11.8290

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

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u^2+1 \\ -u^2 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u^4-u^2-1 \\ u^4-u^3+u^2+1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} u^4-u^3+2u^2-u+1 \\ -1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u^4-u^2-1 \\ u^4-u^3+u^2+1 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ u^3+u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u^4-u^3+2u^2-u \\ -1 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} u^4-u^3+2u^2-u+1 \\ -1 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} u^4-u^3+2u^2-u+1 \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 3u^4+3u^3-4u^2+8u-15$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^5 - u^4 + 2u^3 - u^2 + u - 1$
c_2	$u^5 + 3u^4 + 4u^3 + u^2 - u - 1$
c_3	$u^5 + u^4 - 2u^3 - u^2 + u - 1$
c_4	$u^5 + u^4 + 2u^3 + u^2 + u + 1$
c_5, c_7	$u^5 - u^4 - 2u^3 + u^2 + u + 1$
c_6, c_{10}	u^5
c_8, c_9	$(u-1)^5$
c_{11}	$(u+1)^5$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$y^5 + 3y^4 + 4y^3 + y^2 - y - 1$
c_2	$y^5 - y^4 + 8y^3 - 3y^2 + 3y - 1$
c_3, c_5, c_7	$y^5 - 5y^4 + 8y^3 - 3y^2 - y - 1$
c_6, c_{10}	y^5
c_8, c_9, c_{11}	$(y-1)^5$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.339110+0.822375I$ $a=-0.428550-1.039280I$ $b=-1.00000$	$-1.97403-1.53058I$	$-13.5086+9.8710I$
$u=-0.339110-0.822375I$ $a=-0.428550+1.039280I$ $b=-1.00000$	$-1.97403+1.53058I$	$-13.5086-9.8710I$
$u=\ 0.766826$ $a=\ 1.30408$ $b=-1.00000$	-4.04602	-8.82740
$u=\ 0.455697+1.200150I$ $a=\ 0.276511-0.728237I$ $b=-1.00000$	$-7.51750+4.40083I$	$-11.07763-5.80708I$
$u=\ 0.455697-1.200150I$ $a=\ 0.276511+0.728237I$ $b=-1.00000$	$-7.51750-4.40083I$	$-11.07763+5.80708I$

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

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ u+1 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u \\ u+1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} a \\ \frac{1}{3}au - \frac{1}{3}a - \frac{1}{3}u + \frac{1}{3} \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -\frac{1}{3}au - \frac{2}{3}a + \frac{4}{3}u + \frac{5}{3} \\ -\frac{1}{3}au + \frac{1}{3}a + \frac{1}{3}u - \frac{4}{3} \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ u+1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -\frac{1}{3}au - \frac{2}{3}a + \frac{4}{3}u + \frac{5}{3} \\ -\frac{1}{3}au + \frac{1}{3}a + \frac{1}{3}u - \frac{4}{3} \end{pmatrix}$$
$$a_9 = \begin{pmatrix} \frac{1}{3}au + \frac{2}{3}a - \frac{1}{3}u + \frac{1}{3} \\ \frac{1}{3}au - \frac{1}{3}a - \frac{1}{3}u + \frac{1}{3} \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -\frac{2}{3}au - \frac{1}{3}a + \frac{5}{3}u + \frac{7}{3} \\ -\frac{1}{3}au + \frac{1}{3}a + \frac{1}{3}u - \frac{4}{3} \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -\frac{2}{3}au - \frac{1}{3}a + \frac{5}{3}u + \frac{7}{3} \\ -\frac{1}{3}au + \frac{1}{3}a + \frac{1}{3}u - \frac{4}{3} \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 3au + 3a + 4u - 15$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_5	$(u^2+u+1)^2$
c_3, c_7	u^4
c_4	$(u^2-u+1)^2$
c_6, c_8, c_9	$(u^2+u-1)^2$
c_{10}, c_{11}	$(u^2-u-1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_4 c_5	$(y^2+y+1)^2$
c_3, c_7	y^4
c_6, c_8, c_9 c_{10}, c_{11}	$(y^2-3y+1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = \quad 1.92705 + 0.53523I$ $b = -0.618034$	$-0.98696 - 2.02988I$	$-15.5000 + 9.2736I$
$u = -0.500000 + 0.866025I$ $a = -1.42705 - 1.40126I$ $b = \quad 1.61803$	$-8.88264 - 2.02988I$	$-15.5000 - 2.3454I$
$u = -0.500000 - 0.866025I$ $a = \quad 1.92705 - 0.53523I$ $b = -0.618034$	$-0.98696 + 2.02988I$	$-15.5000 - 9.2736I$
$u = -0.500000 - 0.866025I$ $a = -1.42705 + 1.40126I$ $b = \quad 1.61803$	$-8.88264 + 2.02988I$	$-15.5000 + 2.3454I$

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u^2+u+1)^2)(u^5-u^4+\cdots+u-1)(u^{11}+4u^{10}+\cdots+8u+1)$
c_2	$((u^2+u+1)^2)(u^5+3u^4+\cdots-u-1)(u^{11}+2u^{10}+\cdots+56u-1)$
c_3	$u^4(u^5+u^4+\cdots+u-1)(u^{11}-3u^{10}+\cdots+16u+16)$
c_4	$((u^2-u+1)^2)(u^5+u^4+\cdots+u+1)(u^{11}+4u^{10}+\cdots+8u+1)$
c_5	$((u^2+u+1)^2)(u^5-u^4+\cdots+u+1)(u^{11}-4u^{10}+\cdots+790u+97)$
c_6	$u^5(u^2+u-1)^2(u^{11}+3u^{10}+\cdots-96u+32)$
c_7	$u^4(u^5-u^4+\cdots+u+1)(u^{11}-3u^{10}+\cdots+16u+16)$
c_8, c_9	$((u-1)^5)(u^2+u-1)^2(u^{11}-8u^{10}+\cdots-2u+1)$
c_{10}	$u^5(u^2-u-1)^2(u^{11}+3u^{10}+\cdots-96u+32)$
c_{11}	$((u+1)^5)(u^2-u-1)^2(u^{11}-8u^{10}+\cdots-2u+1)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_4	$((y^2+y+1)^2)(y^5+3y^4+\cdots-y-1)(y^{11}+2y^{10}+\cdots+56y-1)$
c_2	$(y^2+y+1)^2(y^5-y^4+8y^3-3y^2+3y-1)$ $\cdot(y^{11}+18y^{10}+\cdots+3376y-1)$
c_3, c_7	$y^4(y^5-5y^4+\cdots-y-1)(y^{11}+15y^{10}+\cdots+1152y-256)$
c_5	$(y^2+y+1)^2(y^5-5y^4+8y^3-3y^2-y-1)$ $\cdot(y^{11}+34y^{10}+\cdots+507312y-9409)$
c_6, c_{10}	$y^5(y^2-3y+1)^2(y^{11}+27y^{10}+\cdots-2560y-1024)$
c_8, c_9, c_{11}	$((y-1)^5)(y^2-3y+1)^2(y^{11}-14y^{10}+\cdots-114y-1)$