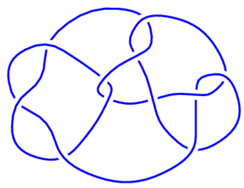
$11n_9$ $(K11n_9)$



[1]

Arc Sequences

$\uparrow$	$\downarrow$	$\downarrow$	$\uparrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
5	1	7	2	3	10	4	11	1	7	9

Solving Sequence

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

Representation Ideals

$$I = \bigcap_{i=1}^{3} I_i^u$$

$$\begin{aligned}
I_1^u &= \langle a^4 - 3a^3 + 5a^2 - 6a + 4,\ -a^3 + a^2 - a + 2u + 2,\ -a^3 + 3a^2 + 2b - 3a + 2\rangle \\
I_2^u &= \langle u^5 - u^4 + 2u^3 - u^2 + u - 1,\ b + 1,\ -u^4 + u^3 - 2u^2 + a + u\rangle \\
I_3^u &= \langle u^{11} + 4u^{10} + 9u^9 + 12u^8 + 13u^7 + 13u^6 + 16u^5 + 12u^4 + 10u^3 + 4u^2 + 8u + 1, \\
&\quad 7u^{10} + 25u^9 + 49u^8 + 40u^7 + 18u^6 + 11u^5 + 35u^4 + u^2 + 46b + 21u + 24, \\
&\quad - 24u^{10} - 89u^9 - 191u^8 - 239u^7 - 272u^6 - 294u^5 - 373u^4 - 253u^3 - 240u^2 + 46a - 95u - 217\rangle
\end{aligned}$$

There are 3 irreducible components with 20 representations.

[1]The knot diagram image is adapter from "C. Livingston and A. H. Moore, KnotInfo: Table of Knot Invariants, http://www.indiana.edu/ knotinfo"

I.

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

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0 \\ \frac{1}{2}a^3 - \frac{1}{2}a^2 + \frac{1}{2}a - 1 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 1 \\ \frac{1}{2}a^3 - \frac{1}{2}a^2 + \frac{1}{2}a \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -\frac{1}{2}a^3 + \frac{1}{2}a^2 - \frac{1}{2}a + 1 \\ \frac{1}{2}a^3 - \frac{1}{2}a^2 + \frac{1}{2}a \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} a \\ \frac{1}{2}a^3 - \frac{3}{2}a^2 + \frac{3}{2}a - 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -\frac{1}{2}a^3 + \frac{3}{2}a^2 - \frac{1}{2}a + 1 \\ \frac{1}{2}a^3 - \frac{3}{2}a^2 + \frac{3}{2}a - 1 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} \frac{1}{2}a^3 - \frac{1}{2}a^2 - \frac{1}{2}a + 1 \\ -\frac{1}{2}a^3 + \frac{3}{2}a^2 - \frac{3}{2}a \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} a^2 - 2a + 3 \\ -\frac{1}{2}a^3 + \frac{3}{2}a^2 - \frac{3}{2}a \end{pmatrix}$$

$$a_8 = \begin{pmatrix} \frac{1}{2}a^3 - \frac{1}{2}a^2 - \frac{1}{2}a + 1 \\ -\frac{1}{2}a^3 + \frac{3}{2}a^2 - \frac{3}{2}a \end{pmatrix}$$

$$a_8 = \begin{pmatrix} \frac{1}{2}a^3 - \frac{1}{2}a^2 - \frac{1}{2}a + 1 \\ -\frac{1}{2}a^3 + \frac{3}{2}a^2 - \frac{3}{2}a \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes =**unknown**

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = 0.19098 - 1.40126I$ $b = 1.61803$	$-8.88264 - 2.02988I$	$-15.5000 - 2.3454I$
$u = -0.500000 - 0.866025I$ $a = 0.19098 + 1.40126I$ $b = 1.61803$	$-8.88264 + 2.02988I$	$-15.5000 + 2.3454I$
$u = -0.500000 - 0.866025I$ $a = 1.30902 - 0.53523I$ $b = -0.618034$	$-0.98696 + 2.02988I$	$-15.5000 - 9.2736I$
$u = -0.500000 + 0.866025I$ $a = 1.30902 + 0.53523I$ $b = -0.618034$	$-0.98696 - 2.02988I$	$-15.5000 + 9.2736I$

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes =unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.339110 - 0.822375I$ $a = -1.42855 + 1.03928I$ $b = -1.00000$	$-1.97403 + 1.53058I$	$-13.5086 - 9.8710I$
$u = -0.339110 + 0.822375I$ $a = -1.42855 - 1.03928I$ $b = -1.00000$	$-1.97403 - 1.53058I$	$-13.5086 + 9.8710I$
$u = \quad 0.455697 - 1.200152I$ $a = -0.723489 + 0.728237I$ $b = -1.00000$	$-7.51750 - 4.40083I$	$-11.07763 + 5.80708I$
$u = \quad 0.455697 + 1.200152I$ $a = -0.723489 - 0.728237I$ $b = -1.00000$	$-7.51750 + 4.40083I$	$-11.07763 - 5.80708I$
$u = \quad 0.766826$ $a = \quad 0.304077$ $b = -1.00000$	-4.04602	-8.82744

III. $\boldsymbol{I_3^u = \langle u^{11} + 4u^{10} + \cdots + 8u + 1,\ 7u^{10} + 25u^9 + \cdots + 46b + 24,\ -24u^{10} - 89u^9 + \cdots + 46a - 217\rangle}$

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} -u^5 - 2u^3 - u \\ u^5 + u^3 + u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0.521739u^{10} + 1.93478u^9 + \cdots + 2.06522u + 4.71739 \\ -0.152174u^{10} - 0.543478u^9 + \cdots - 0.456522u - 0.521739 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.673913u^{10} + 2.47826u^9 + \cdots + 2.52174u + 5.23913 \\ -0.152174u^{10} - 0.543478u^9 + \cdots - 0.456522u - 0.521739 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0.173913u^{10} + 0.978261u^9 + \cdots + 1.02174u + 3.23913 \\ 0.282609u^{10} + 1.15217u^9 + \cdots + 1.84783u - 0.173913 \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} 0.0652174u^{10} + 0.304348u^9 + \cdots + 0.695652u + 3.15217 \\ 0.108696u^{10} + 0.673913u^9 + \cdots + 2.32609u + 0.0869565 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.260870u^{10} - 0.717391u^9 + \cdots - 1.28261u + 2.89130 \\ 0.0217391u^{10} + 0.934783u^9 + \cdots + 4.06522u + 0.217391 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.260870u^{10} - 0.717391u^9 + \cdots - 1.28261u + 2.89130 \\ 0.0217391u^{10} + 0.934783u^9 + \cdots + 4.06522u + 0.217391 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes =unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_3^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -1.38032 - 0.75647I$ $a = -0.628757 - 0.404864I$ $b = 1.94194 + 1.79095I$	$12.91331 - 2.44000I$	$-8.55865 + 0.24092I$
$u = -1.38032 + 0.75647I$ $a = -0.628757 + 0.404864I$ $b = 1.94194 - 1.79095I$	$12.91331 + 2.44000I$	$-8.55865 - 0.24092I$
$u = -0.85960 - 1.26321I$ $a = 0.90868 + 1.38119I$ $b = 1.82324 - 1.07192I$	$10.9219 + 10.3175I$	$-9.91350 - 4.19094I$
$u = -0.85960 + 1.26321I$ $a = 0.90868 - 1.38119I$ $b = 1.82324 + 1.07192I$	$10.9219 - 10.3175I$	$-9.91350 + 4.19094I$
$u = -0.684593 - 1.110733I$ $a = 0.074951 + 0.938541I$ $b = 1.67575 + 0.38496I$	$-8.43909 + 3.01365I$	$-11.25510 - 3.03574I$
$u = -0.684593 + 1.110733I$ $a = 0.074951 - 0.938541I$ $b = 1.67575 - 0.38496I$	$-8.43909 - 3.01365I$	$-11.25510 + 3.03574I$
$u = -0.131154$ $a = 4.52605$ $b = -0.462456$	-0.844734	-11.8286
$u = 0.370726 - 0.886061I$ $a = 0.893909 + 0.072387I$ $b = 0.0248083 + 0.1208385I$	$-0.37744 - 1.65887I$	$-3.08713 + 3.12324I$
$u = 0.370726 + 0.886061I$ $a = 0.893909 - 0.072387I$ $b = 0.0248083 - 0.1208385I$	$-0.37744 + 1.65887I$	$-3.08713 - 3.12324I$
$u = 0.619363 - 0.675074I$ $a = -0.011810 - 0.900393I$ $b = -1.234510 + 0.125378I$	$-1.43681 - 1.43186I$	$-8.27132 + 5.43285I$

Solution to I_3^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.619363 + 0.675074I$ $a = -0.011810 + 0.900393I$ $b = -1.234510 - 0.125378I$	$-1.43681 + 1.43186I$	$-8.27132 - 5.43285I$

IV. u-Polynomials

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