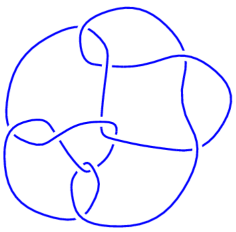
$11n_{31}$ $(K11n_{31})$



[1]

Arc Sequences

$$\to \downarrow_{4} \to \downarrow_{1} \to \downarrow_{6} \to \downarrow_{2} \to \downarrow_{9} \to \downarrow_{3} \to \uparrow_{11} \to \downarrow_{6} \to \downarrow_{1} \to \uparrow_{8} \to \downarrow_{10} \to$$

Solving Sequence

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

Representation Ideals

$$I = \bigcap_{i=1}^{2} I_i^u \bigcap I_1^v$$

$$\begin{aligned}
I_1^u &= \langle a^6 - 2a^5 + 3a^4 - a^2 - a + 1,\ -a^5 + 2a^4 - 3a^3 + b + 1,\ 6a^5 - 9a^4 + 16a^3 + 3a^2 + 3a + 5u - 7\rangle \\
I_2^u &= \langle u^{11} - 6u^{10} + 33u^9 - 62u^8 + 118u^7 - 30u^6 + 247u^5 - 104u^4 + 90u^3 + 88u^2 - 24u + 16, \\
&\quad - 3789082531u^{10} + 10633372989u^9 + \cdots + 474415849196a - 1043439418990, \\
&\quad - 30524470567u^{10} + 168794284924u^9 + \cdots + 9488316983392b + 422515111168\rangle
\end{aligned}$$

$$I_1^v = \langle -b + v - 2,\ b^4 + 3b^3 + b^2 - 2b + 1,\ a\rangle$$

There are 3 irreducible components with 21 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. $I^u_1 = \langle a^6 - 2a^5 + 3a^4 - a^2 - a + 1,\ -a^5 + 2a^4 - 3a^3 + b + 1,\ 6a^5 - 9a^4 + 16a^3 + 3a^2 + 3a + 5u - 7\rangle$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ -\frac{6}{5}a^5 + \frac{9}{5}a^4 + \cdots - \frac{3}{5}a + \frac{7}{5} \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} a \\ a^5 - 2a^4 + 3a^3 - 1 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -\frac{4}{5}a^5 + \frac{6}{5}a^4 + \cdots + \frac{3}{5}a + \frac{3}{5} \\ -\frac{4}{5}a^5 + \frac{6}{5}a^4 + \cdots + \frac{3}{5}a + \frac{3}{5} \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -\frac{6}{5}a^5 + \frac{9}{5}a^4 + \cdots - \frac{3}{5}a + \frac{7}{5} \\ -\frac{6}{5}a^5 + \frac{9}{5}a^4 + \cdots - \frac{3}{5}a + \frac{7}{5} \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -\frac{2}{5}a^5 + \frac{3}{5}a^4 + \cdots - \frac{1}{5}a - \frac{1}{5} \\ -\frac{2}{5}a^5 + \frac{3}{5}a^4 + \cdots - \frac{1}{5}a - \frac{6}{5} \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -\frac{4}{5}a^5 + \frac{6}{5}a^4 + \cdots + \frac{3}{5}a + \frac{3}{5} \\ \frac{1}{5}a^5 - \frac{4}{5}a^4 + \cdots - \frac{2}{5}a - \frac{2}{5} \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0 \\ \frac{6}{5}a^5 - \frac{9}{5}a^4 + \cdots + \frac{3}{5}a - \frac{7}{5} \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ \frac{2}{5}a^5 - \frac{3}{5}a^4 + \cdots + \frac{1}{5}a + \frac{6}{5} \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -\frac{6}{5}a^5 + \frac{9}{5}a^4 + \cdots - \frac{3}{5}a + \frac{7}{5} \\ -\frac{6}{5}a^5 + \frac{9}{5}a^4 + \cdots - \frac{3}{5}a + \frac{7}{5} \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -\frac{4}{5}a^5 + \frac{6}{5}a^4 + \cdots + \frac{3}{5}a + \frac{3}{5} \\ -\frac{4}{5}a^5 + \frac{6}{5}a^4 + \cdots + \frac{3}{5}a + \frac{3}{5} \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -\frac{4}{5}a^5 + \frac{6}{5}a^4 + \cdots + \frac{3}{5}a + \frac{3}{5} \\ -\frac{4}{5}a^5 + \frac{6}{5}a^4 + \cdots + \frac{3}{5}a + \frac{3}{5} \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes =unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.215080 + 1.307141I$ $a = -0.583789 - 0.478572I$ $b = 0.440689 - 1.318407I$	$3.02413 - 4.85801I$	$-7.63258 + 5.38377I$
$u = 0.215080 - 1.307141I$ $a = -0.583789 + 0.478572I$ $b = 0.440689 + 1.318407I$	$3.02413 + 4.85801I$	$-7.63258 - 5.38377I$
$u = 0.215080 + 1.307141I$ $a = 0.706350 - 0.266290I$ $b = -0.533208 - 0.733596I$	$3.02413 - 0.79824I$	$-4.05323 + 2.24743I$
$u = 0.215080 - 1.307141I$ $a = 0.706350 + 0.266290I$ $b = -0.533208 + 0.733596I$	$3.02413 + 0.79824I$	$-4.05323 - 2.24743I$
$u = 0.569840$ $a = 0.87744 - 1.51977I$ $b = 0.59252 - 2.01326I$	$-1.11345 - 2.02988I$	$-15.8142 + 11.5861I$
$u = 0.569840$ $a = 0.87744 + 1.51977I$ $b = 0.59252 + 2.01326I$	$-1.11345 + 2.02988I$	$-15.8142 - 11.5861I$

II. $I_2^u =$ $\langle u^{11}-6u^{10}+\cdots-24u+16,\ -3.79\times10^{9}u^{10}+1.06\times10^{10}u^{9}+\cdots+4.74\times10^{11}a-1.04\times10^{12},\ -3.05\times10^{10}u^{10}+1.69\times10^{11}u^{9}+\cdots+9.49\times10^{11}b+4.23\times10^{11}\rangle$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} 0.00798684u^{10} - 0.0224136u^9 + \cdots + 0.879149u + 2.19942 \\ 0.0321706u^{10} - 0.177897u^9 + \cdots + 2.00589u - 0.445300 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 0.0540709u^{10} - 0.301662u^9 + \cdots + 5.14645u + 0.140853 \\ 0.0128913u^{10} - 0.0651365u^9 + \cdots + 1.27821u - 0.304705 \end{pmatrix}$$

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

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

$$a_{10} = \begin{pmatrix} 0.0374594u^{10} - 0.198136u^9 + \cdots + 3.45458u + 0.724360 \\ 0.0188440u^{10} - 0.0989446u^9 + \cdots + 1.22769u - 0.555460 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.00713614u^{10} + 0.0575289u^9 + \cdots - 0.135221u + 1.35446 \\ -0.00323206u^{10} + 0.0282648u^9 + \cdots + 0.105439u + 0.156346 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.00983174u^{10} + 0.0627741u^9 + \cdots - 0.298762u + 1.24009 \\ -0.00952764u^{10} + 0.0635732u^9 + \cdots - 0.155277u + 0.291757 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0.00498272u^{10} - 0.0218917u^9 + \cdots + 0.226607u + 0.962717 \\ 0.0121189u^{10} - 0.0794206u^9 + \cdots + 0.361828u - 0.391738 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0.0471415u^{10} - 0.264813u^9 + \cdots + 4.74083u - 0.0279808 \\ 0.00596187u^{10} - 0.0282879u^9 + \cdots + 0.872585u - 0.473539 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0.0471415u^{10} - 0.264813u^9 + \cdots + 4.74083u - 0.0279808 \\ 0.00596187u^{10} - 0.0282879u^9 + \cdots + 0.872585u - 0.473539 \end{pmatrix}$$

(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
$u=-0.710923-1.191112I$ $a=-0.088486-0.771399I$ $b=-0.052774-1.123484I$	$4.33457-4.30583I$	$-3.61862+3.76799I$
$u=-0.710923+1.191112I$ $a=-0.088486+0.771399I$ $b=-0.052774+1.123484I$	$4.33457+4.30583I$	$-3.61862-3.76799I$
$u=-0.612580$ $a=\ 0.180576$ $b=-0.418727$	-1.00288	-10.0674
$u=\ 0.143998-0.360224I$ $a=\ 2.23279-0.01740I$ $b=-0.095323-0.544866I$	$-0.33628-1.50726I$	$-2.98443+4.38710I$
$u=\ 0.143998+0.360224I$ $a=\ 2.23279+0.01740I$ $b=-0.095323+0.544866I$	$-0.33628+1.50726I$	$-2.98443-4.38710I$
$u=\ 0.460151-0.697009I$ $a=-0.320726+1.195103I$ $b=-1.17638+2.05599I$	$-1.32886+1.52951I$	$-7.26885-4.94950I$
$u=\ 0.460151+0.697009I$ $a=-0.320726-1.195103I$ $b=-1.17638-2.05599I$	$-1.32886-1.52951I$	$-7.26885+4.94950I$
$u=\ 1.48748-2.15268I$ $a=\ 0.209322-0.583275I$ $b=\ 0.09288-2.66836I$	$-18.0782+10.5314I$	$-5.95863-4.05407I$
$u=\ 1.48748+2.15268I$ $a=\ 0.209322+0.583275I$ $b=\ 0.09288+2.66836I$	$-18.0782-10.5314I$	$-5.95863+4.05407I$
$u=\ 1.92558-3.89584I$ $a=-0.373184-0.237842I$ $b=\ 0.94096-1.72369I$	$-16.1660+1.6365I$	$-5.13576-0.13357I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=\ 1.92558+3.89584I$ $a=-0.373184+0.237842I$ $b=\ 0.94096+1.72369I$	$-16.1660-1.6365I$	$-5.13576+0.13357I$

III. $I_1^v = \langle -b + v - 2,\ b^4 + 3b^3 + b^2 - 2b + 1,\ a\rangle$

(i) Arc colorings

$$a_7 = \begin{pmatrix} b+2 \\ 0 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 0 \\ b \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} b+2 \\ -b^3 - 2b^2 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} b+2 \\ 0 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -b^3 - 4b^2 - 4b \\ b^2 + 2b - 1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -2b^3 - 6b^2 - 2b + 5 \\ -1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -2b^3 - 6b^2 - 2b + 6 \\ -1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 2b^3 + 6b^2 + 2b - 5 \\ 1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 2b^3 + 7b^2 + 6b - 1 \\ -b^3 - 2b^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 2b^3 + 7b^2 + 6b - 1 \\ -b^3 - 2b^2 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes =unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^v	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$v = 0.100768 - 0.400532I$ $a = 0$ $b = -1.89923 - 0.40053I$	$-1.85594 - 1.41510I$	$-15.1414 + 7.6022I$
$v = 0.100768 + 0.400532I$ $a = 0$ $b = -1.89923 + 0.40053I$	$-1.85594 + 1.41510I$	$-15.1414 - 7.6022I$
$v = 2.39923 - 0.32564I$ $a = 0$ $b = 0.399232 - 0.325640I$	$5.14581 - 3.16396I$	$-0.358581 + 1.047693I$
$v = 2.39923 + 0.32564I$ $a = 0$ $b = 0.399232 + 0.325640I$	$5.14581 + 3.16396I$	$-0.358581 - 1.047693I$

IV. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u-1)^4(u^3+u^2-1)^2(u^{11}+7u^{10}+\cdots-9u-1)$
c_2	$(u+1)^4(1+2u+u^2+u^3)^2(u^{11}+11u^{10}+\cdots+5u+1)$
c_3	$u^4(-1+2u-u^2+u^3)^2(u^{11}+6u^{10}+\cdots-24u-16)$
c_4	$(u+1)^4(u^3-u^2+1)^2(u^{11}+7u^{10}+\cdots-9u-1)$
c_5	$u^6(u^4-u^3+\cdots-2u+1)(u^{11}+2u^{10}+\cdots+96u-64)$
c_6	$u^4(1+2u+u^2+u^3)^2(u^{11}+6u^{10}+\cdots-24u-16)$
c_7	$(u^2+u+1)^3(u^4-u^3+u^2+1)(u^{11}+5u^{10}+\cdots+10u+1)$
c_8	$u^6(u^4+u^3+\cdots+2u+1)(u^{11}+2u^{10}+\cdots+96u-64)$
c_9	$(u^2-u+1)^3(u^4-u^3+\cdots-2u+1)(u^{11}+u^{10}+\cdots+80u+1)$
c_{10}	$(u^2-u+1)^3(u^4+u^3+u^2+1)(u^{11}+5u^{10}+\cdots+10u+1)$
c_{11}	$(u^2+u+1)^3(u^4+u^3+\cdots+2u+1)(u^{11}+u^{10}+\cdots+80u+1)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_4	$(y-1)^4(-1+2y-y^2+y^3)^2(y^{11}-11y^{10}+\cdots+5y-1)$
c_2	$(y-1)^4(-1+2y+3y^2+y^3)^2(y^{11}+113y^{10}+\cdots-3895y-1)$
c_3, c_6	$y^4(-1+2y+3y^2+y^3)^2(y^{11}+30y^{10}+\cdots-2240y-256)$
c_5, c_8	$y^6(y^4+5y^3+\cdots+2y+1)(y^{11}+52y^{10}+\cdots+33792y-4096)$
c_7, c_{10}	$(y^2+y+1)^3(y^4+y^3+\cdots+2y+1)(y^{11}-y^{10}+\cdots+80y-1)$
c_9, c_{11}	$(y^2+y+1)^3(y^4+5y^3+\cdots+2y+1)(y^{11}+31y^{10}+\cdots+6676y-1)$