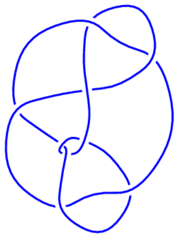
9_{43} $(K9n_3)$



[1]

Arc Sequences

$\rightarrow \downarrow \rightarrow \uparrow \rightarrow \downarrow \rightarrow \downarrow \rightarrow \downarrow \rightarrow \downarrow \rightarrow \downarrow \rightarrow \uparrow \rightarrow \downarrow \rightarrow$

5 9 1 7 2 8 5 3 8

Solving Sequence

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

Representation Ideals

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

$$\begin{aligned} I_1^u &= \langle b^2 - b + 1,\ a + 1,\ u - 1\rangle \\ I_2^u &= \langle u^8 + 3u^7 - 2u^6 - 9u^5 + 5u^4 + 13u^3 - 3u^2 - 3u - 1,\ a - 1, \\ &\quad - u^7 - 2u^6 + 4u^5 + 5u^4 - 10u^3 - 5u^2 + 2b + 6u + 1\rangle \end{aligned}$$

There are 2 irreducible components with 10 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. $I_1^u = \langle b^2 - b + 1,\ a + 1,\ u - 1\rangle$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -1 \\ b \end{pmatrix}$$
$$a_9 = \begin{pmatrix} b-1 \\ b \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0 \\ b-1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 0 \\ b-1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -1 \\ b+1 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ -b \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ -b \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -4b - 7$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -1.00000$ $b = 0.500000 - 0.866025I$	$-1.64493 - 2.02988I$	$-9.00000 + 3.46410I$
$u = 1.00000$ $a = -1.00000$ $b = 0.500000 + 0.866025I$	$-1.64493 + 2.02988I$	$-9.00000 - 3.46410I$

II. $\boldsymbol{I_2^u = \langle u^8 + 3u^7 + \cdots - 3u - 1,\ a - 1,\ -u^7 - 2u^6 + \cdots + 2b + 1\rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -2u^7 - 5u^6 + 5u^5 + 15u^4 - 10u^3 - 22u^2 + 5u - 1$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.89776 - 0.22684I$ $a = \quad 1.00000$ $b = -0.54402 + 1.39007I$	$-15.4360 - 5.9041I$	$-9.72541 + 2.82977I$
$u = -1.89776 + 0.22684I$ $a = \quad 1.00000$ $b = -0.54402 - 1.39007I$	$-15.4360 + 5.9041I$	$-9.72541 - 2.82977I$
$u = -1.82176$ $a = \quad 1.00000$ $b = -1.11498$	-11.0713	-7.35940
$u = -0.238510 - 0.243220I$ $a = \quad 1.00000$ $b = \quad 0.381025 + 0.877247I$	$-0.36340 + 1.66195I$	$-2.61632 - 3.48117I$
$u = -0.238510 + 0.243220I$ $a = \quad 1.00000$ $b = \quad 0.381025 - 0.877247I$	$-0.36340 - 1.66195I$	$-2.61632 + 3.48117I$
$u = \quad 0.736738$ $a = \quad 1.00000$ $b = -0.305633$	-1.10361	-8.78715
$u = \quad 1.178784 - 0.606721I$ $a = \quad 1.00000$ $b = -0.126694 - 1.193164I$	$-4.43209 + 1.62541I$	$-10.58501 - 1.42555I$
$u = \quad 1.178784 + 0.606721I$ $a = \quad 1.00000$ $b = -0.126694 + 1.193164I$	$-4.43209 - 1.62541I$	$-10.58501 + 1.42555I$

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_5	$u^2(u^8+u^7-7u^6-4u^5+16u^4-3u^3-9u^2-8u-4)$
c_2	$(u^2-u+1)(u^8+2u^7+5u^6+6u^5+7u^4+7u^3+4u^2+4u+1)$
c_3	$(u^2+u+1)(u^8+2u^7-7u^6-12u^5+5u^4-3u^3-2u^2-2u+1)$
c_4	$(u-1)^2(u^8+3u^7-2u^6-9u^5+5u^4+13u^3-3u^2-3u-1)$
c_6	$(u-1)^2(u^8+13u^7+\cdots+3u+1)$
c_7	$(u+1)^2(u^8+3u^7-2u^6-9u^5+5u^4+13u^3-3u^2-3u-1)$
c_8	$(u^2+u+1)(u^8+2u^7+5u^6+6u^5+7u^4+7u^3+4u^2+4u+1)$
c_9	$(u^2+u+1)(u^8+6u^7+15u^6+14u^5-9u^4-31u^3-26u^2-8u+1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_5	$y^2(y^8 - 15y^7 + 89y^6 - 252y^5 + 366y^4 - 305y^3 - 95y^2 + 8y + 16)$
c_2, c_8	$(y^2 + y + 1)(y^8 + 6y^7 + 15y^6 + 14y^5 - 9y^4 - 31y^3 - 26y^2 - 8y + 1)$
c_3	$(y^2 + y + 1)(y^8 - 18y^7 + \cdots - 8y + 1)$
c_4, c_7	$(y - 1)^2(y^8 - 13y^7 + \cdots - 3y + 1)$
c_6	$(y - 1)^2(y^8 - 33y^7 + \cdots + 145y + 1)$
c_9	$(y^2 + y + 1)$ $(y^8 - 6y^7 + 39y^6 - 146y^5 + 267y^4 - 239y^3 + 162y^2 - 116y + 1)$