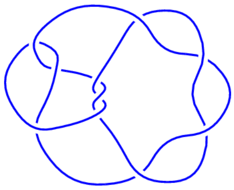
10_{139} $(K10n_{27})$



1

Arc Sequences

$$\to\downarrow_{6}\to\downarrow_{9}\to\downarrow_{7}\to\downarrow_{8}\to\downarrow_{1}\to\downarrow_{2}\to\downarrow_{4}\to\downarrow_{2}\to\downarrow_{8}\to\downarrow_{5}\to$$

Solving Sequence

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

Representation Ideals

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

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

$$I_1^v = \langle v + 1,\ b + 1,\ a\rangle$$

There are 3 irreducible components with 7 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. $I_1^u = \langle u^2 - 2,\ b - 1,\ 2a + u + 2\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -20$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.41421$ $a = -0.292893$ $b = \quad 1.00000$	-8.22467	-20.0000
$u = \quad 1.41421$ $a = -1.70711$ $b = \quad 1.00000$	-8.22467	-20.0000

II.

$$\boldsymbol{I^u_2 = \langle u^4 - 4u^3 + 6u^2 - 2u - 2,\ u^3 - 2u^2 + 2a + 2u,\ -u^3 + 3u^2 + b - 2u - 1\rangle}$$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -\frac{1}{2}u^3 + u^2 - u \\ u^3 - 3u^2 + 2u + 1 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} \frac{1}{2}u^3 - u^2 + 1 \\ 2u^2 - 2u - 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} \frac{1}{2}u^3 - u^2 + 1 \\ u^3 - 2u^2 + u + 1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} u \\ u \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -u^2 + 1 \\ -u^2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u^3 + 2u \\ -u^3 + u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} \frac{1}{2}u^3 - 2u^2 + u + 1 \\ u^3 - 3u^2 + 2u + 1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 4u^3 - 9u^2 + 2u + 3 \\ 4u^3 - 8u^2 + 2u + 2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 2u - 16$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.395337$ $a = 0.582522$ $b = -0.321336$	-0.588647	-16.7907
$u = 1.46036 - 1.13932I$ $a = 0.660443 + 0.716885I$ $b = -1.15548 + 1.89385I$	$4.51885 + 4.85117I$	$-13.07929 - 2.27864I$
$u = 1.46036 + 1.13932I$ $a = 0.660443 - 0.716885I$ $b = -1.15548 - 1.89385I$	$4.51885 - 4.85117I$	$-13.07929 + 2.27864I$
$u = 1.47463$ $a = -0.903408$ $b = 0.632293$	-6.80412	-13.0507

III. $\boldsymbol{I_1^v = \langle v+1,\ b+1,\ a \rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v = -1.00000$ $a = \quad 0$ $b = -1.00000$	-3.28987	-12.0000

IV. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_5, c_6 c_{10}	$u(u^2-2)(u^4+4u^3+6u^2+2u-2)$
c_2	$(u+1)^3(u^4-2u^3+4u^2+2u-1)$
c_3, c_4	$(u-1)(u+1)^2(u^4+2u^3+4u^2-2u-1)$
c_7	$(u+1)^3(u^4+2u^3+4u^2-2u-1)$
c_8	$(u-1)(u+1)^2(u^4-2u^3+4u^2+2u-1)$
c_9	$(u-1)^2(u+1)(u^4+4u^3+22u^2-12u+1)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_5, c_6 c_{10}	$y(y-2)^2(y^4-4y^3+16y^2-28y+4)$
c_2, c_3, c_4 c_7, c_8	$(y-1)^3(y^4+4y^3+22y^2-12y+1)$
c_9	$(y-1)^3(y^4+28y^3+582y^2-100y+1)$