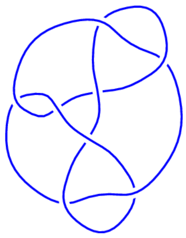
8_{21} $(K8n_2)$



1

Arc Sequences

$$\to\downarrow_4\to\uparrow_7\to\downarrow_5\to\downarrow_2\to\downarrow_7\to\downarrow_1\to\uparrow_2\to\downarrow_6\to$$

Solving Sequence

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

Representation Ideals

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

$$I_1^u = \langle u-1,\ a+1,\ b+1\rangle$$
$$I_2^u = \langle u^4-u^3+u+1,\ b-u,\ u^3-u^2+a+u\rangle$$
$$I_3^u = \langle u^4-u^3+2u-1,\ u^3+b+1,\ u^3-u^2+a+2\rangle$$

There are 3 irreducible components with 9 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. $I_1^u = \langle u - 1,\ a + 1,\ b + 1 \rangle$

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -2 \\ -1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -12$

(iv) Complex Volumes and Cusp Shapes

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

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

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -2u^3 + 6u^2 - 2u - 6$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.566121 - 0.458821I$ $a = 0.50000 + 1.32288I$ $b = -0.566121 - 0.458821I$	$-0.66070 - 1.45022I$	$-4.56010 + 4.72374I$
$u = -0.566121 + 0.458821I$ $a = 0.50000 - 1.32288I$ $b = -0.566121 + 0.458821I$	$-0.66070 + 1.45022I$	$-4.56010 - 4.72374I$
$u = 1.066121 - 0.864054I$ $a = 0.50000 + 1.32288I$ $b = 1.066121 - 0.864054I$	$4.77303 + 6.78371I$	$-3.43990 - 4.72374I$
$u = 1.066121 + 0.864054I$ $a = 0.50000 - 1.32288I$ $b = 1.066121 + 0.864054I$	$4.77303 - 6.78371I$	$-3.43990 + 4.72374I$

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

(i) Arc colorings

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

$$a_4 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

$$a_3 = \begin{pmatrix} -u^3 \\ 2u^2 - 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -2u^3 + u^2 - 3 \\ -u^3 - 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -2u^3 + u^2 + u - 3 \\ -u^3 + u^2 + u - 2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -2$

(iv) Complex Volumes and Cusp Shapes

Solution to I^u_3	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -1.15372$ $a = 0.866760$ $b = 0.535687$	-2.30291	-2.00000
$u = 0.535687$ $a = -1.86676$ $b = -1.15372$	-2.30291	-2.00000
$u = 0.809017 - 0.981593I$ $a = -0.500000 - 0.606658I$ $b = 0.809017 + 0.981593I$	5.59278	-2.00000
$u = 0.809017 + 0.981593I$ $a = -0.500000 + 0.606658I$ $b = 0.809017 - 0.981593I$	5.59278	-2.00000

IV. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_4	$(u+1)(u^4+u^3-2u-1)(u^4+u^3-u+1)$
c_2, c_7	$u(u^2-u-1)^2(u^4+3u^3+3u^2+2u+2)$
c_3	$(u-1)(u^4+u^3+2u^2+4u+1)(u^4+u^3+4u^2+u+1)$
c_5	$(u+1)(u^4+u^3+2u^2+4u+1)(u^4+u^3+4u^2+u+1)$
c_6, c_8	$(u-1)(u^4+u^3-2u-1)(u^4+u^3-u+1)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_4, c_6 c_8	$(y-1)(y^4-y^3+2y^2-4y+1)(y^4-y^3+4y^2-y+1)$
c_2, c_7	$y(y^2-3y+1)^2(y^4-3y^3+y^2+8y+4)$
c_3, c_5	$(y-1)(y^4+3y^3-2y^2-12y+1)(y^4+7y^3+16y^2+7y+1)$