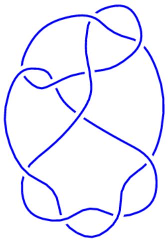
10_{125} $(K10n_{15})$



[1]

Arc Sequences

$\rightarrow \downarrow 3 \rightarrow \downarrow 5 \rightarrow \downarrow 8 \rightarrow \downarrow 2 \rightarrow \uparrow 9 \rightarrow \uparrow 10 \rightarrow \downarrow 4 \rightarrow \uparrow 5 \rightarrow \uparrow 6 \rightarrow \uparrow 8 \rightarrow$

Solving Sequence

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

Representation Ideals

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

$$I_1^u = \langle a^2 + a - 1,\ b,\ u - 1\rangle$$
$$I_2^u = \langle u^7 + 3u^6 + 5u^5 + 2u^4 - u^3 - 4u^2 - u - 1,\ u^5 + 2u^4 + 2u^3 - u^2 + b - u - 1,$$
$$u^6 + 4u^5 + 7u^4 + 3u^3 - 4u^2 + 2a - 6u - 1\rangle$$

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

(i) Arc colorings

$$a_5 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} a \\ 0 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} a \\ -a \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -a + 1 \\ a \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -a + 1 \\ -1 \end{pmatrix}$$

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

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

$$a_2 = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 5$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -1.61803$ $b = 0$	7.23771	5.00000
$u = 1.00000$ $a = 0.618034$ $b = 0$	−0.657974	5.00000

II. $\boldsymbol{I_2^u = \langle u^7 + 3u^6 + 5u^5 + 2u^4 - u^3 - 4u^2 - u - 1,\ u^5 + 2u^4 + 2u^3 - u^2 + b - u - 1,\ u^6 + 4u^5 + 7u^4 + 3u^3 - 4u^2 + 2a - 6u - 1\rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -u^5 - 3u^4 - 6u^3 - 5u^2 - 5u + 5$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.23548 - 1.24689I$ $a = 0.721356 - 0.793001I$ $b = -0.54280 - 2.32525I$	$-18.3019 - 4.6120I$	$5.02514 + 1.92936I$
$u = -1.23548 + 1.24689I$ $a = 0.721356 + 0.793001I$ $b = -0.54280 + 2.32525I$	$-18.3019 + 4.6120I$	$5.02514 - 1.92936I$
$u = -0.649076 - 1.016836I$ $a = -0.469262 + 1.128178I$ $b = -0.25005 + 1.56572I$	$8.55355 - 2.69234I$	$5.72785 + 2.29938I$
$u = -0.649076 + 1.016836I$ $a = -0.469262 - 1.128178I$ $b = -0.25005 - 1.56572I$	$8.55355 + 2.69234I$	$5.72785 - 2.29938I$
$u = -0.055865 - 0.500074I$ $a = -0.38619 - 1.42269I$ $b = 0.515013 - 0.602362I$	$1.33573 - 0.48421I$	$6.10711 + 1.60895I$
$u = -0.055865 + 0.500074I$ $a = -0.38619 + 1.42269I$ $b = 0.515013 + 0.602362I$	$1.33573 + 0.48421I$	$6.10711 - 1.60895I$
$u = 0.880836$ $a = 0.268195$ $b = -0.444320$	-1.26901	-9.72020

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u-1)^2(u^7+u^6+11u^5+8u^4+13u^3-10u^2-7u-1)$
c_2	$(u-1)^2(u^7+3u^6+5u^5+2u^4-u^3-4u^2-u-1)$
c_3, c_7	$u^2(u^7+u^6+8u^5+u^4+13u^3-5u^2+4u+4)$
c_4	$(u+1)^2(u^7+3u^6+5u^5+2u^4-u^3-4u^2-u-1)$
c_5, c_6	$(u^2-u-1)(u^7+2u^6-4u^5-8u^4+4u^3+9u^2+2u-1)$
c_8, c_9	$(u^2+u-1)(u^7+2u^6-4u^5-8u^4+4u^3+9u^2+2u-1)$
c_{10}	$(u^2+u-1)(u^7+8u^6+8u^5-30u^4+102u^3-135u^2+78u-7)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1	$(y-1)^2(y^7+21y^6+131y^5+228y^4+177y^3-266y^2+29y-1)$
c_2, c_4	$(y-1)^2(y^7+y^6+11y^5+8y^4+13y^3-10y^2-7y-1)$
c_3, c_7	$y^2(y^7+15y^6+88y^5+225y^4+235y^3+71y^2+56y-16)$
c_5, c_6, c_8 c_9	$(y^2-3y+1)(y^7-12y^6+\cdots+22y-1)$
c_{10}	(y^2-3y+1) $(y^7-48y^6+748y^5+3048y^4+3664y^3-2733y^2+4194y-49)$