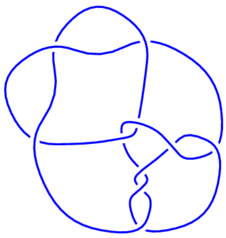
10_{152} $(K10n_{36})$



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Arc Sequences

$$\longrightarrow \overset{}{\underset{4}{\downarrow}} \longrightarrow \underset{5}{\downarrow} \longrightarrow \underset{10}{\downarrow} \longrightarrow \underset{2}{\downarrow} \longrightarrow \underset{8}{\downarrow} \longrightarrow \underset{10}{\downarrow} \longrightarrow \underset{5}{\downarrow} \longrightarrow \underset{6}{\downarrow} \longrightarrow \underset{3}{\downarrow} \longrightarrow \underset{7}{\downarrow} \longrightarrow$$

Solving Sequence

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

Representation Ideals

$$I = \bigcap_{i=1}^{4} I_i^u$$

$$I_1^u = \langle u^2 + u - 1,\ b,\ a + u + 2\rangle$$
$$I_2^u = \langle b^2 - b - 1,\ u - 1,\ -b + a + 1\rangle$$
$$I_3^u = \langle u^4 + u^3 + 2u^2 - u + 1,\ -u^3 - 2u^2 + 2b + 1,\ u^3 + 2u^2 + 2a + 2u - 1\rangle$$
$$I_4^u = \langle u^5 + 3u^4 + 2u^3 - 3u^2 - 3u + 1,\ -u^2 + a - 2u - 1,\ -u^4 - 2u^3 + b + 2u\rangle$$

There are 4 irreducible components with 13 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. $I_1^u = \langle u^2 + u - 1,\ b,\ a + u + 2 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -11$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.61803$ $a = -0.381966$ $b = 0$	-10.5276	-11.0000
$u = 0.618034$ $a = -2.61803$ $b = 0$	-2.63189	-11.0000

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -11$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -1.61803$ $b = -0.618034$	-2.63189	-11.0000
$u = 1.00000$ $a = 0.618034$ $b = 1.61803$	-10.5276	-11.0000

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

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u \\ -u^3+u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -\frac{1}{2}u^3-u^2-u+\frac{1}{2} \\ \frac{1}{2}u^3+u^2-\frac{1}{2} \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -u^3-u^2-u+1 \\ \frac{3}{2}u^3+u-\frac{1}{2} \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u^2+1 \\ u^3+4u^2-u+1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} \frac{1}{2}u^3-u^2+u-\frac{1}{2} \\ \frac{3}{2}u^3+4u^2-3u+\frac{3}{2} \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -2u^3-3u^2-1 \\ \frac{13}{2}u^3+\frac{3}{2} \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -u^3-u^2-u \\ \frac{3}{2}u^3-u^2+u-\frac{1}{2} \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -11$

(iv) Complex Volumes and Cusp Shapes

Solution to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.80902 - 1.40126I$ $a = 0.500000 - 0.866025I$ $b = 0.30902 + 2.26728I$	7.23771	−11.0000
$u = -0.80902 + 1.40126I$ $a = 0.500000 + 0.866025I$ $b = 0.30902 - 2.26728I$	7.23771	−11.0000
$u = 0.309017 - 0.535233I$ $a = 0.500000 + 0.866025I$ $b = -0.809017 - 0.330792I$	−0.657974	−11.0000
$u = 0.309017 + 0.535233I$ $a = 0.500000 - 0.866025I$ $b = -0.809017 + 0.330792I$	−0.657974	−11.0000

IV.

$\boldsymbol{I_4^u = \langle u^5 + 3u^4 + 2u^3 - 3u^2 - 3u + 1,\ -u^2 + a - 2u - 1,\ -u^4 - 2u^3 + b + 2u \rangle}$

(i) Arc colorings

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

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

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

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

$$a_7 = \begin{pmatrix} u^2 + 2u + 1 \\ u^4 + 2u^3 - 2u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -u^3 - 2u^2 + 2 \\ u^3 - u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^2 + 1 \\ -u^4 + 2u^2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 2u^2 + 2u \\ 2u^4 + 2u^3 - 2u^2 - u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -2u^3 - 2u^2 + 2u + 1 \\ 4u^4 + 8u^3 - 4u^2 - 8u + 2 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 2u + 1 \\ 2u^3 + u^2 - 2u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -8u^4 - 24u^3 - 24u^2 - 10$

(iv) Complex Volumes and Cusp Shapes

Solution to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.39814-0.93867I$ $a=-0.722590+0.747455I$ $b=-1.01518-1.84157I$	$5.12323-8.53607I$	$-12.97824+4.17771I$
$u=-1.39814+0.93867I$ $a=-0.722590-0.747455I$ $b=-1.01518+1.84157I$	$5.12323+8.53607I$	$-12.97824-4.17771I$
$u=-1.39373$ $a=\ 0.155021$ $b=\ 1.14610$	-11.4408	-21.8304
$u=\ 0.277157$ $a=\ 1.63113$ $b=-0.505833$	-0.775637	-12.4017
$u=\ 0.912859$ $a=\ 3.65903$ $b=\ 0.390081$	-2.96486	-53.8114

V. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_2, c_5	$(u-1)^2(u^2+u-1)(u^4+u^3+\cdots-u+1)(u^5+3u^4+\cdots-3u+1)$
c_3, c_{10}	$u^2(u^2-u-1)(u^4+u^3+\cdots+8u+4)(u^5+u^4+\cdots-u+1)$
c_4, c_7, c_8	$(u+1)^2(u^2-u-1)(u^4+u^3+\cdots-u+1)(u^5+3u^4+\cdots-3u+1)$
c_6, c_9	$u^2(u^2+u-1)(u^4+u^3+\cdots+8u+4)(u^5+u^4+\cdots-u+1)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_2, c_4 c_5, c_7, c_8	$(y-1)^2(y^2-3y+1)(y^4+3y^3+8y^2+3y+1)$ $(y^5-5y^4+16y^3-27y^2+15y-1)$
c_3, c_6, c_9 c_{10}	$y^2(y^2-3y+1)(y^4+9y^3+17y^2-24y+16)$ $(y^5+3y^4+12y^3-31y^2+11y-1)$