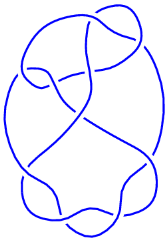
10_{126} $(K10n_{17})$



[1]

Arc Sequences

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

4 8 5 2 9 10 5 2 6 7

Solving Sequence

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

Representation Ideals

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

$$\begin{aligned}
I_1^u &= \langle a^2 + a - 1,\ b,\ u - 1\rangle \\
I_2^u &= \langle u^{11} + 3u^{10} - 3u^9 - 12u^8 + 7u^7 + 18u^6 - 19u^5 - 13u^4 + 21u^3 + u^2 - 7u - 1, \\
&\quad u^{10} + u^9 - 5u^8 - u^7 + 11u^6 - 7u^5 - 10u^4 + 12u^3 - u^2 + b - 3u, \\
&\quad - u^{10} - 4u^9 + 3u^8 + 19u^7 - 10u^6 - 34u^5 + 35u^4 + 22u^3 - 43u^2 + 2a + 8u + 9\rangle
\end{aligned}$$

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

(i) Arc colorings

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

$$a_9 = \begin{pmatrix} a \\ 0 \end{pmatrix}$$

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

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

$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

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

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

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 3$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -1.61803$ $b = 0$	7.23771	3.00000
$u = 1.00000$ $a = 0.618034$ $b = 0$	−0.657974	3.00000

II.

$$\boldsymbol{I^u_2 = \langle u^{11}+3u^{10}+\cdots-7u-1,\ u^{10}+u^9+\cdots+b-3u,\ -u^{10}-4u^9+\cdots+2a+9\rangle}$$

(i) Arc colorings

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

$$a_9 = \begin{pmatrix} \frac{1}{2}u^{10}+2u^9+\cdots-4u-\frac{9}{2} \\ -u^{10}-u^9+5u^8+u^7-11u^6+7u^5+10u^4-12u^3+u^2+3u \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -\frac{1}{2}u^{10}-u^9+\cdots+7u-\frac{1}{2} \\ u^4-2u^2+2u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -\frac{1}{2}u^{10}-u^9+\cdots+6u-\frac{3}{2} \\ -\frac{1}{2}u^{10}-u^9+\cdots+4u+\frac{1}{2} \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} \frac{3}{2}u^{10}+3u^9+\cdots-7u-\frac{9}{2} \\ \frac{3}{2}u^{10}+2u^9+\cdots-6u-\frac{3}{2} \end{pmatrix}$$

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

$$a_1 = \begin{pmatrix} -u^2+1 \\ -u^2 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} \frac{3}{2}u^{10}+3u^9+\cdots-7u-\frac{9}{2} \\ -u^{10}-u^9+5u^8+u^7-11u^6+7u^5+10u^4-12u^3+u^2+3u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= u^{10}-u^9-10u^8+7u^7+29u^6-27u^5-26u^4+48u^3-5u^2-23u+10$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.75765-0.08981I$ $a=\ \ 0.291433-0.484883I$ $b=\ \ 0.19369-1.91501I$	$-11.41256-2.72618I$	$1.17921+2.48457I$
$u=-1.75765+0.08981I$ $a=\ \ 0.291433+0.484883I$ $b=\ \ 0.19369+1.91501I$	$-11.41256+2.72618I$	$1.17921-2.48457I$
$u=-1.68559-0.26432I$ $a=-0.872239+0.317101I$ $b=-0.56252+1.75119I$	$-4.54812-6.90426I$	$4.10911+3.24808I$
$u=-1.68559+0.26432I$ $a=-0.872239-0.317101I$ $b=-0.56252-1.75119I$	$-4.54812+6.90426I$	$4.10911-3.24808I$
$u=-0.514377$ $a=\ \ 3.07726$ $b=\ \ 0.615046$	8.06663	13.5525
$u=-0.150577$ $a=-3.38289$ $b=-0.383618$	0.764590	13.1751
$u=\ \ 0.665578-0.815452I$ $a=\ \ 0.744850+1.102977I$ $b=\ \ 0.104774+1.307463I$	$3.45898+2.75386I$	$6.03924-3.05522I$
$u=\ \ 0.665578+0.815452I$ $a=\ \ 0.744850-1.102977I$ $b=\ \ 0.104774-1.307463I$	$3.45898-2.75386I$	$6.03924+3.05522I$
$u=\ \ 0.887105-0.326749I$ $a=-0.060739-0.463303I$ $b=\ \ 0.276391-0.741296I$	$-1.67531+0.87131I$	$-1.62556-2.85981I$
$u=\ \ 0.887105+0.326749I$ $a=-0.060739+0.463303I$ $b=\ \ 0.276391+0.741296I$	$-1.67531-0.87131I$	$-1.62556+2.85981I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=\ \ 1.44606$ $a=-0.900982$ $b=-1.25610$	1.42853	5.86838

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_4	$(u-1)^2(u^{11}+3u^{10}+\cdots-7u-1)$
c_2, c_8	$u^2(u^{11}+u^{10}+\cdots-4u-4)$
c_3	$(u+1)^2(u^{11}+15u^{10}+\cdots+51u+1)$
c_5, c_6, c_9 c_{10}	$(u^2-u-1)(u^{11}+2u^{10}+\cdots+11u^3+1)$
c_7	(u^2+u-1) $(u^{11}+12u^9+2u^8+32u^7+17u^6-28u^5+27u^4-15u^3+2u^2-2u+1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_4	$(y-1)^2(y^{11}-15y^{10}+\cdots+51y-1)$
c_2, c_8	$y^2(y^{11}+15y^{10}+\cdots+88y-16)$
c_3	$(y-1)^2(y^{11}-35y^{10}+\cdots+1959y-1)$
c_5, c_6, c_9 c_{10}	$(y^2-3y+1)(y^{11}-12y^{10}+\cdots-2y^2-1)$
c_7	$(y^2-3y+1)(y^{11}+24y^{10}+\cdots+2y^2-1)$