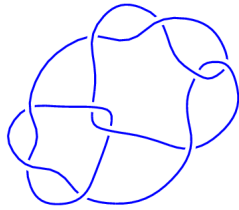
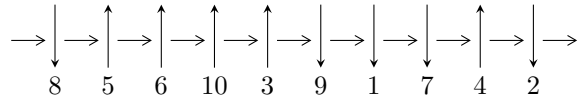


10₅₄ (K10a₄₈)

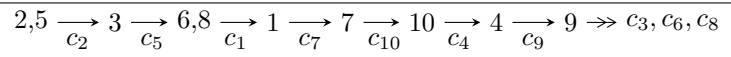


1

Arc Sequences



Solving Sequence



Representation Ideals

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

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

$$I_2^u = \langle u^{26} - 4u^{25} + \dots + u - 1, -u^{25} + u^{24} + \dots + 4a + 9, 2u^{25} - 5u^{24} + \dots + 2b + 1 \rangle$$

There are 2 irreducible components with 29 representations.

¹The knot diagram image is adapter from “C. Livingston and A. H. Moore, KnotInfo: Table of Knot Invariants, <http://www.indiana.edu/~knotinfo>”

$$\text{I. } I_1^u = \langle b^3 - b^2 + 1, u + 1, b^2 + a \rangle$$

(i) Arc colorings

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

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

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

$$a_6 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -b^2 \\ b \end{pmatrix}$$

$$a_1 = \begin{pmatrix} b^2 \\ -b^2 \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} 0 \\ -b^2 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} 0 \\ -b^2 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = $-2b^2 + 7b + 2$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.00000$ $a = -0.569840$ $b = -0.754878$	0.531480	-4.42382
$u = -1.00000$ $a = -0.215080 + 1.307141I$ $b = 0.877439 - 0.744862I$	$4.66906 + 2.82812I$	$7.71191 - 2.59975I$
$u = -1.00000$ $a = -0.215080 - 1.307141I$ $b = 0.877439 + 0.744862I$	$4.66906 - 2.82812I$	$7.71191 + 2.59975I$

II.

$$I_2^u = \langle u^{26} - 4u^{25} + \dots + u - 1, -u^{25} + u^{24} + \dots + 4a + 9, 2u^{25} - 5u^{24} + \dots + 2b + 1 \rangle$$

(i) Arc colorings

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

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

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

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

$$a_8 = \begin{pmatrix} \frac{1}{4}u^{25} - \frac{1}{4}u^{24} + \dots - \frac{15}{2}u - \frac{9}{4} \\ -u^{25} + \frac{5}{2}u^{24} + \dots + \frac{3}{2}u - \frac{1}{2} \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -\frac{3}{4}u^{25} + \frac{3}{4}u^{24} + \dots - \frac{1}{2}u + \frac{3}{4} \\ -\frac{7}{4}u^{25} + \frac{19}{4}u^{24} + \dots - \frac{1}{2}u - \frac{9}{4} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u^6 + 3u^4 + 2u^3 - 2u^2 - 4u - 1 \\ -\frac{1}{4}u^{25} + \frac{3}{4}u^{24} + \dots + \frac{11}{4}u^2 - \frac{1}{4} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -\frac{5}{2}u^{25} + \frac{11}{2}u^{24} + \dots - u - \frac{3}{2} \\ -\frac{7}{4}u^{25} + \frac{19}{4}u^{24} + \dots - \frac{1}{2}u - \frac{9}{4} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u^2 + 1 \\ u^4 - 2u^2 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} \frac{9}{2}u^{25} - \frac{25}{2}u^{24} + \dots - 3u + \frac{7}{2} \\ -\frac{21}{4}u^{25} + \frac{57}{4}u^{24} + \dots - \frac{1}{2}u - \frac{19}{4} \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = $-14u^{25} + \frac{73}{2}u^{24} + \dots + \frac{3}{2}u - \frac{19}{2}$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.52557 - 0.02102I$ $a = -0.86364 + 1.94054I$ $b = 0.920092 - 0.872965I$	$10.46155 + 3.23113I$	$6.21855 - 2.44261I$
$u = -1.52557 + 0.02102I$ $a = -0.86364 - 1.94054I$ $b = 0.920092 + 0.872965I$	$10.46155 - 3.23113I$	$6.21855 + 2.44261I$
$u = -1.256160 - 0.104364I$ $a = 0.30115 - 1.70965I$ $b = -0.714859 + 0.468666I$	$2.60764 + 1.82411I$	$3.14672 - 3.41167I$
$u = -1.256160 + 0.104364I$ $a = 0.30115 + 1.70965I$ $b = -0.714859 - 0.468666I$	$2.60764 - 1.82411I$	$3.14672 + 3.41167I$
$u = -0.813735$ $a = 0.587992$ $b = 0.370909$	1.14285	10.2092
$u = -0.646358 - 0.378619I$ $a = 0.182177 + 0.177626I$ $b = 0.493543 + 0.417386I$	$1.336672 + 0.113896I$	$6.51816 + 0.27618I$
$u = -0.646358 + 0.378619I$ $a = 0.182177 - 0.177626I$ $b = 0.493543 - 0.417386I$	$1.336672 - 0.113896I$	$6.51816 - 0.27618I$
$u = -0.636851 - 0.871335I$ $a = 0.299881 + 0.419254I$ $b = -0.890496 - 0.876738I$	$8.31406 - 0.26926I$	$5.67547 - 0.24692I$
$u = -0.636851 + 0.871335I$ $a = 0.299881 - 0.419254I$ $b = -0.890496 + 0.876738I$	$8.31406 + 0.26926I$	$5.67547 + 0.24692I$
$u = -0.583257 - 0.894502I$ $a = -0.65595 - 1.31235I$ $b = -0.942244 + 0.855193I$	$8.15003 + 6.14753I$	$5.18996 - 5.20017I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.583257 + 0.894502I$ $a = -0.65595 + 1.31235I$ $b = -0.942244 - 0.855193I$	$8.15003 - 6.14753I$	$5.18996 + 5.20017I$
$u = -0.354778 - 0.613616I$ $a = 1.50135 + 0.58086I$ $b = 0.846572 - 0.426560I$	$0.25133 + 3.55563I$	$0.67279 - 7.82227I$
$u = -0.354778 + 0.613616I$ $a = 1.50135 - 0.58086I$ $b = 0.846572 + 0.426560I$	$0.25133 - 3.55563I$	$0.67279 + 7.82227I$
$u = 0.035614 - 0.282177I$ $a = -1.76272 + 2.42519I$ $b = -0.782649 - 0.135062I$	$-1.320764 - 0.339413I$	$-6.54496 + 0.64162I$
$u = 0.035614 + 0.282177I$ $a = -1.76272 - 2.42519I$ $b = -0.782649 + 0.135062I$	$-1.320764 + 0.339413I$	$-6.54496 - 0.64162I$
$u = 0.457633 - 0.052615I$ $a = -0.90823 - 2.23710I$ $b = 0.884681 + 0.778751I$	$3.71424 - 2.93248I$	$-1.57920 + 3.07432I$
$u = 0.457633 + 0.052615I$ $a = -0.90823 + 2.23710I$ $b = 0.884681 - 0.778751I$	$3.71424 + 2.93248I$	$-1.57920 - 3.07432I$
$u = 1.42573$ $a = -0.690585$ $b = -1.05838$	3.31147	2.10675
$u = 1.47440 - 0.17499I$ $a = 0.446539 - 1.314907I$ $b = 1.024208 + 0.483667I$	$6.23030 - 6.31822I$	$4.39684 + 5.98052I$
$u = 1.47440 + 0.17499I$ $a = 0.446539 + 1.314907I$ $b = 1.024208 - 0.483667I$	$6.23030 + 6.31822I$	$4.39684 - 5.98052I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.53361 - 0.09619I$	$8.43955 - 1.72575I$	$8.31886 + 0.55186I$
$a = -0.402223 + 0.879109I$		
$b = 0.352335 - 0.784080I$		
$u = 1.53361 + 0.09619I$	$8.43955 + 1.72575I$	$8.31886 - 0.55186I$
$a = -0.402223 - 0.879109I$		
$b = 0.352335 + 0.784080I$		
$u = 1.58862 - 0.30654I$	$15.2731 - 10.5913I$	$6.79989 + 5.68919I$
$a = -0.05923 + 1.97842I$		
$b = -0.996075 - 0.858678I$		
$u = 1.58862 + 0.30654I$	$15.2731 + 10.5913I$	$6.79989 - 5.68919I$
$a = -0.05923 - 1.97842I$		
$b = -0.996075 + 0.858678I$		
$u = 1.60711 - 0.27991I$	$15.7394 - 4.0044I$	$7.52896 + 1.00327I$
$a = 0.972202 - 1.019591I$		
$b = -0.851371 + 0.929645I$		
$u = 1.60711 + 0.27991I$	$15.7394 + 4.0044I$	$7.52896 - 1.00327I$
$a = 0.972202 + 1.019591I$		
$b = -0.851371 - 0.929645I$		

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u^3 - u^2 + 1)(u^{26} + 2u^{25} + \dots + 2u - 1)$
c_2, c_3	$(u + 1)^3(u^{26} + 4u^{25} + \dots - u - 1)$
c_4, c_9	$u^3(u^{26} + u^{25} + \dots + 12u + 8)$
c_5	$(u - 1)^3(u^{26} + 4u^{25} + \dots - u - 1)$
c_6, c_{10}	$(u^3 - u^2 + 2u - 1)(u^{26} + 6u^{25} + \dots + 14u + 1)$
c_7	$(u^3 + u^2 - 1)(u^{26} + 2u^{25} + \dots + 2u - 1)$
c_8	$(u^3 + u^2 + 2u + 1)(u^{26} + 6u^{25} + \dots + 14u + 1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_7	$(y^3 - y^2 + 2y - 1)(y^{26} - 6y^{25} + \dots - 14y + 1)$
c_2, c_3, c_5	$(y - 1)^3(y^{26} - 28y^{25} + \dots + 9y + 1)$
c_4, c_9	$y^3(y^{26} - 21y^{25} + \dots - 272y + 64)$
c_6, c_8, c_{10}	$(y^3 + 3y^2 + 2y - 1)(y^{26} + 30y^{25} + \dots - 38y + 1)$