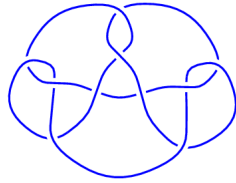
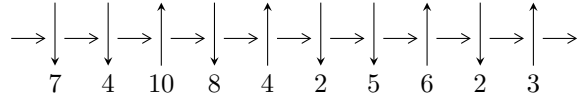


10₁₃₇ (K10n₂)

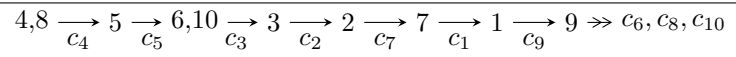


1

Arc Sequences



Solving Sequence



Representation Ideals

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

$$I_1^u = \langle u^{16} + 3u^{15} + \dots + 4u + 1, \\ u^{14} + 2u^{13} + 7u^{12} + 10u^{11} + 18u^{10} + 23u^9 + 25u^8 + 32u^7 + 22u^6 + 25u^5 + 14u^4 + 6u^3 + 10u^2 + 2a - u + 3, \\ -u^{15} - 2u^{14} + \dots + 2b - 5u \rangle$$

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

$$I_3^u = \langle u^2 - u + 1, a + u + 1, b + u - 1 \rangle$$

There are 3 irreducible components with 20 representations.

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

$$\langle u^{16} + 3u^{15} + \dots + 4u + 1, u^{14} + 2u^{13} + \dots + 2a + 3, -u^{15} - 2u^{14} + \dots + 2b - 5u \rangle$$

I. $I_1^u =$

(i) Arc colorings

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

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

$$a_5 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} -\frac{1}{2}u^{14} - u^{13} + \dots + \frac{1}{2}u - \frac{3}{2} \\ \frac{1}{2}u^{15} + u^{14} + \dots + \frac{1}{2}u^2 + \frac{5}{2}u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -\frac{1}{2}u^{15} - \frac{3}{2}u^{14} + \dots - 7u - \frac{1}{2} \\ -\frac{1}{2}u^{15} - u^{14} + \dots - \frac{5}{2}u - 1 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -u^{15} - \frac{5}{2}u^{14} + \dots - \frac{19}{2}u - \frac{3}{2} \\ -\frac{1}{2}u^{15} - u^{14} + \dots - \frac{5}{2}u - 1 \end{pmatrix}$$

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

$$a_1 = \begin{pmatrix} -u^{15} - \frac{7}{2}u^{14} + \dots - \frac{21}{2}u - \frac{3}{2} \\ \frac{1}{2}u^{15} + 2u^{14} + \dots + \frac{13}{2}u^2 + \frac{1}{2}u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u^5 + 2u^3 + u \\ u^5 + u^3 + u \end{pmatrix}$$

(ii) Obstruction class = -1

$$\text{(iii) Cusp Shapes} = \frac{5}{2}u^{15} + 5u^{14} + \frac{35}{2}u^{13} + 24u^{12} + 46u^{11} + \frac{113}{2}u^{10} + \frac{141}{2}u^9 + 87u^8 + 71u^7 + \frac{173}{2}u^6 + 56u^5 + 49u^4 + 43u^3 + \frac{25}{2}u^2 + \frac{37}{2}u + 1$$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.073478 - 0.057122I$ $a = -0.540627 + 0.419792I$ $b = 0.935752 + 0.958508I$	$8.77898 + 3.44428I$	$-0.71478 - 2.21154I$
$u = -1.073478 + 0.057122I$ $a = -0.540627 - 0.419792I$ $b = 0.935752 - 0.958508I$	$8.77898 - 3.44428I$	$-0.71478 + 2.21154I$
$u = -0.55660 - 1.34475I$ $a = -1.82052 - 0.34354I$ $b = 0.923344 - 1.057015I$	$12.7882 - 9.2506I$	$1.44636 + 5.03050I$
$u = -0.55660 + 1.34475I$ $a = -1.82052 + 0.34354I$ $b = 0.923344 + 1.057015I$	$12.7882 + 9.2506I$	$1.44636 - 5.03050I$
$u = -0.48833 - 1.38689I$ $a = -0.783578 - 0.870931I$ $b = 1.031444 + 0.889735I$	$13.35520 - 2.10741I$	$2.23202 + 0.63352I$
$u = -0.48833 + 1.38689I$ $a = -0.783578 + 0.870931I$ $b = 1.031444 - 0.889735I$	$13.35520 + 2.10741I$	$2.23202 - 0.63352I$
$u = -0.231448 - 0.297600I$ $a = -1.48639 - 0.77777I$ $b = -0.362224 - 0.817550I$	$-0.31203 + 1.54541I$	$-2.29594 - 4.92633I$
$u = -0.231448 + 0.297600I$ $a = -1.48639 + 0.77777I$ $b = -0.362224 + 0.817550I$	$-0.31203 - 1.54541I$	$-2.29594 + 4.92633I$
$u = -0.186461 - 1.088146I$ $a = 1.79112 + 0.29650I$ $b = -0.537019 + 1.088354I$	$1.80445 - 3.62763I$	$1.66989 + 3.19198I$
$u = -0.186461 + 1.088146I$ $a = 1.79112 - 0.29650I$ $b = -0.537019 - 1.088354I$	$1.80445 + 3.62763I$	$1.66989 - 3.19198I$

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.044881 - 1.189248I$	$3.73547 + 1.61832I$	$3.41778 - 2.30788I$
$a = 1.25145 + 0.74047I$		
$b = -0.849220 - 0.545637I$		
$u = 0.044881 + 1.189248I$	$3.73547 - 1.61832I$	$3.41778 + 2.30788I$
$a = 1.25145 - 0.74047I$		
$b = -0.849220 + 0.545637I$		
$u = 0.460182 - 0.643087I$	$-0.82216 + 1.37285I$	$-5.23267 - 4.39698I$
$a = -0.627874 - 0.508017I$		
$b = -0.003649 - 0.625754I$		
$u = 0.460182 + 0.643087I$	$-0.82216 - 1.37285I$	$-5.23267 + 4.39698I$
$a = -0.627874 + 0.508017I$		
$b = -0.003649 + 0.625754I$		
$u = 0.531252 - 0.974365I$	$0.15035 + 2.79885I$	$-1.52268 - 1.51981I$
$a = -1.283582 + 0.440428I$		
$b = 0.361572 + 0.440175I$		
$u = 0.531252 + 0.974365I$	$0.15035 - 2.79885I$	$-1.52268 + 1.51981I$
$a = -1.283582 - 0.440428I$		
$b = 0.361572 - 0.440175I$		

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

(i) Arc colorings

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

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

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

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

$$a_{10} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

$$a_7 = \begin{pmatrix} u \\ u - 1 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = 0

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u		$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u =$	$0.500000 - 0.866025I$	0	0
$a =$	0		
$b =$	$0.500000 - 0.866025I$		
$u =$	$0.500000 + 0.866025I$	0	0
$a =$	0		
$b =$	$0.500000 + 0.866025I$		

$$\text{III. } I_3^u = \langle u^2 - u + 1, a + u + 1, b + u - 1 \rangle$$

(i) Arc colorings

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

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

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

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

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

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

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

$$a_7 = \begin{pmatrix} u \\ u - 1 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = $8u - 7$

(iv) Complex Volumes and Cusp Shapes

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.500000 - 0.866025I$ $a = -1.50000 + 0.86603I$ $b = 0.500000 + 0.866025I$	$4.05977I$	$-3.00000 - 6.92820I$
$u = 0.500000 + 0.866025I$ $a = -1.50000 - 0.86603I$ $b = 0.500000 - 0.866025I$	$-4.05977I$	$-3.00000 + 6.92820I$

IV. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_6	$u^4(u^{16} + u^{15} + \dots - 16u + 16)$
c_2	$(u^2 - u + 1)^2(u^{16} + 3u^{15} + \dots + 8u + 1)$
c_3	$(u^2 - u + 1)^2(u^{16} + 3u^{15} + \dots + 2u + 1)$
c_4	$(u^2 - u + 1)^2(u^{16} + 3u^{15} + \dots + 4u + 1)$
c_5	$(u^2 - u + 1)^2(u^{16} + 11u^{15} + \dots + 8u + 1)$
c_7	$(u^2 + u + 1)^2(u^{16} + 3u^{15} + \dots + 4u + 1)$
c_8	$(u^2 - u + 1)^2(u^{16} + 3u^{15} + \dots + 4u^2 + 1)$
c_9	$(u^2 - u + 1)^2(u^{16} + 3u^{15} + \dots - 202u + 73)$
c_{10}	$(u^2 + u + 1)^2(u^{16} + 3u^{15} + \dots + 2u + 1)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_6	$y^4(y^{16} + 25y^{15} + \dots + 896y + 256)$
c_2	$(y^2 + y + 1)^2(y^{16} + 23y^{15} + \dots + 8y + 1)$
c_3, c_{10}	$(y^2 + y + 1)^2(y^{16} + 3y^{15} + \dots + 8y + 1)$
c_4, c_7	$(y^2 + y + 1)^2(y^{16} + 11y^{15} + \dots + 8y + 1)$
c_5	$(y^2 + y + 1)^2(y^{16} - 9y^{15} + \dots + 88y + 1)$
c_8	$(y^2 + y + 1)^2(y^{16} - 29y^{15} + \dots + 8y + 1)$
c_9	$(y^2 + y + 1)^2(y^{16} + 43y^{15} + \dots + 114832y + 5329)$