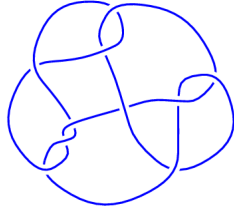
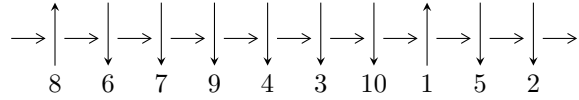


10₇₂ (K10a₄)

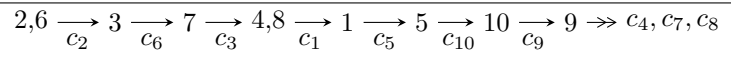


1

Arc Sequences



Solving Sequence



Representation Ideals

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

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

$$I_2^u = \langle u^{38} - 3u^{37} + \dots + 2u - 1, -u^{12} + 5u^{10} + 2u^9 - 9u^8 - 8u^7 + 4u^6 + 10u^5 + 6u^4 - 2u^3 - 5u^2 + a - 2u - 1, u^{37} - 2u^{36} + \dots + 2b + 1 \rangle$$

There are 2 irreducible components with 40 representations.

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

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

(i) Arc colorings

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

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

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

$$a_7 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} -1 \\ b \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -b + 1 \\ b - 1 \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} 0 \\ b - 1 \end{pmatrix}$$

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

(ii) Obstruction class = -1

(iii) Cusp Shapes = $-4b - 7$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$		
$a = -1.00000$	$-1.64493 - 2.02988I$	$-9.00000 + 3.46410I$
$b = 0.500000 - 0.866025I$		
$u = 1.00000$		
$a = -1.00000$	$-1.64493 + 2.02988I$	$-9.00000 - 3.46410I$
$b = 0.500000 + 0.866025I$		

II.

$$I_2^u = \langle u^{38} - 3u^{37} + \dots + 2u - 1, -u^{12} + 5u^{10} + \dots + a - 1, u^{37} - 2u^{36} + \dots + 2b + 1 \rangle$$

(i) Arc colorings

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

$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

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

$$a_8 = \begin{pmatrix} u^{12} - 5u^{10} - 2u^9 + 9u^8 + 8u^7 - 4u^6 - 10u^5 - 6u^4 + 2u^3 + 5u^2 + 2u + 1 \\ -\frac{1}{2}u^{37} + u^{36} + \dots + \frac{5}{2}u - \frac{1}{2} \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -\frac{1}{2}u^{37} + u^{36} + \dots + \frac{5}{2}u + \frac{1}{2} \\ \frac{5}{2}u^{37} - 4u^{36} + \dots - \frac{5}{2}u + \frac{3}{2} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u^5 - 2u^3 + u \\ u^7 - 3u^5 + 2u^3 + u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 2u^{37} - 3u^{36} + \dots + 10u^2 + 2 \\ \frac{5}{2}u^{37} - 4u^{36} + \dots - \frac{5}{2}u + \frac{3}{2} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -3u^{37} + 5u^{36} + \dots + 5u - 2 \\ \frac{3}{2}u^{37} - 2u^{36} + \dots - \frac{1}{2}u + \frac{1}{2} \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes

$$\begin{aligned} &= -2u^{37} - u^{36} + 35u^{35} + 21u^{34} - 270u^{33} - 205u^{32} + 1194u^{31} + 1182u^{30} - 3222u^{29} - 4364u^{28} + \\ &4873u^{27} + 10507u^{26} - 1460u^{25} - 15693u^{24} - 9964u^{23} + 11016u^{22} + 21182u^{21} + 5747u^{20} - \\ &16959u^{19} - 19349u^{18} - 2018u^{17} + 13493u^{16} + 13726u^{15} + 2674u^{14} - 6790u^{13} - 7586u^{12} - \\ &3020u^{11} + 1300u^{10} + 2786u^9 + 1852u^8 + 442u^7 - 314u^6 - 448u^5 - 263u^4 - 91u^3 - 25u^2 + 4u - 5 \end{aligned}$$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.329284 - 0.259672I$		
$a = -1.99856 - 1.39234I$	$-3.13917 - 6.61979I$	$-9.45062 + 5.39938I$
$b = 0.547737 - 1.093967I$		
$u = -1.329284 + 0.259672I$		
$a = -1.99856 + 1.39234I$	$-3.13917 + 6.61979I$	$-9.45062 - 5.39938I$
$b = 0.547737 + 1.093967I$		
$u = -1.315510 - 0.121395I$		
$a = 0.61655 + 1.44009I$	$-4.89567 + 0.49664I$	$-12.27278 - 1.11503I$
$b = 0.291142 + 1.061282I$		
$u = -1.315510 + 0.121395I$		
$a = 0.61655 - 1.44009I$	$-4.89567 - 0.49664I$	$-12.27278 + 1.11503I$
$b = 0.291142 - 1.061282I$		
$u = -1.260344 - 0.253559I$		
$a = -0.003037 - 0.946509I$	$-1.02515 - 1.90334I$	$-5.81979 + 1.07076I$
$b = 0.662945 + 0.361405I$		
$u = -1.260344 + 0.253559I$		
$a = -0.003037 + 0.946509I$	$-1.02515 + 1.90334I$	$-5.81979 - 1.07076I$
$b = 0.662945 - 0.361405I$		
$u = -1.062272 - 0.332916I$		
$a = 1.252158 + 0.030949I$	$-0.568983 - 0.479860I$	$-6.06539 - 0.48126I$
$b = -0.570085 + 0.447308I$		
$u = -1.062272 + 0.332916I$		
$a = 1.252158 - 0.030949I$	$-0.568983 + 0.479860I$	$-6.06539 + 0.48126I$
$b = -0.570085 - 0.447308I$		
$u = -1.000622 - 0.466336I$		
$a = 0.694761 + 0.337574I$	$-2.40471 + 3.95746I$	$-10.27520 - 4.57056I$
$b = -0.527298 - 1.065363I$		
$u = -1.000622 + 0.466336I$		
$a = 0.694761 - 0.337574I$	$-2.40471 - 3.95746I$	$-10.27520 + 4.57056I$
$b = -0.527298 + 1.065363I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.719303 - 0.499357I$ $a = 1.44677 + 0.15075I$ $b = -0.362704 + 1.048014I$	$-3.54227 - 2.75914I$	$-13.19764 + 4.35912I$
$u = -0.719303 + 0.499357I$ $a = 1.44677 - 0.15075I$ $b = -0.362704 - 1.048014I$	$-3.54227 + 2.75914I$	$-13.19764 - 4.35912I$
$u = -0.582954$ $a = 0.891810$ $b = -0.340706$	-0.970134	-9.92362
$u = -0.317784 - 0.691757I$ $a = 0.058360 + 0.565761I$ $b = -0.214760 - 1.058962I$	$-2.35641 - 1.43399I$	$-10.35352 + 2.88902I$
$u = -0.317784 + 0.691757I$ $a = 0.058360 - 0.565761I$ $b = -0.214760 + 1.058962I$	$-2.35641 + 1.43399I$	$-10.35352 - 2.88902I$
$u = -0.214521 - 0.842165I$ $a = 2.14112 - 0.49356I$ $b = -0.573770 + 1.100591I$	$0.00579 - 8.62980I$	$-6.60829 + 7.80256I$
$u = -0.214521 + 0.842165I$ $a = 2.14112 + 0.49356I$ $b = -0.573770 - 1.100591I$	$0.00579 + 8.62980I$	$-6.60829 - 7.80256I$
$u = -0.174468 - 0.788088I$ $a = 1.39685 + 0.95450I$ $b = -0.731729 - 0.388434I$	$2.09675 - 3.65224I$	$-3.04639 + 3.74887I$
$u = -0.174468 + 0.788088I$ $a = 1.39685 - 0.95450I$ $b = -0.731729 + 0.388434I$	$2.09675 + 3.65224I$	$-3.04639 - 3.74887I$
$u = -0.016707 - 0.678781I$ $a = -1.38023 + 1.35662I$ $b = 0.666801 - 0.530991I$	$2.80379 - 1.46931I$	$-1.12935 + 3.08473I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.016707 + 0.678781I$		
$a = -1.38023 - 1.35662I$	$2.80379 + 1.46931I$	$-1.12935 - 3.08473I$
$b = 0.666801 + 0.530991I$		
$u = 0.091958 - 0.636482I$		
$a = -2.64958 - 0.37806I$	$1.34864 + 3.34557I$	$-3.46602 - 2.94107I$
$b = 0.571517 + 1.023411I$		
$u = 0.091958 + 0.636482I$		
$a = -2.64958 + 0.37806I$	$1.34864 - 3.34557I$	$-3.46602 + 2.94107I$
$b = 0.571517 - 1.023411I$		
$u = 0.215436 - 0.157466I$		
$a = 1.56623 - 0.67273I$	$-0.33342 - 1.74546I$	$-2.32569 + 3.49934I$
$b = 0.415410 - 0.878457I$		
$u = 0.215436 + 0.157466I$		
$a = 1.56623 + 0.67273I$	$-0.33342 + 1.74546I$	$-2.32569 - 3.49934I$
$b = 0.415410 + 0.878457I$		
$u = 1.251802 - 0.201783I$		
$a = -0.999363 + 0.281232I$	$-2.15443 - 0.39089I$	$-9.84825 - 1.14697I$
$b = 0.652278 - 0.954226I$		
$u = 1.251802 + 0.201783I$		
$a = -0.999363 - 0.281232I$	$-2.15443 + 0.39089I$	$-9.84825 + 1.14697I$
$b = 0.652278 + 0.954226I$		
$u = 1.284785 - 0.261207I$		
$a = -1.278003 - 0.104536I$	$-1.23963 + 4.86305I$	$-7.46881 - 6.13263I$
$b = 0.731652 + 0.644131I$		
$u = 1.284785 + 0.261207I$		
$a = -1.278003 + 0.104536I$	$-1.23963 - 4.86305I$	$-7.46881 + 6.13263I$
$b = 0.731652 - 0.644131I$		
$u = 1.372868 - 0.330158I$		
$a = 0.451776 - 0.876637I$	$-2.79986 + 7.69321I$	$-7.61913 - 4.90752I$
$b = -0.811572 + 0.358412I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.372868 + 0.330158I$ $a = 0.451776 + 0.876637I$ $b = -0.811572 - 0.358412I$	$-2.79986 - 7.69321I$	$-7.61913 + 4.90752I$
$u = 1.39814 - 0.35135I$ $a = 1.96262 - 0.82883I$ $b = -0.591496 - 1.133848I$	$-5.10692 + 12.92959I$	$-10.40870 - 8.57718I$
$u = 1.39814 + 0.35135I$ $a = 1.96262 + 0.82883I$ $b = -0.591496 + 1.133848I$	$-5.10692 - 12.92959I$	$-10.40870 + 8.57718I$
$u = 1.40646 - 0.27352I$ $a = -0.517124 + 0.625628I$ $b = -0.183991 + 1.166974I$	$-7.80695 + 4.93169I$	$-13.8321 - 3.2391I$
$u = 1.40646 + 0.27352I$ $a = -0.517124 - 0.625628I$ $b = -0.183991 - 1.166974I$	$-7.80695 - 4.93169I$	$-13.8321 + 3.2391I$
$u = 1.42045$ $a = 0.242047$ $b = -0.758415$	-7.33419	-11.4905
$u = 1.47061 - 0.05198I$ $a = 0.671770 - 1.172878I$ $b = -0.422515 - 1.169488I$	$-10.78741 + 4.17106I$	$-15.1053 - 3.6991I$
$u = 1.47061 + 0.05198I$ $a = 0.671770 + 1.172878I$ $b = -0.422515 + 1.169488I$	$-10.78741 - 4.17106I$	$-15.1053 + 3.6991I$

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u^2 - u + 1)(u^{38} + 2u^{37} + \dots + 5u + 1)$
c_2, c_3, c_6	$(u + 1)^2(u^{38} + 3u^{37} + \dots - 2u - 1)$
c_4, c_9	$u^2(u^{38} + u^{37} + \dots + 4u - 4)$
c_5	$u^2(u^{38} + 15u^{37} + \dots + 72u + 16)$
c_7	$(u^2 - u + 1)(u^{38} + 2u^{37} + \dots + 37u + 17)$
c_8	$(u^2 - u + 1)(u^{38} + 2u^{37} + \dots + 5u + 1)$
c_{10}	$(u^2 + u + 1)(u^{38} + 18u^{37} + \dots - 5u + 1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_8	$(y^2 + y + 1)(y^{38} + 18y^{37} + \dots - 5y + 1)$
c_2, c_3, c_6	$(y - 1)^2(y^{38} - 33y^{37} + \dots - 8y + 1)$
c_4, c_9	$y^2(y^{38} - 15y^{37} + \dots - 72y + 16)$
c_5	$y^2(y^{38} + 13y^{37} + \dots - 2848y + 256)$
c_7	$(y^2 + y + 1)(y^{38} - 6y^{37} + \dots - 6333y + 289)$
c_{10}	$(y^2 + y + 1)(y^{38} + 6y^{37} + \dots - 61y + 1)$