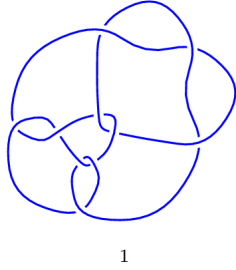
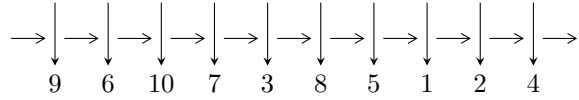


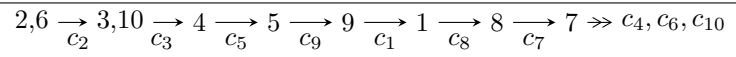
10₈₀ (K10a₈)



Arc Sequences



Solving Sequence



Representation Ideals

$$I = \bigcap_{i=1}^2 I_i^u \cap I_1^v$$

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

$$I_2^u = \langle u^{40} - 2u^{39} + \dots + 4u - 4, -1.26420 \times 10^{36}u^{39} + 2.07440 \times 10^{36}u^{38} + \dots + 2.35525 \times 10^{36}b - 3.32893 \times 10^{36} \\ 2.30624 \times 10^{36}u^{39} - 4.87025 \times 10^{36}u^{38} + \dots + 4.71051 \times 10^{36}a + 2.43924 \times 10^{37} \rangle$$

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

There are 3 irreducible components with 45 representations.

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

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

(i) Arc colorings

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

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

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

$$a_{10} = \begin{pmatrix} -2u^2 + u - 3 \\ -1 \end{pmatrix}$$

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

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

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

$$a_1 = \begin{pmatrix} -2u^2 + u - 3 \\ -1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

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

(ii) Obstruction class = 1

(iii) Cusp Shapes = $u - 8$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.215080 - 1.307141I$ $a = 0.539798 - 0.182582I$ $b = -1.00000$	$1.37919 + 2.82812I$	$-7.78492 - 1.30714I$
$u = 0.215080 + 1.307141I$ $a = 0.539798 + 0.182582I$ $b = -1.00000$	$1.37919 - 2.82812I$	$-7.78492 + 1.30714I$
$u = 0.569840$ $a = -3.07960$ $b = -1.00000$	-2.75839	-7.43016

$$\text{II. } I_2^u = \langle u^{40} - 2u^{39} + \dots + 4u - 4, -1.26 \times 10^{36} u^{39} + 2.07 \times 10^{36} u^{38} + \dots + 2.36 \times 10^{36} b - 3.33 \times 10^{36}, 2.31 \times 10^{36} u^{39} - 4.87 \times 10^{36} u^{38} + \dots + 4.71 \times 10^{36} a + 2.44 \times 10^{37} \rangle$$

(i) Arc colorings

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

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

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

$$a_{10} = \begin{pmatrix} -0.489595u^{39} + 1.03391u^{38} + \dots - 5.49347u - 5.17829 \\ 0.536759u^{39} - 0.880756u^{38} + \dots - 3.25662u + 1.41341 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -0.473705u^{39} + 0.973998u^{38} + \dots - 0.321153u - 2.70973 \\ 0.581299u^{39} - 0.726984u^{38} + \dots - 4.02214u + 1.17964 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} 0.0471637u^{39} + 0.153157u^{38} + \dots - 8.75009u - 3.76489 \\ 0.536759u^{39} - 0.880756u^{38} + \dots - 3.25662u + 1.41341 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.597452u^{39} + 0.737046u^{38} + \dots - 3.78265u - 2.75349 \\ -0.659942u^{39} + 0.591523u^{38} + \dots + 3.19008u - 0.0976319 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.628885u^{39} + 1.24099u^{38} + \dots + 1.69981u - 3.78302 \\ -0.155180u^{39} + 0.266989u^{38} + \dots + 2.02096u - 1.07329 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -0.961214u^{39} + 1.72033u^{38} + \dots + 3.18201u - 4.78644 \\ -0.486102u^{39} + 0.886499u^{38} + \dots + 2.91511u - 2.81798 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = $-2.96903u^{39} + 5.08961u^{38} + \dots - 14.8512u - 32.4878$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.105286 - 0.361243I$		
$a = 0.192027 - 0.003144I$	$-6.42531 + 1.37910I$	$-14.4871 - 0.1126I$
$b = 1.42528 - 0.13732I$		
$u = -1.105286 + 0.361243I$		
$a = 0.192027 + 0.003144I$	$-6.42531 - 1.37910I$	$-14.4871 + 0.1126I$
$b = 1.42528 + 0.13732I$		
$u = -0.712026 - 0.592514I$		
$a = -1.35270 + 1.43314I$	$-4.81110 + 1.15004I$	$-14.8249 - 0.1630I$
$b = -1.310003 + 0.051508I$		
$u = -0.712026 + 0.592514I$		
$a = -1.35270 - 1.43314I$	$-4.81110 - 1.15004I$	$-14.8249 + 0.1630I$
$b = -1.310003 - 0.051508I$		
$u = -0.682230 - 1.218514I$		
$a = -0.29633 - 1.41563I$	$-3.73330 - 7.68923I$	$-11.60024 + 4.76581I$
$b = 1.43155 + 0.31022I$		
$u = -0.682230 + 1.218514I$		
$a = -0.29633 + 1.41563I$	$-3.73330 + 7.68923I$	$-11.60024 - 4.76581I$
$b = 1.43155 - 0.31022I$		
$u = -0.661490 - 0.051964I$		
$a = 0.750383 + 0.021748I$	$-0.945608 + 0.085520I$	$-9.49008 + 0.83288I$
$b = -0.074897 - 0.213008I$		
$u = -0.661490 + 0.051964I$		
$a = 0.750383 - 0.021748I$	$-0.945608 - 0.085520I$	$-9.49008 - 0.83288I$
$b = -0.074897 + 0.213008I$		
$u = -0.620815 - 1.023939I$		
$a = -0.554031 + 1.141011I$	$-3.50534 - 6.28261I$	$-13.0953 + 5.4809I$
$b = -1.45816 - 0.17967I$		
$u = -0.620815 + 1.023939I$		
$a = -0.554031 - 1.141011I$	$-3.50534 + 6.28261I$	$-13.0953 - 5.4809I$
$b = -1.45816 + 0.17967I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.477122 - 1.075674I$ $a = -0.086144 + 1.347713I$ $b = -0.271495 - 0.796081I$	$1.73108 - 3.69196I$	$-7.37427 + 4.06105I$
$u = -0.477122 + 1.075674I$ $a = -0.086144 - 1.347713I$ $b = -0.271495 + 0.796081I$	$1.73108 + 3.69196I$	$-7.37427 - 4.06105I$
$u = -0.418716$ $a = 0.995068$ $b = -0.409236$	-0.821503	-11.8785
$u = -0.361248 - 1.173912I$ $a = 0.366981 - 0.724767I$ $b = 0.377778 + 0.443628I$	$2.47440 - 3.90124I$	$-5.43445 + 4.68146I$
$u = -0.361248 + 1.173912I$ $a = 0.366981 + 0.724767I$ $b = 0.377778 - 0.443628I$	$2.47440 + 3.90124I$	$-5.43445 - 4.68146I$
$u = -0.14806 - 1.51121I$ $a = -0.874630 - 0.251624I$ $b = 1.250124 + 0.055687I$	$0.49614 - 3.22180I$	$-15.2960 + 4.0561I$
$u = -0.14806 + 1.51121I$ $a = -0.874630 + 0.251624I$ $b = 1.250124 - 0.055687I$	$0.49614 + 3.22180I$	$-15.2960 - 4.0561I$
$u = -0.143356 - 0.859264I$ $a = 0.527613 - 1.068941I$ $b = -1.003622 + 0.442463I$	$-0.414732 + 0.767581I$	$-9.73697 - 1.10255I$
$u = -0.143356 + 0.859264I$ $a = 0.527613 + 1.068941I$ $b = -1.003622 - 0.442463I$	$-0.414732 - 0.767581I$	$-9.73697 + 1.10255I$
$u = 0.072074 - 1.152144I$ $a = 0.368515 + 0.957274I$ $b = 0.160673 - 0.580088I$	$3.38024 - 1.21441I$	$-4.33120 + 2.38202I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.072074 + 1.152144I$ $a = 0.368515 - 0.957274I$ $b = 0.160673 + 0.580088I$	$3.38024 + 1.21441I$	$-4.33120 - 2.38202I$
$u = 0.380635$ $a = -8.84579$ $b = -0.932243$	-2.98695	-59.3923
$u = 0.416919 - 0.891552I$ $a = -0.35784 - 1.46982I$ $b = -1.306179 + 0.207684I$	$-1.17381 + 1.71654I$	$-9.22754 - 1.14237I$
$u = 0.416919 + 0.891552I$ $a = -0.35784 + 1.46982I$ $b = -1.306179 - 0.207684I$	$-1.17381 - 1.71654I$	$-9.22754 + 1.14237I$
$u = 0.470686 - 0.578246I$ $a = 0.191234 - 0.000903I$ $b = 1.63869 + 0.09271I$	$-10.88698 + 0.63545I$	$-16.1019 - 7.3224I$
$u = 0.470686 + 0.578246I$ $a = 0.191234 + 0.000903I$ $b = 1.63869 - 0.09271I$	$-10.88698 - 0.63545I$	$-16.1019 + 7.3224I$
$u = 0.473036 - 0.681631I$ $a = -0.26300 - 2.22678I$ $b = -0.477456 + 0.529520I$	$-3.04518 + 0.83928I$	$-13.6876 - 5.4055I$
$u = 0.473036 + 0.681631I$ $a = -0.26300 + 2.22678I$ $b = -0.477456 - 0.529520I$	$-3.04518 - 0.83928I$	$-13.6876 + 5.4055I$
$u = 0.522827 - 1.072493I$ $a = -0.85009 + 1.78859I$ $b = 1.46212 - 0.19943I$	$-9.24274 + 3.54815I$	$-15.7354 - 3.2017I$
$u = 0.522827 + 1.072493I$ $a = -0.85009 - 1.78859I$ $b = 1.46212 + 0.19943I$	$-9.24274 - 3.54815I$	$-15.7354 + 3.2017I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.523308 - 0.966470I$ $a = 0.455655 + 0.673858I$ $b = -0.858789 - 0.701991I$	$-2.11016 + 3.32020I$	$-13.06049 - 3.76837I$
$u = 0.523308 + 0.966470I$ $a = 0.455655 - 0.673858I$ $b = -0.858789 + 0.701991I$	$-2.11016 - 3.32020I$	$-13.06049 + 3.76837I$
$u = 0.657661 - 1.113155I$ $a = -0.283876 - 1.253827I$ $b = -0.374538 + 0.908825I$	$-0.64027 + 8.82354I$	$-11.18744 - 7.65851I$
$u = 0.657661 + 1.113155I$ $a = -0.283876 + 1.253827I$ $b = -0.374538 - 0.908825I$	$-0.64027 - 8.82354I$	$-11.18744 + 7.65851I$
$u = 0.79345 - 1.18299I$ $a = -0.03462 + 1.49209I$ $b = 1.48955 - 0.35340I$	$-6.6238 + 13.3940I$	$-14.1442 - 7.8976I$
$u = 0.79345 + 1.18299I$ $a = -0.03462 - 1.49209I$ $b = 1.48955 + 0.35340I$	$-6.6238 - 13.3940I$	$-14.1442 + 7.8976I$
$u = 0.876256 - 0.500142I$ $a = 0.579698 + 0.340133I$ $b = -0.388591 - 0.672832I$	$-2.52882 - 3.14028I$	$-13.2871 + 4.9220I$
$u = 0.876256 + 0.500142I$ $a = 0.579698 - 0.340133I$ $b = -0.388591 + 0.672832I$	$-2.52882 + 3.14028I$	$-13.2871 - 4.9220I$
$u = 1.124457 - 0.612008I$ $a = 0.196520 + 0.001971I$ $b = 1.45872 + 0.24956I$	$-8.48566 - 6.50843I$	$-15.7623 + 4.5910I$
$u = 1.124457 + 0.612008I$ $a = 0.196520 - 0.001971I$ $b = 1.45872 - 0.24956I$	$-8.48566 + 6.50843I$	$-15.7623 - 4.5910I$

$$\text{III. } I_1^v = \langle -b + v + 2, b^2 - b - 1, a \rangle$$

(i) Arc colorings

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

$$a_6 = \begin{pmatrix} b-2 \\ 0 \end{pmatrix}$$

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

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

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

$$a_5 = \begin{pmatrix} b-2 \\ 0 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} b \\ b \end{pmatrix}$$

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

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

$$a_7 = \begin{pmatrix} b-3 \\ -b-1 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = -11

(iv) Complex Volumes and Cusp Shapes

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

IV. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u+1)^3(u^2-u-1)(u^{40}+5u^{39}+\dots-6u+1)$
c_2	$u^2(u^3-u^2+2u-1)(u^{40}+2u^{39}+\dots-4u-4)$
c_3	$u^3(u^2-u-1)(u^{40}+2u^{39}+\dots-28u-8)$
c_4	$(u-1)^2(u^3+u^2-1)(u^{40}+4u^{39}+\dots-2u+1)$
c_5	$u^2(u^3+u^2+2u+1)(u^{40}+2u^{39}+\dots-4u-4)$
c_6	$(u-1)^2(u^3-u^2+2u-1)(u^{40}+20u^{39}+\dots+38u+1)$
c_7	$(u+1)^2(u^3-u^2+1)(u^{40}+4u^{39}+\dots-2u+1)$
c_8, c_9	$(u-1)^3(u^2+u-1)(u^{40}+5u^{39}+\dots-6u+1)$
c_{10}	$u^3(u^2+u-1)(u^{40}+2u^{39}+\dots-28u-8)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_8, c_9	$(y - 1)^3(y^2 - 3y + 1)(y^{40} - 39y^{39} + \dots + 24y + 1)$
c_2, c_5	$y^2(y^3 + 3y^2 + 2y - 1)(y^{40} + 18y^{39} + \dots - 104y + 16)$
c_3, c_{10}	$y^3(y^2 - 3y + 1)(y^{40} - 24y^{39} + \dots - 1360y + 64)$
c_4, c_7	$(y - 1)^2(y^3 - y^2 + 2y - 1)(y^{40} - 20y^{39} + \dots - 38y + 1)$
c_6	$(y - 1)^2(y^3 + 3y^2 + 2y - 1)(y^{40} + 4y^{39} + \dots - 918y + 1)$