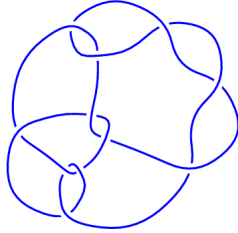
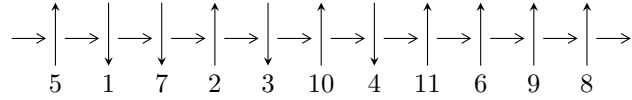


11a<sub>4</sub> (K11a<sub>4</sub>)

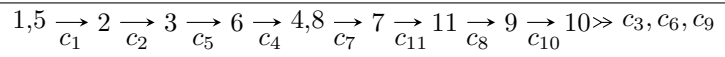


1

**Arc Sequences**



**Solving Sequence**



**Representation Ideals**

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

$$I_1^u = \langle a^6 + a^5 - a^4 + 3a^2 + 2a + 1, a^5 - a^4 + a^3 + 3a^2 + 5b + 2a - 2, 2a^5 + 3a^4 - 3a^3 + a^2 + 9a + 5u + 6 \rangle$$

$$I_2^u = \langle u^{54} - 4u^{53} + \dots - 5u + 1, 7u^{53} - 14u^{52} + \dots + 4a + 17, -6u^{53} + 25u^{52} + \dots + 4b + 7 \rangle$$

There are 2 irreducible components with 60 representations.

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

$$\text{I. } I_1^u = \langle a^6 + a^5 - a^4 + 3a^2 + 2a + 1, a^5 - a^4 + a^3 + 3a^2 + 5b + 2a - 2, 2a^5 + 3a^4 - 3a^3 + a^2 + 9a + 5u + 6 \rangle$$

(i) Arc colorings

$$\begin{aligned} a_1 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_5 &= \begin{pmatrix} 0 \\ -\frac{2}{5}a^5 - \frac{3}{5}a^4 + \dots - \frac{9}{5}a - \frac{6}{5} \end{pmatrix} \\ a_2 &= \begin{pmatrix} 1 \\ -\frac{2}{5}a^5 - \frac{3}{5}a^4 + \dots - \frac{9}{5}a - \frac{1}{5} \end{pmatrix} \\ a_3 &= \begin{pmatrix} \frac{2}{5}a^5 + \frac{3}{5}a^4 + \dots + \frac{9}{5}a + \frac{6}{5} \\ -\frac{2}{5}a^5 - \frac{3}{5}a^4 + \dots - \frac{9}{5}a - \frac{1}{5} \end{pmatrix} \\ a_6 &= \begin{pmatrix} -1 \\ 0 \end{pmatrix} \\ a_4 &= \begin{pmatrix} \frac{2}{5}a^5 + \frac{3}{5}a^4 + \dots + \frac{9}{5}a + \frac{6}{5} \\ -\frac{2}{5}a^5 - \frac{3}{5}a^4 + \dots - \frac{9}{5}a - \frac{1}{5} \end{pmatrix} \\ a_8 &= \begin{pmatrix} a \\ -\frac{1}{5}a^5 + \frac{1}{5}a^4 + \dots - \frac{2}{5}a + \frac{2}{5} \end{pmatrix} \\ a_7 &= \begin{pmatrix} a \\ -\frac{1}{5}a^5 + \frac{1}{5}a^4 + \dots - \frac{2}{5}a + \frac{2}{5} \end{pmatrix} \\ a_{11} &= \begin{pmatrix} \frac{2}{5}a^5 - \frac{2}{5}a^4 + \dots + \frac{4}{5}a + \frac{6}{5} \\ -\frac{2}{5}a^5 + \frac{2}{5}a^4 + \dots - \frac{4}{5}a - \frac{1}{5} \end{pmatrix} \\ a_9 &= \begin{pmatrix} \frac{3}{5}a^5 + \frac{2}{5}a^4 + \dots + \frac{6}{5}a + \frac{4}{5} \\ -\frac{1}{5}a^5 + \frac{1}{5}a^4 + \dots - \frac{2}{5}a + \frac{2}{5} \end{pmatrix} \\ a_{10} &= \begin{pmatrix} \frac{2}{5}a^5 + \frac{3}{5}a^4 + \dots + \frac{4}{5}a + \frac{6}{5} \\ -\frac{1}{5}a^5 + \frac{1}{5}a^4 + \dots - \frac{2}{5}a + \frac{2}{5} \end{pmatrix} \\ a_{10} &= \begin{pmatrix} \frac{2}{5}a^5 + \frac{3}{5}a^4 + \dots + \frac{4}{5}a + \frac{6}{5} \\ -\frac{1}{5}a^5 + \frac{1}{5}a^4 + \dots - \frac{2}{5}a + \frac{2}{5} \end{pmatrix} \end{aligned}$$

(ii) Obstruction class = 1

$$\text{(iii) Cusp Shapes} = -\frac{17}{5}a^5 - \frac{18}{5}a^4 + \frac{33}{5}a^3 - \frac{11}{5}a^2 - \frac{64}{5}a - \frac{1}{5}$$

(iv) Complex Volumes and Cusp Shapes

Solution to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 - 0.866025I$ $a = -1.239557 - 0.467306I$ $b = 0.215080 + 1.307141I$	$-3.02413 + 4.85801I$	$0.94625 - 7.60556I$
$u = -0.500000 + 0.866025I$ $a = -1.239557 + 0.467306I$ $b = 0.215080 - 1.307141I$	$-3.02413 - 4.85801I$	$0.94625 + 7.60556I$
$u = -0.500000 + 0.866025I$ $a = -0.284920 - 0.493496I$ $b = 0.569840$	$1.11345 - 2.02988I$	$5.31735 + 5.84990I$
$u = -0.500000 - 0.866025I$ $a = -0.284920 + 0.493496I$ $b = 0.569840$	$1.11345 + 2.02988I$	$5.31735 - 5.84990I$
$u = -0.500000 + 0.866025I$ $a = 1.024478 - 0.839835I$ $b = 0.215080 + 1.307141I$	$-3.02413 + 0.79824I$	$2.23639 + 1.26697I$
$u = -0.500000 - 0.866025I$ $a = 1.024478 + 0.839835I$ $b = 0.215080 - 1.307141I$	$-3.02413 - 0.79824I$	$2.23639 - 1.26697I$

$$\text{II. } I_2^u = \langle u^{54} - 4u^{53} + \dots - 5u + 1, 7u^{53} - 14u^{52} + \dots + 4a + 17, -6u^{53} + 25u^{52} + \dots + 4b + 7 \rangle$$

(i) Arc colorings

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

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

$$a_2 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} -u^5 - 2u^3 - u \\ u^5 + u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -\frac{7}{4}u^{53} + \frac{7}{2}u^{52} + \dots + \frac{35}{4}u - \frac{17}{4} \\ \frac{3}{2}u^{53} - \frac{25}{4}u^{52} + \dots + 12u - \frac{7}{4} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -\frac{9}{4}u^{53} + \frac{19}{2}u^{52} + \dots - \frac{43}{4}u + \frac{1}{4} \\ -\frac{1}{2}u^{53} + \frac{9}{4}u^{52} + \dots + 11u - \frac{9}{4} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -\frac{1}{4}u^{53} + \frac{3}{4}u^{52} + \dots + u^2 - \frac{5}{4}u \\ \frac{1}{4}u^{53} - u^{52} + \dots + \frac{9}{4}u - \frac{1}{4} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 4u^{53} - 16u^{52} + \dots + 17u - \frac{9}{2} \\ -\frac{5}{4}u^{53} + \frac{25}{4}u^{52} + \dots - \frac{39}{4}u + \frac{5}{2} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{15}{4}u^{53} - \frac{55}{4}u^{52} + \dots + \frac{41}{4}u - 3 \\ -\frac{5}{4}u^{53} + \frac{29}{4}u^{52} + \dots - \frac{55}{4}u + \frac{7}{2} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{15}{4}u^{53} - \frac{55}{4}u^{52} + \dots + \frac{41}{4}u - 3 \\ -\frac{5}{4}u^{53} + \frac{29}{4}u^{52} + \dots - \frac{55}{4}u + \frac{7}{2} \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes =  $-5u^{53} + \frac{67}{2}u^{52} + \dots - 59u + 16$

(iv) Complex Volumes and Cusp Shapes

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.753157 - 0.805387I$ $a = -1.05816 - 1.16882I$ $b = 0.15061 + 1.52668I$	$-5.15771 + 5.91377I$	$-1.48115 - 5.84447I$
$u = -0.753157 + 0.805387I$ $a = -1.05816 + 1.16882I$ $b = 0.15061 - 1.52668I$	$-5.15771 - 5.91377I$	$-1.48115 + 5.84447I$
$u = -0.745011 - 0.831417I$ $a = 0.96483 + 1.25275I$ $b = 0.09191 - 1.50020I$	$-5.23505 - 0.31393I$	$-1.86935 - 0.44521I$
$u = -0.745011 + 0.831417I$ $a = 0.96483 - 1.25275I$ $b = 0.09191 + 1.50020I$	$-5.23505 + 0.31393I$	$-1.86935 + 0.44521I$
$u = -0.666189 - 0.031728I$ $a = -0.0922958 - 0.0482952I$ $b = 0.13196 - 1.49406I$	$-4.53071 - 3.08686I$	$1.77023 + 2.56143I$
$u = -0.666189 + 0.031728I$ $a = -0.0922958 + 0.0482952I$ $b = 0.13196 + 1.49406I$	$-4.53071 + 3.08686I$	$1.77023 - 2.56143I$
$u = -0.626212 - 0.684020I$ $a = -0.946934 - 0.601830I$ $b = 0.572857 + 0.492032I$	$1.52357 + 3.40391I$	$4.82806 - 9.13661I$
$u = -0.626212 + 0.684020I$ $a = -0.946934 + 0.601830I$ $b = 0.572857 - 0.492032I$	$1.52357 - 3.40391I$	$4.82806 + 9.13661I$
$u = -0.591212 - 0.904355I$ $a = 0.136029 + 0.965536I$ $b = 0.452763 - 0.325398I$	$0.88913 + 1.37469I$	$0.74001 + 4.79450I$
$u = -0.591212 + 0.904355I$ $a = 0.136029 - 0.965536I$ $b = 0.452763 + 0.325398I$	$0.88913 - 1.37469I$	$0.74001 - 4.79450I$

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.499017 - 1.041128I$ $a = -0.856626 + 1.113757I$ $b = 0.506001 + 0.649056I$	$-0.12306 + 4.76592I$	$2.75573 - 7.20705I$
$u = -0.499017 + 1.041128I$ $a = -0.856626 - 1.113757I$ $b = 0.506001 - 0.649056I$	$-0.12306 - 4.76592I$	$2.75573 + 7.20705I$
$u = -0.474195 - 0.404040I$ $a = -0.896122 - 0.464008I$ $b = 0.603365 - 0.428675I$	$1.67487 - 0.64549I$	$7.52215 + 2.21794I$
$u = -0.474195 + 0.404040I$ $a = -0.896122 + 0.464008I$ $b = 0.603365 + 0.428675I$	$1.67487 + 0.64549I$	$7.52215 - 2.21794I$
$u = -0.459497 - 1.157946I$ $a = -1.51732 + 1.29201I$ $b = 0.16035 + 1.58211I$	$-7.64003 + 7.27340I$	$-2.35891 - 5.76733I$
$u = -0.459497 + 1.157946I$ $a = -1.51732 - 1.29201I$ $b = 0.16035 - 1.58211I$	$-7.64003 - 7.27340I$	$-2.35891 + 5.76733I$
$u = -0.438089 - 1.158702I$ $a = 1.57252 - 1.18680I$ $b = 0.03942 - 1.53460I$	$-7.79249 + 0.92626I$	$-2.77764 - 0.80155I$
$u = -0.438089 + 1.158702I$ $a = 1.57252 + 1.18680I$ $b = 0.03942 + 1.53460I$	$-7.79249 - 0.92626I$	$-2.77764 + 0.80155I$
$u = -0.379892 - 0.998863I$ $a = 1.103897 - 0.557020I$ $b = 0.102602 - 0.436031I$	$-1.03201 + 1.50079I$	$-1.023162 - 0.644434I$
$u = -0.379892 + 0.998863I$ $a = 1.103897 + 0.557020I$ $b = 0.102602 + 0.436031I$	$-1.03201 - 1.50079I$	$-1.023162 + 0.644434I$

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.350126 - 0.758525I$ $a = 0.992379 + 0.143031I$ $b = -0.0959060 + 0.0489305I$	$-0.23114 + 1.44429I$	$-1.42255 - 4.98888I$
$u = -0.350126 + 0.758525I$ $a = 0.992379 - 0.143031I$ $b = -0.0959060 - 0.0489305I$	$-0.23114 - 1.44429I$	$-1.42255 + 4.98888I$
$u = 0.188104 - 0.813889I$ $a = 1.70541 - 0.20561I$ $b = 0.098016 + 1.198771I$	$-3.67271 + 1.63897I$	$-3.88431 - 4.27010I$
$u = 0.188104 + 0.813889I$ $a = 1.70541 + 0.20561I$ $b = 0.098016 - 1.198771I$	$-3.67271 - 1.63897I$	$-3.88431 + 4.27010I$
$u = 0.263878 - 0.734727I$ $a = -2.05477 + 0.12446I$ $b = 0.313156 - 1.353575I$	$-3.33199 - 3.97385I$	$-2.23953 + 0.35907I$
$u = 0.263878 + 0.734727I$ $a = -2.05477 - 0.12446I$ $b = 0.313156 + 1.353575I$	$-3.33199 + 3.97385I$	$-2.23953 - 0.35907I$
$u = 0.272316 - 1.258419I$ $a = 0.301237 + 0.770778I$ $b = 0.18966 + 1.67412I$	$-13.4813 + 5.1046I$	$-5.03469 - 2.69706I$
$u = 0.272316 + 1.258419I$ $a = 0.301237 - 0.770778I$ $b = 0.18966 - 1.67412I$	$-13.4813 - 5.1046I$	$-5.03469 + 2.69706I$
$u = 0.292425 - 1.259688I$ $a = -0.162036 - 0.763414I$ $b = -0.05529 - 1.59185I$	$-13.77423 - 1.43522I$	$-5.47084 + 2.13204I$
$u = 0.292425 + 1.259688I$ $a = -0.162036 + 0.763414I$ $b = -0.05529 + 1.59185I$	$-13.77423 + 1.43522I$	$-5.47084 - 2.13204I$

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.325799 - 1.118784I$		
$a = 0.231756 - 0.233450I$	$-4.41304 + 1.91296I$	$-2.89081 - 2.70645I$
$b = 0.623088 + 1.028714I$		
$u = 0.325799 + 1.118784I$		
$a = 0.231756 + 0.233450I$	$-4.41304 - 1.91296I$	$-2.89081 + 2.70645I$
$b = 0.623088 - 1.028714I$		
$u = 0.385602 - 0.286567I$		
$a = -1.99051 - 0.52447I$	$1.57101 - 0.14808I$	$6.86906 - 0.36637I$
$b = 0.788212 - 0.173723I$		
$u = 0.385602 + 0.286567I$		
$a = -1.99051 + 0.52447I$	$1.57101 + 0.14808I$	$6.86906 + 0.36637I$
$b = 0.788212 + 0.173723I$		
$u = 0.389551 - 1.166932I$		
$a = 0.368785 + 0.096490I$	$-6.05420 - 2.70137I$	$-5.55406 + 3.31822I$
$b = -0.342003 - 0.642138I$		
$u = 0.389551 + 1.166932I$		
$a = 0.368785 - 0.096490I$	$-6.05420 + 2.70137I$	$-5.55406 - 3.31822I$
$b = -0.342003 + 0.642138I$		
$u = 0.461228 - 1.103379I$		
$a = -0.760887 - 0.869538I$	$-0.79930 - 3.68471I$	$2.05284 + 3.76883I$
$b = 1.049959 + 0.133110I$		
$u = 0.461228 + 1.103379I$		
$a = -0.760887 + 0.869538I$	$-0.79930 + 3.68471I$	$2.05284 - 3.76883I$
$b = 1.049959 - 0.133110I$		
$u = 0.493294 - 1.165469I$		
$a = 1.239929 + 0.400909I$	$-5.33044 - 5.62043I$	$-4.50494 + 4.08091I$
$b = -0.458261 + 0.419014I$		
$u = 0.493294 + 1.165469I$		
$a = 1.239929 - 0.400909I$	$-5.33044 + 5.62043I$	$-4.50494 - 4.08091I$
$b = -0.458261 - 0.419014I$		



Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.533177 - 1.145475I$ $a = -1.55151 - 0.68284I$ $b = 0.838073 - 0.873836I$	$-2.97092 - 9.82935I$	$0.56507 + 9.27115I$
$u = 0.533177 + 1.145475I$ $a = -1.55151 + 0.68284I$ $b = 0.838073 + 0.873836I$	$-2.97092 + 9.82935I$	$0.56507 - 9.27115I$
$u = 0.564569 - 1.201026I$ $a = 1.96539 + 0.25795I$ $b = -0.13428 + 1.52301I$	$-11.8740 - 7.7158I$	$-3.55932 + 3.79203I$
$u = 0.564569 + 1.201026I$ $a = 1.96539 - 0.25795I$ $b = -0.13428 - 1.52301I$	$-11.8740 + 7.7158I$	$-3.55932 - 3.79203I$
$u = 0.575070 - 1.194173I$ $a = -2.04207 - 0.34417I$ $b = 0.27962 - 1.66807I$	$-11.3710 - 14.1846I$	$-2.65497 + 8.52875I$
$u = 0.575070 + 1.194173I$ $a = -2.04207 + 0.34417I$ $b = 0.27962 + 1.66807I$	$-11.3710 + 14.1846I$	$-2.65497 - 8.52875I$
$u = 0.727484 - 0.127692I$ $a = 1.178262 + 0.411070I$ $b = -0.306147 - 0.433369I$	$-2.35286 + 1.07266I$	$-1.50878 - 0.45563I$
$u = 0.727484 + 0.127692I$ $a = 1.178262 - 0.411070I$ $b = -0.306147 + 0.433369I$	$-2.35286 - 1.07266I$	$-1.50878 + 0.45563I$
$u = 0.739810 - 0.258344I$ $a = -1.28681 - 0.82591I$ $b = 0.734944 + 0.813229I$	$-0.37627 + 5.01917I$	$3.74598 - 6.24423I$
$u = 0.739810 + 0.258344I$ $a = -1.28681 + 0.82591I$ $b = 0.734944 - 0.813229I$	$-0.37627 - 5.01917I$	$3.74598 + 6.24423I$

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.885029 - 0.254996I$ $a = -0.781886 - 1.060888I$ $b = 0.24815 + 1.64054I$	$-8.53853 + 8.83927I$	$-0.16984 - 5.18354I$
$u = 0.885029 + 0.254996I$ $a = -0.781886 + 1.060888I$ $b = 0.24815 - 1.64054I$	$-8.53853 - 8.83927I$	$-0.16984 + 5.18354I$
$u = 0.885260 - 0.230562I$ $a = 0.737527 + 0.964365I$ $b = -0.08283 - 1.52053I$	$-8.94569 + 2.41782I$	$-0.944300 - 0.387056I$
$u = 0.885260 + 0.230562I$ $a = 0.737527 - 0.964365I$ $b = -0.08283 + 1.52053I$	$-8.94569 - 2.41782I$	$-0.944300 + 0.387056I$

### III. u-Polynomials

Crossings	u-Polynomials at each crossings
$c_1$	$(u^2 + u + 1)^3(u^{54} + 4u^{53} + \dots + 5u + 1)$
$c_2$	$(u^2 + u + 1)^3(u^{54} + 28u^{53} + \dots + 3u + 1)$
$c_3, c_7$	$u^6(u^{54} + u^{53} + \dots + 96u + 64)$
$c_4$	$(u^2 - u + 1)^3(u^{54} + 4u^{53} + \dots + 5u + 1)$
$c_5$	$(u^2 + u + 1)^3(u^{54} + 4u^{53} + \dots + 713u + 193)$
$c_6$	$(u^3 - u^2 + 1)^2(u^{54} + 3u^{53} + \dots + 2u + 1)$
$c_8$	$(u^3 + u^2 + 2u + 1)^2(u^{54} + 13u^{53} + \dots - 4u + 1)$
$c_9$	$(u^3 + u^2 - 1)^2(u^{54} + 3u^{53} + \dots + 2u + 1)$
$c_{10}, c_{11}$	$(u^3 - u^2 + 2u - 1)^2(u^{54} + 13u^{53} + \dots - 4u + 1)$

#### IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
$c_1, c_4$	$(y^2 + y + 1)^3(y^{54} + 28y^{53} + \dots + 3y + 1)$
$c_2$	$(y^2 + y + 1)^3(y^{54} + 56y^{52} + \dots + 27y + 1)$
$c_3, c_7$	$y^6(y^{54} - 35y^{53} + \dots - 54272y + 4096)$
$c_5$	$(y^2 + y + 1)^3(y^{54} - 28y^{53} + \dots + 214995y + 37249)$
$c_6, c_9$	$(y^3 - y^2 + 2y - 1)^2(y^{54} - 13y^{53} + \dots + 4y + 1)$
$c_8, c_{10}, c_{11}$	$(y^3 + 3y^2 + 2y - 1)^2(y^{54} + 59y^{53} + \dots - 84y + 1)$