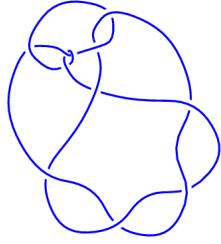
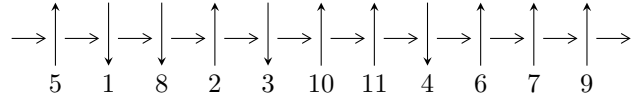


11a₇ (K11a₇)

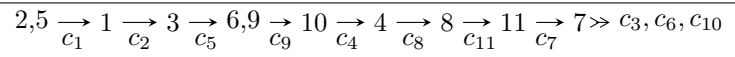


1

Arc Sequences



Solving Sequence



Representation Ideals

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

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

$$I_2^u = \langle u^{51} - 3u^{50} + \dots + 4u - 1, 2u^{50} - 5u^{49} + \dots + 2a - 5, -4u^{50} + 11u^{49} + \dots + 2b + 1 \rangle$$

There are 2 irreducible components with 55 representations.

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

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

(i) Arc colorings

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

$$a_5 = \begin{pmatrix} 0 \\ \frac{1}{2}b^3 + b^2 + b - \frac{1}{2} \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 1 \\ -\frac{1}{2}b^3 - b^2 - b - \frac{1}{2} \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -\frac{1}{2}b^3 - b^2 - b + \frac{1}{2} \\ \frac{1}{2}b^3 + b^2 + b - \frac{1}{2} \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -1 \\ \frac{1}{2}b^3 + b^2 + b + \frac{1}{2} \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} -\frac{1}{2}b^3 - b + \frac{1}{2} \\ 0 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -\frac{1}{2}b^3 - b^2 - b + \frac{1}{2} \\ \frac{1}{2}b^3 + b^2 + b - \frac{1}{2} \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} -\frac{1}{2}b^3 - b^2 + \frac{1}{2} \\ -b \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -b^2 - 1 \\ \frac{1}{2}b^3 + b^2 + b + \frac{1}{2} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -b^2 - 1 \\ \frac{1}{2}b^3 + b^2 + b + \frac{1}{2} \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = $3b^3 + 5b^2 + 7b + 6$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = 0.80902 + 1.40126I$ $b = -0.80902 - 1.40126I$	$8.88264 - 2.02988I$	$6.50000 + 1.52761I$
$u = -0.500000 - 0.866025I$ $a = 0.80902 - 1.40126I$ $b = -0.80902 + 1.40126I$	$8.88264 + 2.02988I$	$6.50000 - 1.52761I$
$u = -0.500000 - 0.866025I$ $a = -0.309017 + 0.535233I$ $b = 0.309017 - 0.535233I$	$0.98696 + 2.02988I$	$6.50000 - 5.40059I$
$u = -0.500000 + 0.866025I$ $a = -0.309017 - 0.535233I$ $b = 0.309017 + 0.535233I$	$0.98696 - 2.02988I$	$6.50000 + 5.40059I$

$$\langle u^{51} - 3u^{50} + \dots + 4u - 1, 2u^{50} - 5u^{49} + \dots + 2a - 5, -4u^{50} + 11u^{49} + \dots + 2b + 1 \rangle$$

II. $I_2^u =$

(i) Arc colorings

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

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

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

$$a_3 = \begin{pmatrix} u^2 + 1 \\ u^4 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u^5 - 2u^3 - u \\ -u^7 - u^5 + u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u^{50} + \frac{5}{2}u^{49} + \dots - \frac{1}{2}u + \frac{5}{2} \\ 2u^{50} - \frac{11}{2}u^{49} + \dots - \frac{5}{2}u - \frac{1}{2} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -\frac{5}{2}u^{50} + \frac{9}{2}u^{49} + \dots - u^2 + \frac{5}{2} \\ 3u^{50} - 6u^{49} + \dots - 2u - 1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u \\ u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -3u^{50} + \frac{11}{2}u^{49} + \dots + \frac{1}{2}u + \frac{5}{2} \\ 4u^{50} - \frac{17}{2}u^{49} + \dots - \frac{7}{2}u - \frac{1}{2} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{1}{2}u^{49} - u^{48} + \dots + \frac{1}{2}u - \frac{1}{2} \\ -\frac{1}{2}u^{49} + u^{48} + \dots - \frac{1}{2}u + \frac{1}{2} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} \frac{1}{2}u^{50} - \frac{3}{2}u^{49} + \dots - 2u + \frac{3}{2} \\ u^{28} + 6u^{26} + \dots - 4u^7 + 3u^4 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} \frac{1}{2}u^{50} - \frac{3}{2}u^{49} + \dots - 2u + \frac{3}{2} \\ u^{28} + 6u^{26} + \dots - 4u^7 + 3u^4 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = $-\frac{7}{2}u^{50} + 10u^{49} + \dots + \frac{33}{2}u + 2$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.746173 - 0.671816I$ $a = -1.22741 - 0.70733I$ $b = 1.62911 - 0.31874I$	$8.59223 + 5.32247I$	$7.48744 - 5.63982I$
$u = -0.746173 + 0.671816I$ $a = -1.22741 + 0.70733I$ $b = 1.62911 + 0.31874I$	$8.59223 - 5.32247I$	$7.48744 + 5.63982I$
$u = -0.674399 - 0.310610I$ $a = -0.812214 - 0.138491I$ $b = 0.86193 - 1.27986I$	$8.87289 - 2.35791I$	$9.47357 + 0.84331I$
$u = -0.674399 + 0.310610I$ $a = -0.812214 + 0.138491I$ $b = 0.86193 + 1.27986I$	$8.87289 + 2.35791I$	$9.47357 - 0.84331I$
$u = -0.673837 - 0.944734I$ $a = 0.29081 + 1.48440I$ $b = -1.02684 - 1.01782I$	$7.78597 + 0.04605I$	$5.53767 + 0.41549I$
$u = -0.673837 + 0.944734I$ $a = 0.29081 - 1.48440I$ $b = -1.02684 + 1.01782I$	$7.78597 - 0.04605I$	$5.53767 - 0.41549I$
$u = -0.663066 - 0.701668I$ $a = 0.985956 + 0.688699I$ $b = -1.285979 + 0.192603I$	$1.18905 + 3.57721I$	$4.64362 - 8.91865I$
$u = -0.663066 + 0.701668I$ $a = 0.985956 - 0.688699I$ $b = -1.285979 - 0.192603I$	$1.18905 - 3.57721I$	$4.64362 + 8.91865I$
$u = -0.607747 - 0.889945I$ $a = -0.262903 - 0.990356I$ $b = 0.764384 + 0.586620I$	$0.64233 + 1.35638I$	$0.89935 + 4.08945I$
$u = -0.607747 + 0.889945I$ $a = -0.262903 + 0.990356I$ $b = 0.764384 - 0.586620I$	$0.64233 - 1.35638I$	$0.89935 - 4.08945I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.536684 - 1.108795I$ $a = -1.03449 + 1.53013I$ $b = 0.06769 - 1.54409I$	$6.58151 + 7.03980I$	$5.66959 - 5.10498I$
$u = -0.536684 + 1.108795I$ $a = -1.03449 - 1.53013I$ $b = 0.06769 + 1.54409I$	$6.58151 - 7.03980I$	$5.66959 + 5.10498I$
$u = -0.502040 - 0.337442I$ $a = 0.804385 + 0.445505I$ $b = -0.669002 + 0.913699I$	$1.41349 - 0.80124I$	$7.83477 + 2.87289I$
$u = -0.502040 + 0.337442I$ $a = 0.804385 - 0.445505I$ $b = -0.669002 - 0.913699I$	$1.41349 + 0.80124I$	$7.83477 - 2.87289I$
$u = -0.495151 - 1.076852I$ $a = 1.02618 - 1.22247I$ $b = -0.154071 + 1.306393I$	$-0.67124 + 4.97036I$	$2.71900 - 7.31464I$
$u = -0.495151 + 1.076852I$ $a = 1.02618 + 1.22247I$ $b = -0.154071 - 1.306393I$	$-0.67124 - 4.97036I$	$2.71900 + 7.31464I$
$u = -0.415603 - 1.038040I$ $a = -1.122088 + 0.780611I$ $b = 0.358377 - 1.024715I$	$-1.31778 + 1.81267I$	$0.238643 + 0.120411I$
$u = -0.415603 + 1.038040I$ $a = -1.122088 - 0.780611I$ $b = 0.358377 + 1.024715I$	$-1.31778 - 1.81267I$	$0.238643 - 0.120411I$
$u = -0.383207 - 0.705541I$ $a = -0.967703 - 0.255280I$ $b = 0.677207 - 0.483675I$	$-0.118620 + 1.395526I$	$-0.02533 - 5.05336I$
$u = -0.383207 + 0.705541I$ $a = -0.967703 + 0.255280I$ $b = 0.677207 + 0.483675I$	$-0.118620 - 1.395526I$	$-0.02533 + 5.05336I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.300794 - 1.084322I$		
$a = 1.51480 - 0.49850I$	$4.98533 + 0.33539I$	$3.56661 - 1.24180I$
$b = -0.679204 + 0.948835I$		
$u = -0.300794 + 1.084322I$		
$a = 1.51480 + 0.49850I$	$4.98533 - 0.33539I$	$3.56661 + 1.24180I$
$b = -0.679204 - 0.948835I$		
$u = 0.200170 - 1.188261I$		
$a = 0.780533 + 0.412329I$	$1.69351 + 5.28998I$	$1.44744 - 2.87280I$
$b = -0.161391 + 0.528515I$		
$u = 0.200170 + 1.188261I$		
$a = 0.780533 - 0.412329I$	$1.69351 - 5.28998I$	$1.44744 + 2.87280I$
$b = -0.161391 - 0.528515I$		
$u = 0.256879 - 1.171487I$		
$a = -0.501157 - 0.251719I$	$-5.51696 + 2.60444I$	$-1.87192 - 3.52202I$
$b = -0.037264 - 0.694370I$		
$u = 0.256879 + 1.171487I$		
$a = -0.501157 + 0.251719I$	$-5.51696 - 2.60444I$	$-1.87192 + 3.52202I$
$b = -0.037264 + 0.694370I$		
$u = 0.317473 - 1.162932I$		
$a = 0.154438 + 0.071266I$	$-6.27450 - 1.45252I$	$-3.69386 + 3.06697I$
$b = 0.292986 + 0.888064I$		
$u = 0.317473 + 1.162932I$		
$a = 0.154438 - 0.071266I$	$-6.27450 + 1.45252I$	$-3.69386 - 3.06697I$
$b = 0.292986 - 0.888064I$		
$u = 0.407353 - 1.165949I$		
$a = 0.506071 + 0.155532I$	$-0.93634 - 4.10134I$	$0.68047 + 3.80285I$
$b = -0.806184 - 1.160211I$		
$u = 0.407353 + 1.165949I$		
$a = 0.506071 - 0.155532I$	$-0.93634 + 4.10134I$	$0.68047 - 3.80285I$
$b = -0.806184 + 1.160211I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.408316 - 0.340820I$ $a = 1.99468 + 0.57647I$ $b = -0.634475 - 0.306977I$	$1.51394 - 0.22954I$	$7.32004 - 0.16659I$
$u = 0.408316 + 0.340820I$ $a = 1.99468 - 0.57647I$ $b = -0.634475 + 0.306977I$	$1.51394 + 0.22954I$	$7.32004 + 0.16659I$
$u = 0.474576 - 1.100281I$ $a = 0.876075 + 0.945289I$ $b = -1.01572 - 1.85694I$	$-0.74107 - 3.69137I$	$2.28507 + 3.57636I$
$u = 0.474576 + 1.100281I$ $a = 0.876075 - 0.945289I$ $b = -1.01572 + 1.85694I$	$-0.74107 + 3.69137I$	$2.28507 - 3.57636I$
$u = 0.489385 - 1.020536I$ $a = -0.73730 - 1.87526I$ $b = 0.80890 + 2.61389I$	$8.41785 - 2.99724I$	$2.95548 + 6.50316I$
$u = 0.489385 + 1.020536I$ $a = -0.73730 + 1.87526I$ $b = 0.80890 - 2.61389I$	$8.41785 + 2.99724I$	$2.95548 - 6.50316I$
$u = 0.519996 - 0.547883I$ $a = -2.32081 - 0.85440I$ $b = 1.26836 + 0.79151I$	$9.84168 - 1.12988I$	$9.58308 - 2.02440I$
$u = 0.519996 + 0.547883I$ $a = -2.32081 + 0.85440I$ $b = 1.26836 - 0.79151I$	$9.84168 + 1.12988I$	$9.58308 + 2.02440I$
$u = 0.529853 - 1.145981I$ $a = -1.52227 - 0.67028I$ $b = 1.57653 + 1.70925I$	$-4.82761 - 6.67077I$	$-1.71165 + 4.27909I$
$u = 0.529853 + 1.145981I$ $a = -1.52227 + 0.67028I$ $b = 1.57653 - 1.70925I$	$-4.82761 + 6.67077I$	$-1.71165 - 4.27909I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.563371 - 1.148481I$ $a = 1.83281 + 0.72402I$ $b = -1.82096 - 1.79311I$	$-3.44622 - 10.79077I$	$1.49962 + 9.34961I$
$u = 0.563371 + 1.148481I$ $a = 1.83281 - 0.72402I$ $b = -1.82096 + 1.79311I$	$-3.44622 + 10.79077I$	$1.49962 - 9.34961I$
$u = 0.589598 - 1.147369I$ $a = -2.06378 - 0.78967I$ $b = 1.99762 + 1.87781I$	$4.3011 - 13.5338I$	$4.49876 + 8.15018I$
$u = 0.589598 + 1.147369I$ $a = -2.06378 + 0.78967I$ $b = 1.99762 - 1.87781I$	$4.3011 + 13.5338I$	$4.49876 - 8.15018I$
$u = 0.740406 - 0.223770I$ $a = -1.23578 - 0.72281I$ $b = -0.273306 + 0.791248I$	$-2.16539 + 1.90010I$	$1.028545 - 0.515555I$
$u = 0.740406 + 0.223770I$ $a = -1.23578 + 0.72281I$ $b = -0.273306 - 0.791248I$	$-2.16539 - 1.90010I$	$1.028545 + 0.515555I$
$u = 0.756423$ $a = 1.03589$ $b = 0.548801$	2.53581	4.50795
$u = 0.793549 - 0.293043I$ $a = 1.18008 + 1.02485I$ $b = 0.308842 - 1.163197I$	$-0.91928 + 5.72397I$	$4.37797 - 6.08222I$
$u = 0.793549 + 0.293043I$ $a = 1.18008 - 1.02485I$ $b = 0.308842 + 1.163197I$	$-0.91928 - 5.72397I$	$4.37797 + 6.08222I$
$u = 0.829568 - 0.338452I$ $a = -1.15687 - 1.24852I$ $b = -0.32193 + 1.44354I$	$6.71685 + 8.26103I$	$7.30202 - 4.55405I$
Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.829568 + 0.338452I$ $a = -1.15687 + 1.24852I$ $b = -0.32193 - 1.44354I$	$6.71685 - 8.26103I$	$7.30202 + 4.55405I$

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u^2 + u + 1)^2(u^{51} + 3u^{50} + \dots + 4u + 1)$
c_2	$(u^2 + u + 1)^2(u^{51} + 25u^{50} + \dots - 2u - 1)$
c_3, c_8	$u^4(u^{51} + u^{50} + \dots - 100u^2 + 16)$
c_4	$(u^2 - u + 1)^2(u^{51} + 3u^{50} + \dots + 4u + 1)$
c_5	$(u^2 + u + 1)^2(u^{51} + 3u^{50} + \dots - 488u - 241)$
c_6, c_7	$(u^2 - u - 1)^2(u^{51} + 3u^{50} + \dots + 3u^2 + 1)$
c_9, c_{10}	$(u^2 + u - 1)^2(u^{51} + 3u^{50} + \dots + 3u^2 + 1)$
c_{11}	$(u^2 + u - 1)^2(u^{51} + 13u^{50} + \dots + 102u - 7)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_4	$(y^2 + y + 1)^2(y^{51} + 25y^{50} + \dots - 2y - 1)$
c_2	$(y^2 + y + 1)^2(y^{51} + 5y^{50} + \dots - 42y - 1)$
c_3, c_8	$y^4(y^{51} - 25y^{50} + \dots + 3200y - 256)$
c_5	$(y^2 + y + 1)^2(y^{51} - 15y^{50} + \dots + 378406y - 58081)$
c_6, c_7, c_9 c_{10}	$(y^2 - 3y + 1)^2(y^{51} - 59y^{50} + \dots - 6y - 1)$
c_{11}	$(y^2 - 3y + 1)^2(y^{51} + y^{50} + \dots + 27134y - 49)$