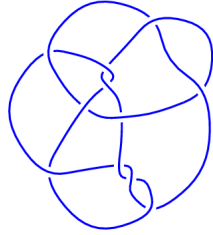
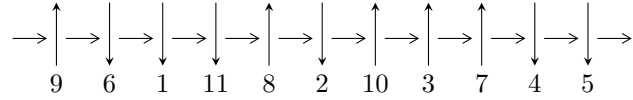


11a₃₁₆ (K11a₃₁₆)

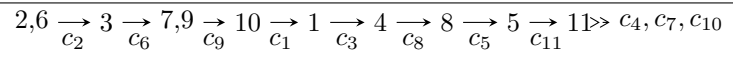


1

Arc Sequences



Solving Sequence



Representation Ideals

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

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

$$I_2^u = \langle u^{62} + 2u^{61} + \dots - u + 1, 1.84297 \times 10^{92}u^{61} + 4.82420 \times 10^{92}u^{60} + \dots + 8.95123 \times 10^{92}b + 3.45436 \times 10^{92}, \\ 8.94450 \times 10^{92}u^{61} + 1.54943 \times 10^{93}u^{60} + \dots + 8.95123 \times 10^{92}a - 8.71238 \times 10^{92} \rangle$$

There are 2 irreducible components with 64 representations.

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

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

(i) Arc colorings

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

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

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

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

$$a_9 = \begin{pmatrix} \frac{3}{5}u + \frac{4}{5} \\ \frac{3}{5}u + \frac{1}{5} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{8}{5}u + \frac{4}{5} \\ -\frac{3}{5}u + \frac{1}{5} \end{pmatrix}$$

$$a_1 = \begin{pmatrix} \frac{1}{5}u + \frac{7}{5} \\ 0.2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u - \frac{1}{5} \\ -\frac{4}{5}u + \frac{4}{5} \end{pmatrix}$$

$$a_8 = \begin{pmatrix} \frac{3}{5}u + \frac{4}{5} \\ \frac{3}{5}u + \frac{1}{5} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -\frac{2}{5}u - \frac{3}{5} \\ \frac{4}{5}u - \frac{1}{5} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{2}{5}u + \frac{9}{5} \\ u - \frac{13}{5} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{2}{5}u + \frac{9}{5} \\ u - \frac{13}{5} \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.61803$ $a = -0.170820$ $b = -0.447214$	-7.23771	-36.2997
$u = 0.618034$ $a = 1.17082$ $b = 0.447214$	0.657974	-4.10031

II.

$$I_2^u = \langle u^{62} + 2u^{61} + \dots - u + 1, 1.84 \times 10^{92} u^{61} + 4.82 \times 10^{92} u^{60} + \dots + 8.95 \times 10^{92} b + 3.45 \times 10^{92}, 8.94 \times 10^{92} u^{61} + 1.55 \times 10^{93} u^{60} + \dots + 8.95 \times 10^{92} a - 8.71 \times 10^{92} \rangle$$

(i) Arc colorings

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

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

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

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

$$a_9 = \begin{pmatrix} -0.999248u^{61} - 1.73097u^{60} + \dots + 7.69342u + 0.973316 \\ -0.205890u^{61} - 0.538943u^{60} + \dots + 3.64802u - 0.385909 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -1.05698u^{61} - 1.86841u^{60} + \dots + 9.03892u + 0.832957 \\ -0.148160u^{61} - 0.401509u^{60} + \dots + 2.30253u - 0.245549 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.246699u^{61} - 1.81043u^{60} + \dots + 0.744103u + 2.83504 \\ 0.707800u^{61} + 2.51840u^{60} + \dots - 1.83028u + 1.52032 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -1.05477u^{61} - 0.547610u^{60} + \dots - 2.96099u + 2.37771 \\ 0.820020u^{61} - 0.0638714u^{60} + \dots + 1.79809u - 1.19452 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.959644u^{61} - 1.67641u^{60} + \dots + 5.31217u + 1.09170 \\ -0.173212u^{61} - 0.489459u^{60} + \dots + 3.58377u - 0.361261 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -0.358021u^{61} - 0.474970u^{60} + \dots + 1.00388u - 1.17136 \\ 1.24252u^{61} + 2.05157u^{60} + \dots - 0.491103u - 0.185903 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0.357662u^{61} - 0.0949908u^{60} + \dots + 3.57658u + 2.71513 \\ -0.804722u^{61} - 0.507984u^{60} + \dots - 1.17519u + 1.21328 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0.357662u^{61} - 0.0949908u^{60} + \dots + 3.57658u + 2.71513 \\ -0.804722u^{61} - 0.507984u^{60} + \dots - 1.17519u + 1.21328 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.226348 - 0.108993I$		
$a = 0.0661823 + 0.0471175I$	$2.26101 - 1.03760I$	$3.34506 + 2.53811I$
$b = 0.929307 - 0.272262I$		
$u = -1.226348 + 0.108993I$		
$a = 0.0661823 - 0.0471175I$	$2.26101 + 1.03760I$	$3.34506 - 2.53811I$
$b = 0.929307 + 0.272262I$		
$u = -1.113744 - 0.125687I$		
$a = 0.089861 + 0.137808I$	$-0.48145 - 10.21060I$	$-1.39697 + 7.43753I$
$b = 1.010022 - 0.625330I$		
$u = -1.113744 + 0.125687I$		
$a = 0.089861 - 0.137808I$	$-0.48145 + 10.21060I$	$-1.39697 - 7.43753I$
$b = 1.010022 + 0.625330I$		
$u = -0.658314 - 0.044052I$		
$a = 0.542092 - 0.296560I$	$-4.39333 + 5.67407I$	$-6.68227 - 4.64377I$
$b = -0.561727 - 0.990219I$		
$u = -0.658314 + 0.044052I$		
$a = 0.542092 + 0.296560I$	$-4.39333 - 5.67407I$	$-6.68227 + 4.64377I$
$b = -0.561727 + 0.990219I$		
$u = -0.65526 - 1.45235I$		
$a = -0.470916 - 0.489439I$	$3.38499 + 3.70672I$	$5.40950 - 3.23486I$
$b = 0.837326 - 0.219954I$		
$u = -0.65526 + 1.45235I$		
$a = -0.470916 + 0.489439I$	$3.38499 - 3.70672I$	$5.40950 + 3.23486I$
$b = 0.837326 + 0.219954I$		
$u = -0.550805 - 0.317440I$		
$a = 0.250174 - 0.088130I$	$-1.008560 - 0.666322I$	$-7.37810 + 3.95165I$
$b = -0.153184 - 0.532409I$		
$u = -0.550805 + 0.317440I$		
$a = 0.250174 + 0.088130I$	$-1.008560 + 0.666322I$	$-7.37810 - 3.95165I$
$b = -0.153184 + 0.532409I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.54540 - 1.46800I$ $a = -0.926837 - 0.284383I$ $b = 1.115702 - 0.565795I$	$6.81266 - 5.56177I$	$4.66163 + 5.86539I$
$u = -0.54540 + 1.46800I$ $a = -0.926837 + 0.284383I$ $b = 1.115702 + 0.565795I$	$6.81266 + 5.56177I$	$4.66163 - 5.86539I$
$u = -0.50790 - 1.42710I$ $a = -1.343186 - 0.183181I$ $b = 1.41397 - 0.80252I$	$7.18631 - 7.01551I$	$2.90347 + 3.14427I$
$u = -0.50790 + 1.42710I$ $a = -1.343186 + 0.183181I$ $b = 1.41397 + 0.80252I$	$7.18631 + 7.01551I$	$2.90347 - 3.14427I$
$u = -0.49535 - 1.40480I$ $a = -1.59941 - 0.06233I$ $b = 1.57693 - 0.99221I$	$4.3271 - 15.8582I$	$0.74909 + 8.45650I$
$u = -0.49535 + 1.40480I$ $a = -1.59941 + 0.06233I$ $b = 1.57693 + 0.99221I$	$4.3271 + 15.8582I$	$0.74909 - 8.45650I$
$u = -0.466688 - 0.056845I$ $a = 0.016943 + 0.880133I$ $b = -0.936524 + 0.341014I$	$-2.34840 + 0.48442I$	$-4.81285 + 0.96835I$
$u = -0.466688 + 0.056845I$ $a = 0.016943 - 0.880133I$ $b = -0.936524 - 0.341014I$	$-2.34840 - 0.48442I$	$-4.81285 - 0.96835I$
$u = -0.320326 - 1.224200I$ $a = 1.91360 - 0.25677I$ $b = -0.900571 + 0.644914I$	$-0.80126 - 9.32026I$	$-0.56370 + 8.17638I$
$u = -0.320326 + 1.224200I$ $a = 1.91360 + 0.25677I$ $b = -0.900571 - 0.644914I$	$-0.80126 + 9.32026I$	$-0.56370 - 8.17638I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.277759 - 1.120725I$ $a = 1.47905 + 0.20875I$ $b = -0.914383 + 0.159828I$	$1.45921 - 2.58594I$	$-1.55168 + 3.98149I$
$u = -0.277759 + 1.120725I$ $a = 1.47905 - 0.20875I$ $b = -0.914383 - 0.159828I$	$1.45921 + 2.58594I$	$-1.55168 - 3.98149I$
$u = -0.266596 - 0.292059I$ $a = -0.41328 + 3.31809I$ $b = -1.058607 - 0.761511I$	$3.63336 - 1.04794I$	$2.34672 + 0.35139I$
$u = -0.266596 + 0.292059I$ $a = -0.41328 - 3.31809I$ $b = -1.058607 + 0.761511I$	$3.63336 + 1.04794I$	$2.34672 - 0.35139I$
$u = -0.245626 - 1.196569I$ $a = 1.86241 + 0.22802I$ $b = -1.109762 + 0.416696I$	$1.22471 - 2.22328I$	$1.72830 + 3.36065I$
$u = -0.245626 + 1.196569I$ $a = 1.86241 - 0.22802I$ $b = -1.109762 - 0.416696I$	$1.22471 + 2.22328I$	$1.72830 - 3.36065I$
$u = -0.168925 - 1.058642I$ $a = 0.71321 + 1.50228I$ $b = -0.83421 - 1.30269I$	$-1.00664 + 2.96825I$	$-0.76468 - 1.87544I$
$u = -0.168925 + 1.058642I$ $a = 0.71321 - 1.50228I$ $b = -0.83421 + 1.30269I$	$-1.00664 - 2.96825I$	$-0.76468 + 1.87544I$
$u = -0.118148 - 1.022893I$ $a = 3.66595 + 1.82260I$ $b = -3.75706 - 0.98838I$	$0.03983 - 2.79266I$	$11.94643 + 2.94472I$
$u = -0.118148 + 1.022893I$ $a = 3.66595 - 1.82260I$ $b = -3.75706 + 0.98838I$	$0.03983 + 2.79266I$	$11.94643 - 2.94472I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.090353 - 1.257009I$ $a = 1.23556 + 0.99864I$ $b = -0.822239 + 0.355328I$	$8.09797 - 2.26515I$	$10.09980 + 3.27421I$
$u = -0.090353 + 1.257009I$ $a = 1.23556 - 0.99864I$ $b = -0.822239 - 0.355328I$	$8.09797 + 2.26515I$	$10.09980 - 3.27421I$
$u = 0.055369 - 1.146576I$ $a = -1.186711 - 0.506164I$ $b = 1.06745 + 1.54986I$	$4.30759 + 0.97665I$	$-0.516718 - 1.197110I$
$u = 0.055369 + 1.146576I$ $a = -1.186711 + 0.506164I$ $b = 1.06745 - 1.54986I$	$4.30759 - 0.97665I$	$-0.516718 + 1.197110I$
$u = 0.061581 - 1.260213I$ $a = -0.880801 + 1.072764I$ $b = 0.592279 + 0.347209I$	$4.49072 - 1.35832I$	$5.77140 + 0.97290I$
$u = 0.061581 + 1.260213I$ $a = -0.880801 - 1.072764I$ $b = 0.592279 - 0.347209I$	$4.49072 + 1.35832I$	$5.77140 - 0.97290I$
$u = 0.113786 - 1.261433I$ $a = -1.50072 + 0.99812I$ $b = 0.973051 + 0.319989I$	$3.91657 + 5.96640I$	$4.70782 - 6.24297I$
$u = 0.113786 + 1.261433I$ $a = -1.50072 - 0.99812I$ $b = 0.973051 - 0.319989I$	$3.91657 - 5.96640I$	$4.70782 + 6.24297I$
$u = 0.185559 - 1.050580I$ $a = -1.34463 + 1.23126I$ $b = 1.32068 - 0.83350I$	$3.55015 + 0.20409I$	$5.98628 + 1.19975I$
$u = 0.185559 + 1.050580I$ $a = -1.34463 - 1.23126I$ $b = 1.32068 + 0.83350I$	$3.55015 - 0.20409I$	$5.98628 - 1.19975I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.188577 - 0.364096I$ $a = 0.20443 + 3.96154I$ $b = 0.84113 - 1.17897I$	$-0.11388 - 2.17095I$	$-4.83160 + 3.47030I$
$u = 0.188577 + 0.364096I$ $a = 0.20443 - 3.96154I$ $b = 0.84113 + 1.17897I$	$-0.11388 + 2.17095I$	$-4.83160 - 3.47030I$
$u = 0.207449$ $a = 3.77069$ $b = 0.573655$	1.30954	9.93956
$u = 0.299504 - 1.211219I$ $a = -1.88201 - 0.08991I$ $b = 0.957244 + 0.548690I$	$3.96361 + 5.62230I$	$4.59110 - 7.16807I$
$u = 0.299504 + 1.211219I$ $a = -1.88201 + 0.08991I$ $b = 0.957244 - 0.548690I$	$3.96361 - 5.62230I$	$4.59110 + 7.16807I$
$u = 0.341543 - 0.277716I$ $a = 0.11973 + 2.81257I$ $b = 1.31181 - 0.54651I$	$-0.57816 + 4.41700I$	$-2.90527 - 4.08329I$
$u = 0.341543 + 0.277716I$ $a = 0.11973 - 2.81257I$ $b = 1.31181 + 0.54651I$	$-0.57816 - 4.41700I$	$-2.90527 + 4.08329I$
$u = 0.394127 - 1.133119I$ $a = -1.214880 - 0.299863I$ $b = 0.470685 + 0.349300I$	$-4.26849 + 2.33228I$	$-5.41476 - 2.55374I$
$u = 0.394127 + 1.133119I$ $a = -1.214880 + 0.299863I$ $b = 0.470685 - 0.349300I$	$-4.26849 - 2.33228I$	$-5.41476 + 2.55374I$
$u = 0.46376 - 1.46899I$ $a = 1.064702 + 0.158675I$ $b = -1.06320 - 0.97967I$	$-1.16526 + 6.77623I$	$-1.26226 - 6.46265I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.46376 + 1.46899I$ $a = 1.064702 - 0.158675I$ $b = -1.06320 + 0.97967I$	$-1.16526 - 6.77623I$	$-1.26226 + 6.46265I$
$u = 0.50118 - 1.41253I$ $a = 1.50871 - 0.13372I$ $b = -1.52945 - 0.90219I$	$9.4690 + 11.6120I$	$5.02297 - 7.15875I$
$u = 0.50118 + 1.41253I$ $a = 1.50871 + 0.13372I$ $b = -1.52945 + 0.90219I$	$9.4690 - 11.6120I$	$5.02297 + 7.15875I$
$u = 0.589382 - 0.058868I$ $a = -0.388375 - 0.370506I$ $b = 0.586967 - 0.761456I$	$0.49280 - 2.22863I$	$-1.88873 + 4.27642I$
$u = 0.589382 + 0.058868I$ $a = -0.388375 + 0.370506I$ $b = 0.586967 + 0.761456I$	$0.49280 + 2.22863I$	$-1.88873 - 4.27642I$
$u = 0.59848 - 1.46855I$ $a = 0.690335 - 0.423759I$ $b = -0.981364 - 0.361154I$	$8.77447 + 0.73219I$	$8.26642 - 0.24787I$
$u = 0.59848 + 1.46855I$ $a = 0.690335 + 0.423759I$ $b = -0.981364 + 0.361154I$	$8.77447 - 0.73219I$	$8.26642 + 0.24787I$
$u = 0.801731 - 0.247306I$ $a = -0.346425 - 0.007335I$ $b = -0.099675 - 0.837866I$	$-7.01139 + 2.01626I$	$-9.35384 - 3.40733I$
$u = 0.801731 + 0.247306I$ $a = -0.346425 + 0.007335I$ $b = -0.099675 + 0.837866I$	$-7.01139 - 2.01626I$	$-9.35384 + 3.40733I$
$u = 1.152512 - 0.122537I$ $a = -0.0728364 + 0.0995513I$ $b = -1.001116 - 0.478447I$	$4.62237 + 5.84398I$	$3.48358 - 6.22366I$
Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.152512 + 0.122537I$ $a = -0.0728364 - 0.0995513I$ $b = -1.001116 + 0.478447I$	$4.62237 - 5.84398I$	$3.48358 + 6.22366I$
$u = 1.71345$ $a = -0.0745109$ $b = -0.536613$	-7.12923	37.6282

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(5u^2 - 1)(10u^{62} + 14u^{61} + \dots + 200076u - 56034)$
c_2	$(u^2 + u - 1)(u^{62} + 2u^{61} + \dots - u + 1)$
c_3	$(u^2 + 3u + 1)(u^{62} + 6u^{61} + \dots - 795u - 117)$
c_4	$(u^2 - u - 1)(u^{62} + 2u^{61} + \dots - 3u + 1)$
c_5	$(5u^2 + 5u + 1)(5u^{62} + 14u^{61} + \dots - 61755u + 8377)$
c_6	$(u^2 - u - 1)(u^{62} + 2u^{61} + \dots - u + 1)$
c_7	$(u + 1)^2(u^{62} + 3u^{61} + \dots + 214u - 25)$
c_8	$u^2(u^{62} + u^{61} + \dots + 280u - 100)$
c_9	$(u - 1)^2(u^{62} + 3u^{61} + \dots + 214u - 25)$
c_{10}	$(u^2 + u - 1)(u^{62} + 2u^{61} + \dots - 3u + 1)$
c_{11}	$(u^2 + u - 1)(u^{62} + 2u^{61} + \dots - 3u + 1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1	$(5y - 1)^2$ $(900y^{62} - 47124y^{61} + \dots - 556472892600y + 28258282400)$
c_2, c_6	$(y^2 - 3y + 1)(y^{62} + 42y^{61} + \dots - 25y + 1)$
c_3	$(y^2 - 7y + 1)(y^{62} + 18y^{61} + \dots - 440613y + 13689)$
c_4	$(y^2 - 3y + 1)(y^{62} - 54y^{61} + \dots - 25y + 1)$
c_5	$(25y^2 - 15y + 1)$ $(1050y^{62} - 12012y^{61} + \dots - 54282378400y + 2947313418)$
c_7, c_9	$(y - 1)^2(y^{62} - 49y^{61} + \dots - 22596y + 625)$
c_8	$y^2(y^{62} - 15y^{61} + \dots - 413000y + 10000)$
c_{10}	$(y^2 - 3y + 1)(y^{62} - 54y^{61} + \dots - 25y + 1)$
c_{11}	$(y^2 - 3y + 1)(y^{62} - 54y^{61} + \dots - 25y + 1)$