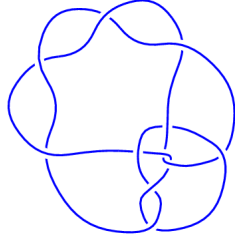
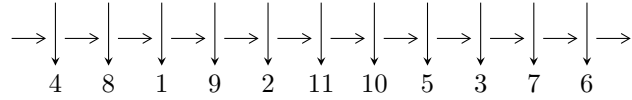


11a₂₉₉ (K11a₂₉₉)

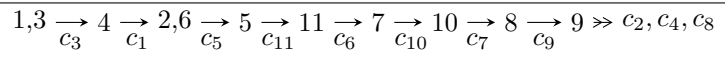


1

Arc Sequences



Solving Sequence



Representation Ideals

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

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

$$I_2^u = \langle u^{51} + 4u^{50} + \dots - 49u - 25, 1.73640 \times 10^{65}u^{50} + 5.49678 \times 10^{65}u^{49} + \dots + 1.64457 \times 10^{65}b - 5.18267 \times 10^{65} \\ - 2.66280 \times 10^{66}u^{50} - 7.12472 \times 10^{66}u^{49} + \dots + 8.22283 \times 10^{66}a - 3.83237 \times 10^{66} \rangle$$

There are 2 irreducible components with 54 representations.

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

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

(i) Arc colorings

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

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

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

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

$$a_6 = \begin{pmatrix} -\frac{1}{5}b^2 - \frac{2}{5}b - \frac{4}{5} \\ b \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -\frac{1}{5}b^2 - \frac{2}{5}b - \frac{4}{5} \\ \frac{1}{5}b^2 + \frac{7}{5}b + \frac{4}{5} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{1}{5}b^2 + \frac{2}{5}b + \frac{4}{5} \\ -b^2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -\frac{2}{5}b^2 - \frac{4}{5}b - \frac{3}{5} \\ -b^2 - b - 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{3}{5}b^2 + \frac{1}{5}b + \frac{2}{5} \\ -b^2 - b - 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 0 \\ -b^2 - 2b - 2 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} \frac{3}{5}b^2 + \frac{1}{5}b + \frac{2}{5} \\ -\frac{8}{5}b^2 - \frac{6}{5}b - \frac{7}{5} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} \frac{3}{5}b^2 + \frac{1}{5}b + \frac{2}{5} \\ -\frac{8}{5}b^2 - \frac{6}{5}b - \frac{7}{5} \end{pmatrix}$$

(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
$u = 1.00000$ $a = -0.637007$ $b = -0.569840$	-2.75839	-14.9031
$u = 1.00000$ $a = -0.381496 + 0.410401I$ $b = -0.215080 - 1.307141I$	$1.37919 - 2.82812I$	$-14.9284 + 3.3378I$
$u = 1.00000$ $a = -0.381496 - 0.410401I$ $b = -0.215080 + 1.307141I$	$1.37919 + 2.82812I$	$-14.9284 - 3.3378I$

$$\text{II. } I_2^u = \langle u^{51} + 4u^{50} + \dots - 49u - 25, 1.74 \times 10^{65} u^{50} + 5.50 \times 10^{65} u^{49} + \dots + 1.64 \times 10^{65} b - 5.18 \times 10^{66}, -2.66 \times 10^{66} u^{50} - 7.12 \times 10^{66} u^{49} + \dots + 8.22 \times 10^{66} a - 3.83 \times 10^{66} \rangle$$

(i) Arc colorings

$$\begin{aligned} a_1 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_3 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\ a_4 &= \begin{pmatrix} -u \\ u \end{pmatrix} \\ a_2 &= \begin{pmatrix} -u^2 + 1 \\ u^2 \end{pmatrix} \\ a_6 &= \begin{pmatrix} 0.323830u^{50} + 0.866457u^{49} + \dots - 9.10394u + 0.466064 \\ -1.05584u^{50} - 3.34239u^{49} + \dots + 23.6711u + 31.5139 \end{pmatrix} \\ a_5 &= \begin{pmatrix} 0.189742u^{50} + 0.584034u^{49} + \dots - 5.52625u + 1.24281 \\ -1.79580u^{50} - 5.77878u^{49} + \dots + 39.9107u + 50.9480 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} 0.445659u^{50} + 1.37893u^{49} + \dots - 17.6080u - 14.3558 \\ 0.122342u^{50} + 0.664939u^{49} + \dots - 3.14254u - 8.39179 \end{pmatrix} \\ a_7 &= \begin{pmatrix} 0.762366u^{50} + 2.21591u^{49} + \dots - 28.5399u - 26.4849 \\ 0.710038u^{50} + 2.35049u^{49} + \dots - 17.6295u - 24.1743 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} 0.0779482u^{50} + 0.351189u^{49} + \dots + 8.86230u + 4.60922 \\ -0.926742u^{50} - 2.85371u^{49} + \dots + 15.8059u + 23.8797 \end{pmatrix} \\ a_8 &= \begin{pmatrix} 0.488327u^{50} + 1.46749u^{49} + \dots - 17.7433u - 15.1867 \\ 2.26776u^{50} + 7.28910u^{49} + \dots - 50.9593u - 68.9021 \end{pmatrix} \\ a_9 &= \begin{pmatrix} 0.0779482u^{50} + 0.351189u^{49} + \dots + 8.86230u + 4.60922 \\ -1.00165u^{50} - 3.14194u^{49} + \dots + 11.9267u + 22.8948 \end{pmatrix} \\ a_9 &= \begin{pmatrix} 0.0779482u^{50} + 0.351189u^{49} + \dots + 8.86230u + 4.60922 \\ -1.00165u^{50} - 3.14194u^{49} + \dots + 11.9267u + 22.8948 \end{pmatrix} \end{aligned}$$

(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
$u = -1.30371 - 0.73473I$ $a = -1.36012 + 1.44880I$ $b = -0.16225 - 1.65033I$	$11.0558 - 14.3418I$	$-5.64679 + 7.44685I$
$u = -1.30371 + 0.73473I$ $a = -1.36012 - 1.44880I$ $b = -0.16225 + 1.65033I$	$11.0558 + 14.3418I$	$-5.64679 - 7.44685I$
$u = -1.242445 - 0.646879I$ $a = -0.822718 + 0.850455I$ $b = -0.552527 - 0.820307I$	$2.62483 - 11.59537I$	$-7.79067 + 8.85645I$
$u = -1.242445 + 0.646879I$ $a = -0.822718 - 0.850455I$ $b = -0.552527 + 0.820307I$	$2.62483 + 11.59537I$	$-7.79067 - 8.85645I$
$u = -1.192413 - 0.594620I$ $a = 1.35362 - 1.24885I$ $b = 0.17216 + 1.64138I$	$7.44997 - 8.60283I$	$-8.37609 + 5.25476I$
$u = -1.192413 + 0.594620I$ $a = 1.35362 + 1.24885I$ $b = 0.17216 - 1.64138I$	$7.44997 + 8.60283I$	$-8.37609 - 5.25476I$
$u = -1.146744 - 0.549997I$ $a = -0.396576 + 0.218624I$ $b = -0.744224 + 0.089987I$	$0.42114 - 7.27131I$	$-10.81656 + 5.67006I$
$u = -1.146744 + 0.549997I$ $a = -0.396576 - 0.218624I$ $b = -0.744224 - 0.089987I$	$0.42114 + 7.27131I$	$-10.81656 - 5.67006I$
$u = -1.090942 - 0.461623I$ $a = 0.878372 - 0.695545I$ $b = 0.589306 + 0.788540I$	$-0.80955 - 5.70999I$	$-10.32903 + 7.24097I$
$u = -1.090942 + 0.461623I$ $a = 0.878372 + 0.695545I$ $b = 0.589306 - 0.788540I$	$-0.80955 + 5.70999I$	$-10.32903 - 7.24097I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.946910 - 0.304002I$ $a = 0.558232 - 0.204153I$ $b = 0.773905 - 0.191317I$	$-2.64708 - 1.15805I$	$-10.73331 + 5.02870I$
$u = -0.946910 + 0.304002I$ $a = 0.558232 + 0.204153I$ $b = 0.773905 + 0.191317I$	$-2.64708 + 1.15805I$	$-10.73331 - 5.02870I$
$u = -0.946433 - 0.502421I$ $a = -0.142015 - 0.509292I$ $b = -0.433100 + 0.988087I$	$3.75291 - 3.24873I$	$-5.67642 + 3.82013I$
$u = -0.946433 + 0.502421I$ $a = -0.142015 + 0.509292I$ $b = -0.433100 - 0.988087I$	$3.75291 + 3.24873I$	$-5.67642 - 3.82013I$
$u = -0.905265 - 0.615337I$ $a = -1.72995 + 1.00752I$ $b = -0.15866 - 1.61313I$	$12.51666 - 3.55318I$	$-3.48726 + 3.50374I$
$u = -0.905265 + 0.615337I$ $a = -1.72995 - 1.00752I$ $b = -0.15866 + 1.61313I$	$12.51666 + 3.55318I$	$-3.48726 - 3.50374I$
$u = -0.780971 - 0.062434I$ $a = 0.402433 + 0.077190I$ $b = 0.309159 - 1.281953I$	$1.88408 + 2.74356I$	$0.924641 - 0.548389I$
$u = -0.780971 + 0.062434I$ $a = 0.402433 - 0.077190I$ $b = 0.309159 + 1.281953I$	$1.88408 - 2.74356I$	$0.924641 + 0.548389I$
$u = -0.705356 - 0.642035I$ $a = 0.20913 - 1.59187I$ $b = -0.08999 + 1.68712I$	$13.10850 - 1.33730I$	$-2.96652 + 3.64874I$
$u = -0.705356 + 0.642035I$ $a = 0.20913 + 1.59187I$ $b = -0.08999 - 1.68712I$	$13.10850 + 1.33730I$	$-2.96652 - 3.64874I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.630583 - 0.557769I$ $a = -1.37248 + 0.75536I$ $b = -0.493565 - 0.692270I$	$4.68147 - 1.04951I$	$-4.16172 + 4.32794I$
$u = -0.630583 + 0.557769I$ $a = -1.37248 - 0.75536I$ $b = -0.493565 + 0.692270I$	$4.68147 + 1.04951I$	$-4.16172 - 4.32794I$
$u = -0.388723 - 1.311466I$ $a = -0.06337 - 2.06962I$ $b = -0.10468 + 1.64228I$	$14.0417 + 7.2484I$	$-3.17711 - 4.95121I$
$u = -0.388723 + 1.311466I$ $a = -0.06337 + 2.06962I$ $b = -0.10468 - 1.64228I$	$14.0417 - 7.2484I$	$-3.17711 + 4.95121I$
$u = -0.295900 - 1.111291I$ $a = 0.073153 - 0.851180I$ $b = -0.376973 + 0.809467I$	$5.59371 + 5.41403I$	$-4.14016 - 6.52359I$
$u = -0.295900 + 1.111291I$ $a = 0.073153 + 0.851180I$ $b = -0.376973 - 0.809467I$	$5.59371 - 5.41403I$	$-4.14016 + 6.52359I$
$u = -0.252564 - 0.754785I$ $a = -0.227405 + 0.610176I$ $b = -0.535402 + 0.073202I$	$3.00953 + 2.35838I$	$-8.15249 - 2.65728I$
$u = -0.252564 + 0.754785I$ $a = -0.227405 - 0.610176I$ $b = -0.535402 - 0.073202I$	$3.00953 - 2.35838I$	$-8.15249 + 2.65728I$
$u = -0.227052 - 0.900508I$ $a = -0.24490 + 2.22849I$ $b = 0.08123 - 1.64771I$	$10.29886 + 3.16367I$	$-6.11967 - 1.96636I$
$u = -0.227052 + 0.900508I$ $a = -0.24490 - 2.22849I$ $b = 0.08123 + 1.64771I$	$10.29886 - 3.16367I$	$-6.11967 + 1.96636I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.109405 - 0.536765I$ $a = -0.614217 + 0.917044I$ $b = 0.249787 - 0.812726I$	$1.73380 + 1.81855I$	$-6.35906 - 4.36354I$
$u = -0.109405 + 0.536765I$ $a = -0.614217 - 0.917044I$ $b = 0.249787 + 0.812726I$	$1.73380 - 1.81855I$	$-6.35906 + 4.36354I$
$u = 0.221051$ $a = -1.14734$ $b = 0.295696$	-0.590385	-17.0961
$u = 0.810890 - 0.116476I$ $a = 4.65367 + 3.25743I$ $b = 0.02693 - 1.61334I$	$9.33157 + 0.28182I$	$-8.77049 + 5.04634I$
$u = 0.810890 + 0.116476I$ $a = 4.65367 - 3.25743I$ $b = 0.02693 + 1.61334I$	$9.33157 - 0.28182I$	$-8.77049 - 5.04634I$
$u = 0.853695 - 0.091512I$ $a = 2.12342 - 2.78746I$ $b = 0.128736 + 0.681128I$	$1.377801 + 0.247335I$	$-11.41702 + 6.59841I$
$u = 0.853695 + 0.091512I$ $a = 2.12342 + 2.78746I$ $b = 0.128736 - 0.681128I$	$1.377801 - 0.247335I$	$-11.41702 - 6.59841I$
$u = 0.97738 - 1.08187I$ $a = 0.75063 + 2.09644I$ $b = 0.06969 - 1.58540I$	$7.57583 + 5.34940I$	$-7.06162 - 6.81779I$
$u = 0.97738 + 1.08187I$ $a = 0.75063 - 2.09644I$ $b = 0.06969 + 1.58540I$	$7.57583 - 5.34940I$	$-7.06162 + 6.81779I$
$u = 1.005707 - 0.788996I$ $a = 0.399512 + 0.976707I$ $b = 0.328726 - 0.602476I$	$0.09032 + 4.00238I$	$-9.47119 - 9.47766I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.005707 + 0.788996I$ $a = 0.399512 - 0.976707I$ $b = 0.328726 + 0.602476I$	$0.09032 - 4.00238I$	$-9.47119 + 9.47766I$
$u = 1.111791 - 0.441573I$ $a = 0.060256 - 0.284505I$ $b = 0.339596 + 0.188204I$	$-1.01423 + 1.50344I$	$-14.02114 - 0.26378I$
$u = 1.111791 + 0.441573I$ $a = 0.060256 + 0.284505I$ $b = 0.339596 - 0.188204I$	$-1.01423 - 1.50344I$	$-14.02114 + 0.26378I$
$u = 1.143792 - 0.267385I$ $a = -0.828284 - 0.546247I$ $b = -0.235448 + 0.507844I$	$-1.46138 + 0.98661I$	$-12.15795 - 1.22039I$
$u = 1.143792 + 0.267385I$ $a = -0.828284 + 0.546247I$ $b = -0.235448 - 0.507844I$	$-1.46138 - 0.98661I$	$-12.15795 + 1.22039I$
$u = 1.194401 - 0.595818I$ $a = -1.21718 - 1.56119I$ $b = -0.04180 + 1.57969I$	$5.80181 + 1.83329I$	$-10.40385 - 0.42256I$
$u = 1.194401 + 0.595818I$ $a = -1.21718 + 1.56119I$ $b = -0.04180 - 1.57969I$	$5.80181 - 1.83329I$	$-10.40385 + 0.42256I$
$u = 1.345023 - 0.069345I$ $a = -0.435107 - 0.319469I$ $b = -0.271262 + 0.396700I$	$-1.67074 + 1.07820I$	$-12.01082 - 5.84608I$
$u = 1.345023 + 0.069345I$ $a = -0.435107 + 0.319469I$ $b = -0.271262 - 0.396700I$	$-1.67074 - 1.07820I$	$-12.01082 + 5.84608I$
$u = 1.61221 - 0.25894I$ $a = -0.414432 - 1.003153I$ $b = -0.01718 + 1.55667I$	$5.04838 + 1.69001I$	$-10.14966 - 3.42632I$
Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.61221 + 0.25894I$ $a = -0.414432 + 1.003153I$ $b = -0.01718 - 1.55667I$	$5.04838 - 1.69001I$	$-10.14966 + 3.42632I$

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u - 1)^3(u^{51} + 4u^{50} + \dots - 49u - 25)$
c_2	$u^3(u^{51} + u^{50} + \dots + 380u + 200)$
c_3	$(u + 1)^3(u^{51} + 4u^{50} + \dots - 49u - 25)$
c_4	$(u^3 + u^2 - 1)(u^{51} + 2u^{50} + \dots + 4u + 1)$
c_5	$(5u^3 + 7u^2 + 4u + 1)(5u^{51} + 28u^{50} + \dots - 30u - 857)$
c_6, c_7	$(u^3 - u^2 + 2u - 1)(u^{51} + 2u^{50} + \dots + u^2 - 1)$
c_8	$(u^3 - u^2 + 1)(u^{51} + 2u^{50} + \dots + 4u + 1)$
c_9	$(5u^3 + 4u^2 - u - 1)(5u^{51} + 9u^{50} + \dots + 1703u - 239)$
c_{10}, c_{11}	$(u^3 + u^2 + 2u + 1)(u^{51} + 2u^{50} + \dots + u^2 - 1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_3	$(y - 1)^3(y^{51} - 26y^{50} + \dots + 17851y - 625)$
c_2	$y^3(y^{51} + 21y^{50} + \dots - 118000y - 40000)$
c_4, c_8	$(y^3 - y^2 + 2y - 1)(y^{51} + 28y^{50} + \dots + 2y - 1)$
c_5	$(25y^3 - 9y^2 + 2y - 1)(25y^{51} + 176y^{50} + \dots - 1375442y - 734449)$
c_6, c_7, c_{10} c_{11}	$(y^3 + 3y^2 + 2y - 1)(y^{51} + 60y^{50} + \dots + 2y - 1)$
c_9	$(25y^3 - 26y^2 + 9y - 1)(25y^{51} + 739y^{50} + \dots - 637947y - 57121)$