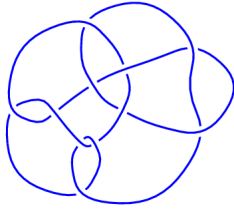
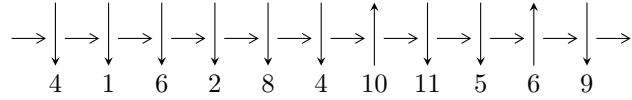


11n₄₃ (K11n₄₃)

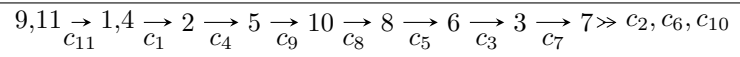


1

Arc Sequences



Solving Sequence



Representation Ideals

$$I = \bigcap_{i=1}^3 I_i^u$$

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

$$I_2^u = \langle u^2 + 6u + 4, 4a - u - 6, 2b - 3u - 4 \rangle$$

$$I_3^u = \langle u^{51} - 10u^{50} + \dots - 1299926u + 166228, \\ - 2.30096 \times 10^{247}u^{50} + 2.14840 \times 10^{248}u^{49} + \dots + 8.58527 \times 10^{249}b + 5.98416 \times 10^{252}, \\ 7.20161 \times 10^{251}u^{50} - 6.71919 \times 10^{252}u^{49} + \dots + 3.56778 \times 10^{254}a - 1.91794 \times 10^{257} \rangle$$

There are 3 irreducible components with 58 representations.

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

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

(i) Arc colorings

$$a_9 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} a \\ -a - 1 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} a + 1 \\ -1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -a \\ 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} a^2 \\ -a - 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -a^2 \\ a^2 + a - 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -a^4 + a^3 + a^2 - 2a + 1 \\ 0 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} -a^4 + a^3 + a^2 - 2a + 1 \\ 0 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -a^4 + a^3 + a^2 - 2a + 1 \\ 0 \end{pmatrix}$$

(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
$u = -1.00000$ $a = -1.41878 - 0.21917I$ $b = 0.418784 + 0.219165I$	$-7.51750 - 4.40083I$	$-22.0438 + 5.2094I$
$u = -1.00000$ $a = -1.41878 + 0.21917I$ $b = 0.418784 - 0.219165I$	$-7.51750 + 4.40083I$	$-22.0438 - 5.2094I$
$u = -1.00000$ $a = 0.309916 - 0.549911I$ $b = -1.30992 + 0.54991I$	$-1.97403 + 1.53058I$	$-13.4575 - 4.4032I$
$u = -1.00000$ $a = 0.309916 + 0.549911I$ $b = -1.30992 - 0.54991I$	$-1.97403 - 1.53058I$	$-13.4575 + 4.4032I$
$u = -1.00000$ $a = 1.21774$ $b = -2.21774$	-4.04602	-2.99735

$$\text{II. } I_2^u = \langle u^2 + 6u + 4, 4a - u - 6, 2b - 3u - 4 \rangle$$

(i) Arc colorings

$$a_9 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{1}{4}u + \frac{3}{2} \\ \frac{3}{2}u + 2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} \frac{1}{4}u + \frac{3}{2} \\ \frac{1}{2}u + 2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -\frac{1}{4}u - \frac{1}{2} \\ \frac{1}{2}u + 2 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0.5 \\ \frac{1}{2}u + 3 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} -\frac{1}{4}u - \frac{3}{2} \\ -\frac{1}{2}u - 2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -\frac{3}{4}u - \frac{7}{2} \\ -\frac{1}{2}u - 2 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u - \frac{9}{2} \\ -\frac{1}{2}u - 3 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -\frac{1}{4}u - \frac{3}{2} \\ -\frac{1}{2}u - 2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -\frac{1}{4}u - \frac{3}{2} \\ -\frac{1}{2}u - 2 \end{pmatrix}$$

(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
$u = -5.23607$ $a = 0.190983$ $b = -5.85410$	-2.63189	-61.0000
$u = -0.763932$ $a = 1.30902$ $b = 0.854102$	-10.5276	-61.0000

$$\text{III. } I_3^u = \langle u^{51} - 10u^{50} + \dots - 1299926u + 166228, -2.30 \times 10^{247}u^{50} + 2.15 \times 10^{248}u^{49} + \dots + 8.59 \times 10^{249}b + 5.98 \times 10^{252}, 7.20 \times 10^{251}u^{50} - 6.72 \times 10^{252}u^{49} + \dots + 3.57 \times 10^{254}a - 1.92 \times 10^{257} \rangle$$

(i) Arc colorings

$$\begin{aligned} a_9 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\ a_{11} &= \begin{pmatrix} -0.00201851u^{50} + 0.0188330u^{49} + \dots - 3295.21u + 537.572 \\ 0.00268013u^{50} - 0.0250243u^{49} + \dots + 4333.21u - 697.027 \end{pmatrix} \\ a_1 &= \begin{pmatrix} -0.00201851u^{50} + 0.0188330u^{49} + \dots - 3295.21u + 537.572 \\ 0.00170221u^{50} - 0.0160030u^{49} + \dots + 2911.05u - 472.262 \end{pmatrix} \\ a_4 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_2 &= \begin{pmatrix} -0.00372072u^{50} + 0.0348360u^{49} + \dots - 6206.26u + 1009.83 \\ 0.00170221u^{50} - 0.0160030u^{49} + \dots + 2911.05u - 472.262 \end{pmatrix} \\ a_5 &= \begin{pmatrix} -0.0000154275u^{50} + 0.000525031u^{49} + \dots - 543.989u + 97.7439 \\ -0.000532763u^{50} + 0.00507315u^{49} + \dots - 1100.08u + 193.914 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} 0.000821253u^{50} - 0.00850985u^{49} + \dots + 2652.73u - 476.131 \\ -0.00489093u^{50} + 0.0450196u^{49} + \dots - 6756.96u + 1034.01 \end{pmatrix} \\ a_8 &= \begin{pmatrix} 0.00188618u^{50} - 0.0172771u^{49} + \dots + 2602.41u - 410.593 \\ -0.00128608u^{50} + 0.0120461u^{49} + \dots - 2167.31u + 354.534 \end{pmatrix} \\ a_6 &= \begin{pmatrix} -0.00686743u^{50} + 0.0638716u^{49} + \dots - 10603.9u + 1676.32 \\ -0.00242860u^{50} + 0.0223262u^{49} + \dots - 3434.21u + 542.395 \end{pmatrix} \\ a_3 &= \begin{pmatrix} -0.000685616u^{50} + 0.00703395u^{49} + \dots - 2308.84u + 435.713 \\ 0.00230835u^{50} - 0.0219226u^{49} + \dots + 4244.18u - 696.333 \end{pmatrix} \\ a_7 &= \begin{pmatrix} -0.00443882u^{50} + 0.0415454u^{49} + \dots - 7169.70u + 1133.93 \\ -0.00242860u^{50} + 0.0223262u^{49} + \dots - 3434.21u + 542.395 \end{pmatrix} \\ a_7 &= \begin{pmatrix} -0.00443882u^{50} + 0.0415454u^{49} + \dots - 7169.70u + 1133.93 \\ -0.00242860u^{50} + 0.0223262u^{49} + \dots - 3434.21u + 542.395 \end{pmatrix} \end{aligned}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.80161 - 1.46261I$		
$a = 0.276410 - 0.592485I$	$0.8642 + 15.7945I$	$-8.70527 - 8.85601I$
$b = -2.21486 - 1.51948I$		
$u = -1.80161 + 1.46261I$		
$a = 0.276410 + 0.592485I$	$0.8642 - 15.7945I$	$-8.70527 + 8.85601I$
$b = -2.21486 + 1.51948I$		
$u = -1.56097 - 0.89821I$		
$a = 0.407933 - 0.530935I$	$1.87901 + 7.98783I$	$-8.12954 - 7.19035I$
$b = -0.926330 - 0.946559I$		
$u = -1.56097 + 0.89821I$		
$a = 0.407933 + 0.530935I$	$1.87901 - 7.98783I$	$-8.12954 + 7.19035I$
$b = -0.926330 + 0.946559I$		
$u = -1.44652 - 0.39904I$		
$a = 0.022304 - 0.815827I$	$6.12236 - 2.89222I$	$-3.53220 + 2.32311I$
$b = -0.381586 + 0.631553I$		
$u = -1.44652 + 0.39904I$		
$a = 0.022304 + 0.815827I$	$6.12236 + 2.89222I$	$-3.53220 - 2.32311I$
$b = -0.381586 - 0.631553I$		
$u = -1.037452 - 0.842943I$		
$a = -0.651884 + 0.241242I$	$1.43007 + 1.84298I$	$-5.28738 - 8.98031I$
$b = 1.44851 + 0.34423I$		
$u = -1.037452 + 0.842943I$		
$a = -0.651884 - 0.241242I$	$1.43007 - 1.84298I$	$-5.28738 + 8.98031I$
$b = 1.44851 - 0.34423I$		
$u = -1.036358 - 0.030953I$		
$a = 1.41997 + 0.16512I$	$-7.16136 - 4.34566I$	$0.37647 + 1.57270I$
$b = -0.678961 - 0.291256I$		
$u = -1.036358 + 0.030953I$		
$a = 1.41997 - 0.16512I$	$-7.16136 + 4.34566I$	$0.37647 - 1.57270I$
$b = -0.678961 + 0.291256I$		

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.988752 - 0.796474I$ $a = 0.552353 + 0.430698I$ $b = -0.256174 - 0.459940I$	$0.62734 + 3.24727I$	$-5.87868 - 5.45997I$
$u = -0.988752 + 0.796474I$ $a = 0.552353 - 0.430698I$ $b = -0.256174 + 0.459940I$	$0.62734 - 3.24727I$	$-5.87868 + 5.45997I$
$u = -0.844649 - 0.486018I$ $a = 0.253196 - 0.842569I$ $b = -0.093126 - 0.808944I$	$5.28316 + 2.70789I$	$-3.72797 - 4.62977I$
$u = -0.844649 + 0.486018I$ $a = 0.253196 + 0.842569I$ $b = -0.093126 + 0.808944I$	$5.28316 - 2.70789I$	$-3.72797 + 4.62977I$
$u = -0.813306 - 0.333594I$ $a = -0.57173 + 1.44411I$ $b = 1.76359 + 0.14903I$	$0.08535 + 1.42859I$	$-8.20291 - 2.86015I$
$u = -0.813306 + 0.333594I$ $a = -0.57173 - 1.44411I$ $b = 1.76359 - 0.14903I$	$0.08535 - 1.42859I$	$-8.20291 + 2.86015I$
$u = -0.785342$ $a = 1.22565$ $b = 0.886433$	-10.4502	42.5646
$u = -0.660965 - 0.501008I$ $a = 0.634697 - 1.116633I$ $b = -1.56703 - 1.07565I$	$-1.46329 + 2.48395I$	$-7.42637 - 4.33344I$
$u = -0.660965 + 0.501008I$ $a = 0.634697 + 1.116633I$ $b = -1.56703 + 1.07565I$	$-1.46329 - 2.48395I$	$-7.42637 + 4.33344I$
$u = -0.27550 - 2.57946I$ $a = 0.146051 + 0.445382I$ $b = 0.67013 + 3.02777I$	$-3.69039 + 2.13393I$	$-15.8264 - 4.5625I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.27550 + 2.57946I$ $a = 0.146051 - 0.445382I$ $b = 0.67013 - 3.02777I$	$-3.69039 - 2.13393I$	$-15.8264 + 4.5625I$
$u = 0.062767 - 0.424232I$ $a = 1.36666 + 0.97822I$ $b = 0.407189 + 0.301069I$	$-0.61038 + 1.48999I$	$-4.46560 - 4.54978I$
$u = 0.062767 + 0.424232I$ $a = 1.36666 - 0.97822I$ $b = 0.407189 - 0.301069I$	$-0.61038 - 1.48999I$	$-4.46560 + 4.54978I$
$u = 0.20421 - 1.46615I$ $a = -0.058655 + 0.821689I$ $b = -1.68897 + 1.82716I$	$-4.21875 - 0.45905I$	$-12.7704 + 7.0072I$
$u = 0.20421 + 1.46615I$ $a = -0.058655 - 0.821689I$ $b = -1.68897 - 1.82716I$	$-4.21875 + 0.45905I$	$-12.7704 - 7.0072I$
$u = 0.437043 - 0.267925I$ $a = -1.054485 + 0.668518I$ $b = 1.004931 + 0.482365I$	$4.27954 - 3.84215I$	$-4.79842 + 0.74687I$
$u = 0.437043 + 0.267925I$ $a = -1.054485 - 0.668518I$ $b = 1.004931 - 0.482365I$	$4.27954 + 3.84215I$	$-4.79842 - 0.74687I$
$u = 0.558386$ $a = -0.0219166$ $b = -0.643615$	-1.00288	-10.0668
$u = 0.593389 - 0.094339I$ $a = -1.61131 + 0.74377I$ $b = 0.828996 + 0.546872I$	$4.54085 + 1.95941I$	$-3.52747 - 2.51429I$
$u = 0.593389 + 0.094339I$ $a = -1.61131 - 0.74377I$ $b = 0.828996 - 0.546872I$	$4.54085 - 1.95941I$	$-3.52747 + 2.51429I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.675060 - 0.634705I$ $a = 1.49986 + 1.15386I$ $b = -0.19543 + 1.80529I$	$-2.26568 - 2.29719I$	$-12.40272 + 3.03914I$
$u = 0.675060 + 0.634705I$ $a = 1.49986 - 1.15386I$ $b = -0.19543 - 1.80529I$	$-2.26568 + 2.29719I$	$-12.40272 - 3.03914I$
$u = 0.879883 - 0.018476I$ $a = -1.262509 - 0.553591I$ $b = -0.473863 + 0.492979I$	$-3.74009 - 5.32281I$	$-9.19635 + 5.98834I$
$u = 0.879883 + 0.018476I$ $a = -1.262509 + 0.553591I$ $b = -0.473863 - 0.492979I$	$-3.74009 + 5.32281I$	$-9.19635 - 5.98834I$
$u = 1.005875 - 0.283256I$ $a = -0.972494 - 0.946838I$ $b = 1.88300 - 0.74357I$	$3.27749 - 9.36362I$	$-6.17125 + 5.41405I$
$u = 1.005875 + 0.283256I$ $a = -0.972494 + 0.946838I$ $b = 1.88300 + 0.74357I$	$3.27749 + 9.36362I$	$-6.17125 - 5.41405I$
$u = 1.092616 - 0.151383I$ $a = -0.223936 + 0.454070I$ $b = -1.110942 - 0.690529I$	$-1.13007 - 1.28368I$	$-3.18177 + 0.90248I$
$u = 1.092616 + 0.151383I$ $a = -0.223936 - 0.454070I$ $b = -1.110942 + 0.690529I$	$-1.13007 + 1.28368I$	$-3.18177 - 0.90248I$
$u = 1.11835 - 1.54296I$ $a = -0.133468 - 0.675000I$ $b = 1.18811 - 1.96050I$	$-2.32039 - 8.39966I$	$-9.43233 + 7.03660I$
$u = 1.11835 + 1.54296I$ $a = -0.133468 + 0.675000I$ $b = 1.18811 + 1.96050I$	$-2.32039 + 8.39966I$	$-9.43233 - 7.03660I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.351318 - 0.257254I$ $a = -0.304164 + 0.912622I$ $b = 0.98715 - 1.08343I$	$4.63878 - 8.97661I$	$-6.03126 + 7.51919I$
$u = 1.351318 + 0.257254I$ $a = -0.304164 - 0.912622I$ $b = 0.98715 + 1.08343I$	$4.63878 + 8.97661I$	$-6.03126 - 7.51919I$
$u = 1.42266 - 0.55927I$ $a = -0.268768 - 0.377077I$ $b = 0.008939 - 0.301567I$	$-0.294650 - 1.061436I$	$-4.84581 + 2.42805I$
$u = 1.42266 + 0.55927I$ $a = -0.268768 + 0.377077I$ $b = 0.008939 + 0.301567I$	$-0.294650 + 1.061436I$	$-4.84581 - 2.42805I$
$u = 1.47863$ $a = 0.773712$ $b = -1.78643$	-2.29513	-1.15087
$u = 1.51078 - 1.23807I$ $a = 0.210973 + 0.793232I$ $b = -2.13231 + 0.83382I$	$-0.91339 - 6.46505I$	$-11.09691 + 8.15111I$
$u = 1.51078 + 1.23807I$ $a = 0.210973 - 0.793232I$ $b = -2.13231 - 0.83382I$	$-0.91339 + 6.46505I$	$-11.09691 - 8.15111I$
$u = 1.98819 - 5.76383I$ $a = 0.050744 + 0.149118I$ $b = -2.67487 + 5.65169I$	$-2.64938 + 0.11132I$	$-58.9394 - 3.8883I$
$u = 1.98819 + 5.76383I$ $a = 0.050744 - 0.149118I$ $b = -2.67487 - 5.65169I$	$-2.64938 - 0.11132I$	$-58.9394 + 3.8883I$
$u = 2.49810 - 1.34713I$ $a = 0.291593 + 0.246256I$ $b = -2.02428 + 1.56194I$	$1.01385 - 3.52246I$	$-1.47352 - 5.19905I$
Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 2.49810 + 1.34713I$ $a = 0.291593 - 0.246256I$ $b = -2.02428 - 1.56194I$	$1.01385 + 3.52246I$	$-1.47352 + 5.19905I$

IV. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u-1)^5(u^2+u-1)(u^{51}+7u^{50}+\dots-81u^2+1)$
c_2	$(u+1)^5(u^2+3u+1)(u^{51}+23u^{50}+\dots+162u+1)$
c_3	$u^5(u^2+u-1)(u^{51}+2u^{50}+\dots-96u+32)$
c_4	$(u+1)^5(u^2-u-1)(u^{51}+7u^{50}+\dots-81u^2+1)$
c_5	$(u^2-3u+1)(u^5-3u^4+\dots-u+1)(u^{51}+3u^{50}+\dots+2u+1)$
c_6	$u^5(u^2-u-1)(u^{51}+2u^{50}+\dots-96u+32)$
c_7	$u^2(u^5-u^4+\dots+u-1)(u^{51}+8u^{50}+\dots+64u+4)$
c_8	$(u-1)^2(u^5+u^4+\dots+u-1)(u^{51}+4u^{50}+\dots-87u-1)$
c_9	$(u^2-3u+1)(u^5-u^4+\dots+u+1)(u^{51}+5u^{50}+\dots-402u-137)$
c_{10}	$(u^2-3u+1)(u^5+u^4+\dots+u+1)(u^{51}+u^{50}+\dots-4u+31)$
c_{11}	$(u+1)^2(u^5-u^4+\dots+u+1)(u^{51}+4u^{50}+\dots-87u-1)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_4	$(y - 1)^5(y^2 - 3y + 1)(y^{51} - 23y^{50} + \dots + 162y - 1)$
c_2	$(y - 1)^5(y^2 - 7y + 1)(y^{51} + 17y^{50} + \dots + 12790y - 1)$
c_3	$y^5(y^2 - 3y + 1)(y^{51} + 30y^{50} + \dots - 8704y - 1024)$
c_5	$(y^2 - 7y + 1)(y^5 - y^4 + \dots + 3y - 1)(y^{51} - 15y^{50} + \dots + 20y - 1)$
c_6	$y^5(y^2 - 3y + 1)(y^{51} + 30y^{50} + \dots - 8704y - 1024)$
c_7	$y^2(y^5 + 3y^4 + \dots - y - 1)(y^{51} - 12y^{50} + \dots + 1272y - 16)$
c_8	$(y - 1)^2(y^5 - 5y^4 + \dots - y - 1)(y^{51} - 30y^{50} + \dots + 6683y - 1)$
c_9	$(y^2 - 7y + 1)(y^5 - 5y^4 + 8y^3 - 3y^2 - y - 1)$ $(y^{51} + 37y^{50} + \dots + 211472y - 18769)$
c_{10}	$(y^2 - 7y + 1)(y^5 + 3y^4 + 4y^3 + y^2 - y - 1)$ $(y^{51} + 29y^{50} + \dots + 22708y - 961)$
c_{11}	$(y - 1)^2(y^5 - 5y^4 + \dots - y - 1)(y^{51} - 30y^{50} + \dots + 6683y - 1)$