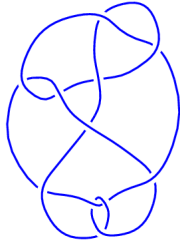
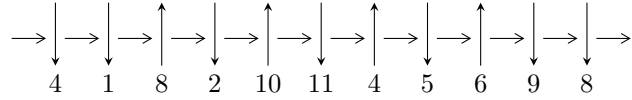


11n<sub>52</sub> (K11n<sub>52</sub>)

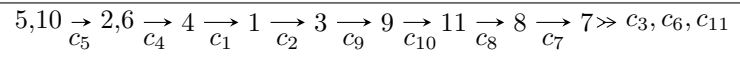


1

**Arc Sequences**



**Solving Sequence**



**Representation Ideals**

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

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

$$I_2^u = \langle u^{34} - 6u^{33} + \dots + 4u - 1, -12u^{33} + 61u^{32} + \dots + 8a - 5, -43u^{33} + 219u^{32} + \dots + 16b - 47 \rangle$$

There are 2 irreducible components with 39 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>”

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

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} a \\ a^4 + a^3 + a^2 + 2a \end{pmatrix}$$

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

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

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

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

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

$$a_9 = \begin{pmatrix} a^3 + a \\ 2a^3 + 2a \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -a^4 - a^3 - a^2 - 1 \\ -a^4 - a^3 - a^2 - 2 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} a^3 + a \\ a^3 + a \end{pmatrix}$$

$$a_7 = \begin{pmatrix} a^3 + a \\ a^3 + a \end{pmatrix}$$

$$a_7 = \begin{pmatrix} a^3 + a \\ a^3 + a \end{pmatrix}$$

**(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
$u = 1.00000$ $a = -0.766826$ $b = -1.05077$	$-4.04602$	$-9.63839$
$u = 1.00000$ $a = -0.455697 - 1.200152I$ $b = 0.05352 - 3.02220I$	$-7.51750 + 4.40083I$	$-13.17182 - 3.02310I$
$u = 1.00000$ $a = -0.455697 + 1.200152I$ $b = 0.05352 + 3.02220I$	$-7.51750 - 4.40083I$	$-13.17182 + 3.02310I$
$u = 1.00000$ $a = 0.339110 - 0.822375I$ $b = -0.528134 - 1.303899I$	$-1.97403 - 1.53058I$	$-5.00899 + 6.23673I$
$u = 1.00000$ $a = 0.339110 + 0.822375I$ $b = -0.528134 + 1.303899I$	$-1.97403 + 1.53058I$	$-5.00899 - 6.23673I$

$$\text{II. } I_2^u = \langle u^{34} - 6u^{33} + \dots + 4u - 1, -12u^{33} + 61u^{32} + \dots + 8a - 5, -43u^{33} + 219u^{32} + \dots + 16b - 47 \rangle$$

(i) Arc colorings

$$\begin{aligned} a_5 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\ a_{10} &= \begin{pmatrix} \frac{3}{2}u^{33} - \frac{61}{8}u^{32} + \dots - \frac{35}{4}u + \frac{5}{8} \\ 2.68750u^{33} - 13.6875u^{32} + \dots - 10.5625u + 2.93750 \end{pmatrix} \\ a_2 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_6 &= \begin{pmatrix} 14.6875u^{33} - 80.1875u^{32} + \dots - 59.0625u + 24.4375 \\ 15.6875u^{33} - 86.1875u^{32} + \dots - 65.3125u + 28.1875 \end{pmatrix} \\ a_4 &= \begin{pmatrix} u \\ u \end{pmatrix} \\ a_1 &= \begin{pmatrix} -u^2 + 1 \\ -u^2 \end{pmatrix} \\ a_3 &= \begin{pmatrix} u^4 - u^2 + 1 \\ u^4 \end{pmatrix} \\ a_9 &= \begin{pmatrix} -\frac{107}{4}u^{33} + \frac{287}{2}u^{32} + \dots + 102u - \frac{177}{4} \\ -25.7500u^{33} + 137.500u^{32} + \dots + 95.7500u - 40.5000 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} -0.0625000u^{33} + 0.312500u^{32} + \dots - 1.81250u - 0.0625000 \\ -0.0625000u^{33} + 0.312500u^{32} + \dots - 0.812500u - 0.0625000 \end{pmatrix} \\ a_8 &= \begin{pmatrix} -\frac{107}{4}u^{33} + \frac{287}{2}u^{32} + \dots + 102u - \frac{177}{4} \\ -14.2500u^{33} + 76.2500u^{32} + \dots + 54.5000u - 23.5000 \end{pmatrix} \\ a_7 &= \begin{pmatrix} -\frac{125}{4}u^{33} + \frac{675}{4}u^{32} + \dots + \frac{241}{2}u - 52 \\ -\frac{75}{4}u^{33} + \frac{203}{2}u^{32} + \dots + 73u - \frac{125}{4} \end{pmatrix} \\ a_7 &= \begin{pmatrix} -\frac{125}{4}u^{33} + \frac{675}{4}u^{32} + \dots + \frac{241}{2}u - 52 \\ -\frac{75}{4}u^{33} + \frac{203}{2}u^{32} + \dots + 73u - \frac{125}{4} \end{pmatrix} \end{aligned}$$

(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
$u = -1.307533 - 0.065436I$ $a = -0.299142 + 0.884522I$ $b = 0.26581 + 3.82507I$	$-5.63834 - 3.94702I$	$-6.39479 + 3.36113I$
$u = -1.307533 + 0.065436I$ $a = -0.299142 - 0.884522I$ $b = 0.26581 - 3.82507I$	$-5.63834 + 3.94702I$	$-6.39479 - 3.36113I$
$u = -1.21971$ $a = -0.485550$ $b = -1.14126$	$-2.64346$	$-1.59533$
$u = -1.034701 - 0.173788I$ $a = 0.041112 - 0.660333I$ $b = -1.02029 - 1.27410I$	$-2.09473 - 0.78471I$	$-6.87662 - 2.65408I$
$u = -1.034701 + 0.173788I$ $a = 0.041112 + 0.660333I$ $b = -1.02029 + 1.27410I$	$-2.09473 + 0.78471I$	$-6.87662 + 2.65408I$
$u = -0.867707 - 0.523486I$ $a = 0.911057 + 0.742984I$ $b = 0.039980 + 0.922704I$	$-4.35229 + 1.60461I$	$-8.26502 - 1.09622I$
$u = -0.867707 + 0.523486I$ $a = 0.911057 - 0.742984I$ $b = 0.039980 - 0.922704I$	$-4.35229 - 1.60461I$	$-8.26502 + 1.09622I$
$u = -0.706452 - 0.661902I$ $a = -0.433006 - 1.202722I$ $b = -0.50525 - 1.99068I$	$-3.70744 - 6.19607I$	$-6.22304 + 6.67245I$
$u = -0.706452 + 0.661902I$ $a = -0.433006 + 1.202722I$ $b = -0.50525 + 1.99068I$	$-3.70744 + 6.19607I$	$-6.22304 - 6.67245I$
$u = -0.658221 - 0.529258I$ $a = 0.715183 - 0.315200I$ $b = 0.152256 - 0.692515I$	$-0.99883 - 1.83078I$	$-2.95289 + 3.76618I$

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.658221 + 0.529258I$ $a = 0.715183 + 0.315200I$ $b = 0.152256 + 0.692515I$	$-0.99883 + 1.83078I$	$-2.95289 - 3.76618I$
$u = -0.257061 - 0.435953I$ $a = 0.71364 + 1.38793I$ $b = 0.711858 + 0.021585I$	$0.37642 - 1.53920I$	$0.52977 + 5.14051I$
$u = -0.257061 + 0.435953I$ $a = 0.71364 - 1.38793I$ $b = 0.711858 - 0.021585I$	$0.37642 + 1.53920I$	$0.52977 - 5.14051I$
$u = 0.151137 - 0.378084I$ $a = -1.72188 + 1.72529I$ $b = 0.342124 + 1.171360I$	$-0.33123 + 1.99737I$	$-1.04171 - 3.94659I$
$u = 0.151137 + 0.378084I$ $a = -1.72188 - 1.72529I$ $b = 0.342124 - 1.171360I$	$-0.33123 - 1.99737I$	$-1.04171 + 3.94659I$
$u = 0.598522$ $a = -1.34216$ $b = -0.901374$	$-3.18504$	$0.914630$
$u = 0.649218 - 0.049959I$ $a = -0.55537 - 1.91402I$ $b = -0.21433 - 2.31941I$	$-6.76337 + 4.50518I$	$-1.87945 - 4.07859I$
$u = 0.649218 + 0.049959I$ $a = -0.55537 + 1.91402I$ $b = -0.21433 + 2.31941I$	$-6.76337 - 4.50518I$	$-1.87945 + 4.07859I$
$u = 0.692953 - 1.024118I$ $a = 1.015907 - 0.151443I$ $b = -1.65138 - 0.21047I$	$2.49823 - 5.83735I$	$-3.10039 + 3.72465I$
$u = 0.692953 + 1.024118I$ $a = 1.015907 + 0.151443I$ $b = -1.65138 + 0.21047I$	$2.49823 + 5.83735I$	$-3.10039 - 3.72465I$

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.719802 - 0.838712I$ $a = -0.642453 + 0.855692I$ $b = 1.12515 + 1.72788I$	$0.59034 + 2.20193I$	$-5.39762 - 2.89255I$
$u = 0.719802 + 0.838712I$ $a = -0.642453 - 0.855692I$ $b = 1.12515 - 1.72788I$	$0.59034 - 2.20193I$	$-5.39762 + 2.89255I$
$u = 0.749373 - 0.980750I$ $a = 0.203215 + 0.635392I$ $b = -0.0406697 + 0.1141947I$	$5.05465 - 0.88184I$	$-0.0341976 - 0.1167760I$
$u = 0.749373 + 0.980750I$ $a = 0.203215 - 0.635392I$ $b = -0.0406697 - 0.1141947I$	$5.05465 + 0.88184I$	$-0.0341976 + 0.1167760I$
$u = 0.919309 - 0.963610I$ $a = -0.736247 + 0.034227I$ $b = 0.242674 - 0.367171I$	$7.32303 + 1.01150I$	$0.462803 + 0.538404I$
$u = 0.919309 + 0.963610I$ $a = -0.736247 - 0.034227I$ $b = 0.242674 + 0.367171I$	$7.32303 - 1.01150I$	$0.462803 - 0.538404I$
$u = 0.986984 - 0.934448I$ $a = 0.074663 - 0.754191I$ $b = 0.43827 - 1.77159I$	$7.11131 + 5.93371I$	$-0.19300 - 5.69756I$
$u = 0.986984 + 0.934448I$ $a = 0.074663 + 0.754191I$ $b = 0.43827 + 1.77159I$	$7.11131 - 5.93371I$	$-0.19300 + 5.69756I$
$u = 1.058347 - 0.773720I$ $a = 0.740255 - 0.603346I$ $b = -0.46407 - 2.48780I$	$-0.44863 + 3.88868I$	$-6.63703 - 2.26154I$
$u = 1.058347 + 0.773720I$ $a = 0.740255 + 0.603346I$ $b = -0.46407 + 2.48780I$	$-0.44863 - 3.88868I$	$-6.63703 + 2.26154I$

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.088073 - 0.833628I$	$3.98565 + 7.54944I$	$-1.73478 - 4.55602I$
$a = 0.571374 + 0.237996I$		
$b = 1.007891 + 0.420890I$		
$u = 1.088073 + 0.833628I$	$3.98565 - 7.54944I$	$-1.73478 + 4.55602I$
$a = 0.571374 - 0.237996I$		
$b = 1.007891 - 0.420890I$		
$u = 1.127075 - 0.824983I$	$1.13195 + 12.58770I$	$-4.92167 - 7.87699I$
$a = -0.184448 + 0.911740I$		
$b = 0.09128 + 3.62230I$		
$u = 1.127075 + 0.824983I$	$1.13195 - 12.58770I$	$-4.92167 + 7.87699I$
$a = -0.184448 - 0.911740I$		
$b = 0.09128 - 3.62230I$		



### III. u-Polynomials

Crossings	u-Polynomials at each crossings
$c_1$	$(u - 1)^5(u^{34} + 6u^{33} + \dots - 4u - 1)$
$c_2$	$(u + 1)^5(u^{34} + 10u^{33} + \dots + 2u^2 + 1)$
$c_3, c_7$	$u^5(u^{34} + u^{33} + \dots - 32u + 32)$
$c_4$	$(u + 1)^5(u^{34} + 6u^{33} + \dots - 4u - 1)$
$c_5$	$(u^5 - u^4 + \dots + u - 1)(u^{34} + 2u^{33} + \dots - 2u - 1)$
$c_6$	$(u^5 + u^4 + \dots + u - 1)(u^{34} + 2u^{33} + \dots - 58u - 17)$
$c_8$	$(u^5 - u^4 + \dots + u + 1)(u^{34} + 2u^{33} + \dots - 58u - 17)$
$c_9$	$(u^5 + u^4 + \dots + u + 1)(u^{34} + 2u^{33} + \dots - 2u - 1)$
$c_{10}$	$(u^5 + 3u^4 + \dots - u - 1)(u^{34} + 18u^{33} + \dots + 2u + 1)$
$c_{11}$	$(u^5 - u^4 + \dots + u + 1)(u^{34} + 2u^{33} + \dots - 2u + 1)$

#### IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
$c_1, c_4$	$(y - 1)^5(y^{34} - 10y^{33} + \dots + 2y^2 + 1)$
$c_2$	$(y - 1)^5(y^{34} + 34y^{33} + \dots + 4y + 1)$
$c_3, c_7$	$y^5(y^{34} - 33y^{33} + \dots - 11776y + 1024)$
$c_5$	$(y^5 + 3y^4 + \dots - y - 1)(y^{34} + 18y^{33} + \dots + 2y + 1)$
$c_6, c_8$	$(y^5 - 5y^4 + \dots - y - 1)(y^{34} - 22y^{33} + \dots + 682y + 289)$
$c_9$	$(y^5 + 3y^4 + \dots - y - 1)(y^{34} + 18y^{33} + \dots + 2y + 1)$
$c_{10}$	$(y^5 - y^4 + \dots + 3y - 1)(y^{34} - 2y^{33} + \dots - 18y + 1)$
$c_{11}$	$(y^5 - 5y^4 + \dots - y - 1)(y^{34} + 38y^{33} + \dots + 2y + 1)$