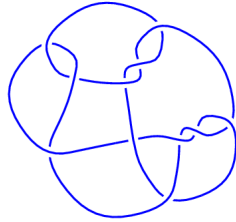
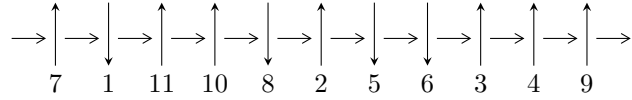


11a₂₂₂ (K11a₂₂₂)

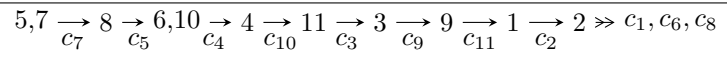


1

Arc Sequences



Solving Sequence



Representation Ideals

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

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

$$I_2^u = \langle u^{53} - 4u^{52} + \dots + 6u - 1, -u^{12} + 5u^{10} + 2u^9 - 9u^8 - 8u^7 + 4u^6 + 10u^5 + 6u^4 - 2u^3 - 5u^2 + a - 2u - 1, -u^{52} + 3u^{51} + \dots + 4b - 1 \rangle$$

There are 2 irreducible components with 56 representations.

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

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

(i) Arc colorings

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

$$a_7 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -1 \\ b \end{pmatrix}$$

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

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

$$a_3 = \begin{pmatrix} 0 \\ b^2 - b + 1 \end{pmatrix}$$

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

$$a_1 = \begin{pmatrix} 0 \\ b^2 - b + 1 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0 \\ b^2 - b + 1 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0 \\ b^2 - b + 1 \end{pmatrix}$$

(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
$u = 1.00000$ $a = -1.00000$ $b = 0.215080 - 1.307141I$	$-4.66906 - 2.82812I$	$-1.84740 + 3.54173I$
$u = 1.00000$ $a = -1.00000$ $b = 0.215080 + 1.307141I$	$-4.66906 + 2.82812I$	$-1.84740 - 3.54173I$
$u = 1.00000$ $a = -1.00000$ $b = 0.569840$	-0.531480	2.69479

II.

$$I_2^u = \langle u^{53} - 4u^{52} + \dots + 6u - 1, -u^{12} + 5u^{10} + \dots + a - 1, -u^{52} + 3u^{51} + \dots + 4b - 1 \rangle$$

(i) Arc colorings

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

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} -u^2 + 1 \\ u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} u^{12} - 5u^{10} - 2u^9 + 9u^8 + 8u^7 - 4u^6 - 10u^5 - 6u^4 + 2u^3 + 5u^2 + 2u + 1 \\ \frac{1}{4}u^{52} - \frac{3}{4}u^{51} + \dots + \frac{3}{4}u + \frac{1}{4} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} \frac{1}{4}u^{52} - \frac{3}{4}u^{51} + \dots + \frac{3}{4}u + \frac{5}{4} \\ -3u^{52} + \frac{17}{2}u^{51} + \dots + 13u - \frac{5}{2} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{5}{4}u^{52} - \frac{17}{4}u^{51} + \dots - \frac{17}{4}u + \frac{11}{4} \\ \frac{21}{4}u^{52} - \frac{53}{4}u^{51} + \dots - \frac{69}{4}u + \frac{15}{4} \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -\frac{11}{2}u^{52} + \frac{27}{2}u^{51} + \dots + \frac{43}{2}u - \frac{3}{2} \\ \frac{3}{4}u^{52} - \frac{3}{4}u^{51} + \dots + \frac{1}{4}u + \frac{1}{4} \end{pmatrix}$$

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

$$a_1 = \begin{pmatrix} -\frac{5}{2}u^{52} + \frac{15}{2}u^{51} + \dots + \frac{27}{2}u - \frac{1}{2} \\ 11.2500u^{52} - 29.2500u^{51} + \dots - 39.2500u + 7.75000 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -\frac{5}{2}u^{52} + \frac{15}{2}u^{51} + \dots + \frac{27}{2}u - \frac{1}{2} \\ 12.7500u^{52} - 35.7500u^{51} + \dots - 51.7500u + 10.2500 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -\frac{5}{2}u^{52} + \frac{15}{2}u^{51} + \dots + \frac{27}{2}u - \frac{1}{2} \\ 12.7500u^{52} - 35.7500u^{51} + \dots - 51.7500u + 10.2500 \end{pmatrix}$$

(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
$u = -1.340089 - 0.256972I$		
$a = -2.48312 - 1.26259I$	$-6.53406 - 7.50813I$	$-2.48060 + 5.10060I$
$b = 0.26368 - 1.40696I$		
$u = -1.340089 + 0.256972I$		
$a = -2.48312 + 1.26259I$	$-6.53406 + 7.50813I$	$-2.48060 - 5.10060I$
$b = 0.26368 + 1.40696I$		
$u = -1.337476 - 0.124077I$		
$a = 0.54122 + 1.99692I$	$-8.23681 + 0.97965I$	$-4.65901 - 0.74482I$
$b = 0.14460 + 1.40859I$		
$u = -1.337476 + 0.124077I$		
$a = 0.54122 - 1.99692I$	$-8.23681 - 0.97965I$	$-4.65901 + 0.74482I$
$b = 0.14460 - 1.40859I$		
$u = -1.299932 - 0.254117I$		
$a = -0.94952 - 1.13322I$	$-1.18376 - 4.09953I$	$2.32118 + 4.98239I$
$b = 0.669973 - 0.268863I$		
$u = -1.299932 + 0.254117I$		
$a = -0.94952 + 1.13322I$	$-1.18376 + 4.09953I$	$2.32118 - 4.98239I$
$b = 0.669973 + 0.268863I$		
$u = -1.231545 - 0.172173I$		
$a = 0.451340 + 0.088457I$	$-2.47497 - 0.74735I$	$-0.90212 - 1.24909I$
$b = 0.275122 + 0.481412I$		
$u = -1.231545 + 0.172173I$		
$a = 0.451340 - 0.088457I$	$-2.47497 + 0.74735I$	$-0.90212 + 1.24909I$
$b = 0.275122 - 0.481412I$		
$u = -1.161206 - 0.306433I$		
$a = 1.32388 - 0.52271I$	$-2.68045 - 1.19639I$	$0.561902 + 0.388264I$
$b = -0.057331 + 1.081858I$		
$u = -1.161206 + 0.306433I$		
$a = 1.32388 + 0.52271I$	$-2.68045 + 1.19639I$	$0.561902 - 0.388264I$
$b = -0.057331 - 1.081858I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.006356 - 0.404023I$		
$a = 1.027739 + 0.236484I$	$-0.53651 + 1.57348I$	$1.80074 - 4.58385I$
$b = -0.633173 - 0.236384I$		
$u = -1.006356 + 0.404023I$		
$a = 1.027739 - 0.236484I$	$-0.53651 - 1.57348I$	$1.80074 + 4.58385I$
$b = -0.633173 + 0.236384I$		
$u = -0.993065 - 0.486660I$		
$a = 0.523612 + 0.275597I$	$-5.75404 + 4.81132I$	$-3.33331 - 4.06462I$
$b = -0.25065 - 1.39582I$		
$u = -0.993065 + 0.486660I$		
$a = 0.523612 - 0.275597I$	$-5.75404 - 4.81132I$	$-3.33331 + 4.06462I$
$b = -0.25065 + 1.39582I$		
$u = -0.741431 - 0.530945I$		
$a = 1.60280 + 0.03241I$	$-6.86405 - 3.34890I$	$-5.53237 + 3.71045I$
$b = -0.172891 + 1.400031I$		
$u = -0.741431 + 0.530945I$		
$a = 1.60280 - 0.03241I$	$-6.86405 + 3.34890I$	$-5.53237 - 3.71045I$
$b = -0.172891 - 1.400031I$		
$u = -0.673274 - 0.340918I$		
$a = 1.057549 + 0.175048I$	$-1.43718 - 1.12513I$	$-2.70988 + 5.24060I$
$b = -0.404297 + 0.307034I$		
$u = -0.673274 + 0.340918I$		
$a = 1.057549 - 0.175048I$	$-1.43718 + 1.12513I$	$-2.70988 - 5.24060I$
$b = -0.404297 - 0.307034I$		
$u = -0.346311 - 0.718386I$		
$a = -0.156567 + 0.579414I$	$-5.68668 - 1.06282I$	$-2.80690 + 2.95348I$
$b = -0.114458 - 1.406808I$		
$u = -0.346311 + 0.718386I$		
$a = -0.156567 - 0.579414I$	$-5.68668 + 1.06282I$	$-2.80690 - 2.95348I$
$b = -0.114458 + 1.406808I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.224599 - 0.849112I$		
$a = 2.07687 - 0.87780I$	$-3.39969 - 9.56118I$	$0.28637 + 7.56251I$
$b = -0.27728 + 1.40745I$		
$u = -0.224599 + 0.849112I$		
$a = 2.07687 + 0.87780I$	$-3.39969 + 9.56118I$	$0.28637 - 7.56251I$
$b = -0.27728 - 1.40745I$		
$u = -0.199005 - 0.815326I$		
$a = 1.78137 + 0.27121I$	$1.93858 - 5.99540I$	$5.14118 + 7.31361I$
$b = -0.702777 + 0.266046I$		
$u = -0.199005 + 0.815326I$		
$a = 1.78137 - 0.27121I$	$1.93858 + 5.99540I$	$5.14118 - 7.31361I$
$b = -0.702777 - 0.266046I$		
$u = -0.180982 - 0.721453I$		
$a = 0.498579 + 0.908515I$	$0.38779 - 2.33704I$	$2.43384 + 2.57524I$
$b = -0.264457 - 0.648002I$		
$u = -0.180982 + 0.721453I$		
$a = 0.498579 - 0.908515I$	$0.38779 + 2.33704I$	$2.43384 - 2.57524I$
$b = -0.264457 + 0.648002I$		
$u = -0.077045 - 0.713159I$		
$a = -0.34893 + 1.76098I$	$0.59121 - 2.50996I$	$4.33610 + 3.95071I$
$b = 0.154538 - 1.012976I$		
$u = -0.077045 + 0.713159I$		
$a = -0.34893 - 1.76098I$	$0.59121 + 2.50996I$	$4.33610 - 3.95071I$
$b = 0.154538 + 1.012976I$		
$u = 0.034455 - 0.645365I$		
$a = -1.98437 + 0.51216I$	$2.99577 + 0.83630I$	$8.46469 - 1.37155I$
$b = 0.681955 + 0.183935I$		
$u = 0.034455 + 0.645365I$		
$a = -1.98437 - 0.51216I$	$2.99577 - 0.83630I$	$8.46469 + 1.37155I$
$b = 0.681955 - 0.183935I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.115897 - 0.626414I$ $a = -2.72892 - 0.92563I$ $b = 0.265997 + 1.368653I$	$-1.92655 + 4.26986I$	$3.38600 - 2.83654I$
$u = 0.115897 + 0.626414I$ $a = -2.72892 + 0.92563I$ $b = 0.265997 - 1.368653I$	$-1.92655 - 4.26986I$	$3.38600 + 2.83654I$
$u = 0.159324$ $a = 1.44872$ $b = 0.495480$	0.852216	12.0644
$u = 0.248192 - 0.218926I$ $a = 1.63313 - 1.04229I$ $b = 0.178556 - 1.327833I$	$-3.39404 - 2.40292I$	$4.22803 + 2.59091I$
$u = 0.248192 + 0.218926I$ $a = 1.63313 + 1.04229I$ $b = 0.178556 + 1.327833I$	$-3.39404 + 2.40292I$	$4.22803 - 2.59091I$
$u = 1.248241 - 0.181646I$ $a = -0.876663 + 0.294818I$ $b = 0.299491 - 1.315650I$	$-5.29869 - 1.45751I$	$-3.56392 - 1.11425I$
$u = 1.248241 + 0.181646I$ $a = -0.876663 - 0.294818I$ $b = 0.299491 + 1.315650I$	$-5.29869 + 1.45751I$	$-3.56392 + 1.11425I$
$u = 1.271865 - 0.230719I$ $a = -1.153978 + 0.116149I$ $b = 0.740703 - 0.115693I$	$-0.82302 + 2.29845I$	$2.07591 - 2.82759I$
$u = 1.271865 + 0.230719I$ $a = -1.153978 - 0.116149I$ $b = 0.740703 + 0.115693I$	$-0.82302 - 2.29845I$	$2.07591 + 2.82759I$
$u = 1.306781 - 0.280326I$ $a = -1.168090 - 0.377181I$ $b = 0.277391 + 1.071940I$	$-3.72441 + 6.08956I$	$-1.10463 - 6.46640I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.306781 + 0.280326I$ $a = -1.168090 + 0.377181I$ $b = 0.277391 - 1.071940I$	$-3.72441 - 6.08956I$	$-1.10463 + 6.46640I$
$u = 1.372550 - 0.306311I$ $a = -0.038594 - 0.342319I$ $b = -0.403047 + 0.699359I$	$-4.53517 + 6.09494I$	$-1.88196 - 3.13383I$
$u = 1.372550 + 0.306311I$ $a = -0.038594 + 0.342319I$ $b = -0.403047 - 0.699359I$	$-4.53517 - 6.09494I$	$-1.88196 + 3.13383I$
$u = 1.38677 - 0.34044I$ $a = 1.15399 - 0.83382I$ $b = -0.735483 - 0.293968I$	$-3.08458 + 10.16493I$	$0.83427 - 8.08700I$
$u = 1.38677 + 0.34044I$ $a = 1.15399 + 0.83382I$ $b = -0.735483 + 0.293968I$	$-3.08458 - 10.16493I$	$0.83427 + 8.08700I$
$u = 1.40426 - 0.35282I$ $a = 2.27157 - 0.62207I$ $b = -0.28972 - 1.42258I$	$-8.5679 + 13.8903I$	$-3.37373 - 8.37209I$
$u = 1.40426 + 0.35282I$ $a = 2.27157 + 0.62207I$ $b = -0.28972 + 1.42258I$	$-8.5679 - 13.8903I$	$-3.37373 + 8.37209I$
$u = 1.42026 - 0.27304I$ $a = -0.615360 + 0.963319I$ $b = -0.09539 + 1.45292I$	$-11.29942 + 4.62469I$	$-6.19787 - 3.25754I$
$u = 1.42026 + 0.27304I$ $a = -0.615360 - 0.963319I$ $b = -0.09539 - 1.45292I$	$-11.29942 - 4.62469I$	$-6.19787 + 3.25754I$
$u = 1.44045 - 0.02930I$ $a = 0.419443 - 0.454128I$ $b = -0.590607 - 0.440889I$	$-8.22882 + 1.96670I$	$-4.21460 - 3.59094I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.44045 + 0.02930I$		
$a = 0.419443 + 0.454128I$	$-8.22882 - 1.96670I$	$-4.21460 + 3.59094I$
$b = -0.590607 + 0.440889I$		
$u = 1.48292 - 0.05239I$		
$a = 0.91666 - 1.40408I$	$-14.2996 + 4.8556I$	$-7.64155 - 3.38582I$
$b = -0.20818 - 1.45109I$		
$u = 1.48292 + 0.05239I$		
$a = 0.91666 + 1.40408I$	$-14.2996 - 4.8556I$	$-7.64155 + 3.38582I$
$b = -0.20818 + 1.45109I$		

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_6	$u^3(u^{53} + u^{52} + \dots - 12u - 8)$
c_2	$u^3(u^{53} + 21u^{52} + \dots - 112u - 64)$
c_3, c_4, c_{10}	$(u^3 - u^2 + 2u - 1)(u^{53} + 2u^{52} + \dots - 3u - 1)$
c_5, c_7, c_8	$(u + 1)^3(u^{53} + 4u^{52} + \dots + 6u + 1)$
c_9	$(u^3 - u^2 + 1)(u^{53} + 2u^{52} + \dots - 3u + 1)$
c_{11}	$(u^3 + u^2 - 1)(u^{53} + 12u^{52} + \dots - 1235u - 131)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_6	$y^3(y^{53} + 21y^{52} + \dots - 112y - 64)$
c_2	$y^3(y^{53} + 17y^{52} + \dots + 167168y - 4096)$
c_3, c_4, c_{10}	$(y^3 + 3y^2 + 2y - 1)(y^{53} + 48y^{52} + \dots + y - 1)$
c_5, c_7, c_8	$(y - 1)^3(y^{53} - 46y^{52} + \dots + 38y - 1)$
c_9	$(y^3 - y^2 + 2y - 1)(y^{53} + 54y^{51} + \dots + y - 1)$
c_{11}	$(y^3 - y^2 + 2y - 1)(y^{53} + 12y^{52} + \dots - 263187y - 17161)$