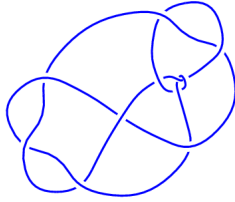
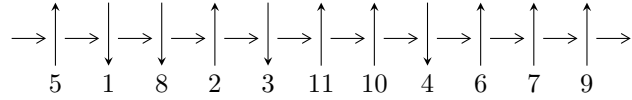


11a<sub>8</sub> (K11a<sub>8</sub>)

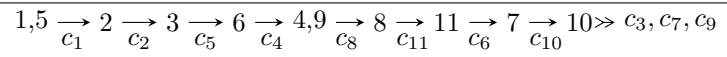


1

**Arc Sequences**



**Solving Sequence**



**Representation Ideals**

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

$$I_1^u = \langle a^6 - a^5 + a^4 - 2a^3 + a^2 + 1, -a^4 + a^3 - a^2 + a + u, -a^5 + a^4 - a^3 + a^2 + b \rangle$$

$$I_2^u = \langle u^{64} - 4u^{63} + \dots - 4u + 1, 4u^{63} - 33u^{62} + \dots + 4b - 21, -21u^{63} + 88u^{62} + \dots + 4a + 31 \rangle$$

There are 2 irreducible components with 70 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>”

$$I_1^u = \langle a^6 - a^5 + a^4 - 2a^3 + a^2 + 1, -a^4 + a^3 - a^2 + a + u, -a^5 + a^4 - a^3 + a^2 + b \rangle$$

I.

(i) Arc colorings

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

$$a_5 = \begin{pmatrix} 0 \\ a^4 - a^3 + a^2 - a \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 1 \\ a^4 - a^3 + a^2 - a + 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -a^4 + a^3 - a^2 + a \\ a^4 - a^3 + a^2 - a + 1 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} -a^4 + a^3 - a^2 + a \\ a^4 - a^3 + a^2 - a + 1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} a \\ a^5 - a^4 + a^3 - a^2 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} a \\ a^5 - a^4 + a^3 - a^2 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} a^4 - a^3 \\ a^5 - a^4 - a^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} a^5 - a^4 + a^3 - a^2 + a \\ a^5 - a^4 + a^3 - a^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} a^5 - a^4 + a^3 - a^2 + a \\ a^5 - a^4 + a^3 - a^2 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes =  $3a^5 + 2a^4 - a^3 + a^2 - 6a + 5$

(iv) Complex Volumes and Cusp Shapes

Solution to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = -0.377439 - 0.653743I$ $b = 0.754878$	$1.11345 - 2.02988I$	$5.85715 + 4.49037I$
$u = -0.500000 - 0.866025I$ $a = -0.377439 + 0.653743I$ $b = 0.754878$	$1.11345 + 2.02988I$	$5.85715 - 4.49037I$
$u = -0.500000 - 0.866025I$ $a = -0.206350 - 1.132315I$ $b = -0.877439 + 0.744862I$	$-3.02413 - 0.79824I$	$2.09851 - 0.12339I$
$u = -0.500000 + 0.866025I$ $a = -0.206350 + 1.132315I$ $b = -0.877439 - 0.744862I$	$-3.02413 + 0.79824I$	$2.09851 + 0.12339I$
$u = -0.500000 - 0.866025I$ $a = 1.083789 - 0.387453I$ $b = -0.877439 - 0.744862I$	$-3.02413 + 4.85801I$	$-1.45566 - 6.64456I$
$u = -0.500000 + 0.866025I$ $a = 1.083789 + 0.387453I$ $b = -0.877439 + 0.744862I$	$-3.02413 - 4.85801I$	$-1.45566 + 6.64456I$

$$\text{II. } I_2^u = \langle u^{64} - 4u^{63} + \dots - 4u + 1, 4u^{63} - 33u^{62} + \dots + 4b - 21, -21u^{63} + 88u^{62} + \dots + 4a + 31 \rangle$$

(i) Arc colorings

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

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

$$a_2 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} -u^5 - 2u^3 - u \\ u^5 + u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} \frac{21}{4}u^{63} - 22u^{62} + \dots + 24u - \frac{31}{4} \\ -u^{63} + \frac{33}{4}u^{62} + \dots - \frac{57}{4}u + \frac{21}{4} \end{pmatrix}$$

$$a_8 = \begin{pmatrix} \frac{23}{4}u^{63} - 20u^{62} + \dots + 13u - \frac{17}{4} \\ -3u^{63} + \frac{71}{4}u^{62} + \dots - \frac{75}{4}u + \frac{23}{4} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -\frac{1}{4}u^{63} + \frac{3}{4}u^{62} + \dots + \frac{3}{4}u^2 - \frac{5}{4}u \\ \frac{1}{4}u^{63} - u^{62} + \dots + 2u - \frac{1}{4} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -\frac{15}{4}u^{63} + \frac{57}{4}u^{62} + \dots - \frac{51}{4}u + \frac{5}{2} \\ \frac{3}{4}u^{63} - \frac{23}{4}u^{62} + \dots + \frac{51}{4}u - \frac{7}{2} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{21}{4}u^{63} - \frac{63}{4}u^{62} + \dots + \frac{19}{4}u - \frac{3}{2} \\ -4u^{63} + \frac{81}{4}u^{62} + \dots - \frac{81}{4}u + \frac{25}{4} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{21}{4}u^{63} - \frac{63}{4}u^{62} + \dots + \frac{19}{4}u - \frac{3}{2} \\ -4u^{63} + \frac{81}{4}u^{62} + \dots - \frac{81}{4}u + \frac{25}{4} \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes =  $-4u^{63} + \frac{59}{2}u^{62} + \dots - 45u + 19$

(iv) Complex Volumes and Cusp Shapes

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.735078 - 0.741338I$		
$a = 1.11429 + 0.90700I$	$-4.22111 + 6.84171I$	$-1.59341 - 7.10151I$
$b = -0.588299 - 1.208458I$		
$u = -0.735078 + 0.741338I$		
$a = 1.11429 - 0.90700I$	$-4.22111 - 6.84171I$	$-1.59341 + 7.10151I$
$b = -0.588299 + 1.208458I$		
$u = -0.694513 - 0.879406I$		
$a = -0.62208 - 1.29262I$	$-4.62918 - 1.44235I$	$-3.37995 + 0.97036I$
$b = -0.505150 + 1.066698I$		
$u = -0.694513 + 0.879406I$		
$a = -0.62208 + 1.29262I$	$-4.62918 + 1.44235I$	$-3.37995 - 0.97036I$
$b = -0.505150 - 1.066698I$		
$u = -0.680116 - 0.715014I$		
$a = -1.002741 - 0.745211I$	$1.11308 + 3.77623I$	$3.53850 - 8.28052I$
$b = 0.575290 + 0.806783I$		
$u = -0.680116 + 0.715014I$		
$a = -1.002741 + 0.745211I$	$1.11308 - 3.77623I$	$3.53850 + 8.28052I$
$b = 0.575290 - 0.806783I$		
$u = -0.622690 - 0.884006I$		
$a = 0.340957 + 1.035380I$	$0.617090 + 1.254920I$	$0.39440 + 2.97018I$
$b = 0.417018 - 0.552234I$		
$u = -0.622690 + 0.884006I$		
$a = 0.340957 - 1.035380I$	$0.617090 - 1.254920I$	$0.39440 - 2.97018I$
$b = 0.417018 + 0.552234I$		
$u = -0.619258 - 0.181711I$		
$a = 0.494250 + 0.200611I$	$-3.79975 - 3.98351I$	$1.34226 + 2.85237I$
$b = -0.605266 + 1.128643I$		
$u = -0.619258 + 0.181711I$		
$a = 0.494250 - 0.200611I$	$-3.79975 + 3.98351I$	$1.34226 - 2.85237I$
$b = -0.605266 - 1.128643I$		

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.615065 - 0.539710I$		
$a = 1.020154 + 0.418669I$	$-0.80196 + 1.43696I$	$3.65803 - 3.25922I$
$b = -0.915962 - 0.020615I$		
$u = -0.615065 + 0.539710I$		
$a = 1.020154 - 0.418669I$	$-0.80196 - 1.43696I$	$3.65803 + 3.25922I$
$b = -0.915962 + 0.020615I$		
$u = -0.576511 - 0.995174I$		
$a = 0.344265 - 1.271349I$	$-2.10866 + 3.26818I$	$0.88800 - 1.82800I$
$b = -0.843175 - 0.130343I$		
$u = -0.576511 + 0.995174I$		
$a = 0.344265 + 1.271349I$	$-2.10866 - 3.26818I$	$0.88800 + 1.82800I$
$b = -0.843175 + 0.130343I$		
$u = -0.519658 - 0.292194I$		
$a = -0.726282 - 0.423734I$	$1.38695 - 0.99326I$	$6.93338 + 2.70050I$
$b = 0.619288 - 0.692243I$		
$u = -0.519658 + 0.292194I$		
$a = -0.726282 + 0.423734I$	$1.38695 + 0.99326I$	$6.93338 - 2.70050I$
$b = 0.619288 + 0.692243I$		
$u = -0.494728 - 1.126425I$		
$a = 1.26113 - 1.37996I$	$-6.41876 + 8.33142I$	$-2.78341 - 6.40396I$
$b = -0.53135 - 1.32618I$		
$u = -0.494728 + 1.126425I$		
$a = 1.26113 + 1.37996I$	$-6.41876 - 8.33142I$	$-2.78341 + 6.40396I$
$b = -0.53135 + 1.32618I$		
$u = -0.490810 - 1.089827I$		
$a = -1.09940 + 1.24577I$	$-0.84283 + 5.16860I$	$1.77998 - 6.94898I$
$b = 0.493247 + 1.009751I$		
$u = -0.490810 + 1.089827I$		
$a = -1.09940 - 1.24577I$	$-0.84283 - 5.16860I$	$1.77998 + 6.94898I$
$b = 0.493247 - 1.009751I$		

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.418981 - 1.053552I$ $a = 1.16793 - 0.83737I$ $b = -0.019707 - 0.737165I$	$-1.42932 + 1.81815I$	$-0.185423 + 0.070708I$
$u = -0.418981 + 1.053552I$ $a = 1.16793 + 0.83737I$ $b = -0.019707 + 0.737165I$	$-1.42932 - 1.81815I$	$-0.185423 - 0.070708I$
$u = -0.389062 - 0.696232I$ $a = 0.966018 + 0.272929I$ $b = -0.218441 + 0.050295I$	$-0.108314 + 1.390216I$	$-0.08539 - 5.01290I$
$u = -0.389062 + 0.696232I$ $a = 0.966018 - 0.272929I$ $b = -0.218441 - 0.050295I$	$-0.108314 - 1.390216I$	$-0.08539 + 5.01290I$
$u = -0.387885 - 1.118076I$ $a = -1.49532 + 0.87150I$ $b = -0.304351 + 1.069283I$	$-7.17316 - 0.63151I$	$-4.30122 - 0.34053I$
$u = -0.387885 + 1.118076I$ $a = -1.49532 - 0.87150I$ $b = -0.304351 - 1.069283I$	$-7.17316 + 0.63151I$	$-4.30122 + 0.34053I$
$u = -0.122603 - 0.930328I$ $a = -1.393606 + 0.045154I$ $b = -0.469006 - 0.335557I$	$-4.92247 + 2.18904I$	$-4.65404 - 3.26972I$
$u = -0.122603 + 0.930328I$ $a = -1.393606 - 0.045154I$ $b = -0.469006 + 0.335557I$	$-4.92247 - 2.18904I$	$-4.65404 + 3.26972I$
$u = 0.242313 - 1.220947I$ $a = -0.521486 - 0.556363I$ $b = -0.47904 - 1.55418I$	$-11.74310 + 6.28318I$	$-6.20124 - 3.33262I$
$u = 0.242313 + 1.220947I$ $a = -0.521486 + 0.556363I$ $b = -0.47904 + 1.55418I$	$-11.74310 - 6.28318I$	$-6.20124 + 3.33262I$

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.257924 - 1.188837I$ $a = 0.467350 + 0.349051I$ $b = 0.49301 + 1.37784I$	$-5.86520 + 2.84323I$	$-2.57675 - 3.28324I$
$u = 0.257924 + 1.188837I$ $a = 0.467350 - 0.349051I$ $b = 0.49301 - 1.37784I$	$-5.86520 - 2.84323I$	$-2.57675 + 3.28324I$
$u = 0.307917 - 1.177710I$ $a = -0.181626 - 0.189097I$ $b = -0.384211 - 1.164543I$	$-6.52829 - 1.28000I$	$-4.07342 + 3.16356I$
$u = 0.307917 + 1.177710I$ $a = -0.181626 + 0.189097I$ $b = -0.384211 + 1.164543I$	$-6.52829 + 1.28000I$	$-4.07342 - 3.16356I$
$u = 0.337131 - 1.219578I$ $a = -0.101584 + 0.418135I$ $b = 0.063179 + 1.129281I$	$-13.05125 - 3.75910I$	$-7.26420 + 3.01338I$
$u = 0.337131 + 1.219578I$ $a = -0.101584 - 0.418135I$ $b = 0.063179 - 1.129281I$	$-13.05125 + 3.75910I$	$-7.26420 - 3.01338I$
$u = 0.356619 - 0.583792I$ $a = 2.25724 + 0.39467I$ $b = -0.984540 + 0.964605I$	$-2.78162 - 3.76575I$	$0.263198 + 0.073153I$
$u = 0.356619 + 0.583792I$ $a = 2.25724 - 0.39467I$ $b = -0.984540 - 0.964605I$	$-2.78162 + 3.76575I$	$0.263198 - 0.073153I$
$u = 0.409832 - 0.426095I$ $a = -2.07083 - 0.60941I$ $b = 1.030905 - 0.389819I$	$1.72799 - 0.42864I$	$6.50290 - 0.62963I$
$u = 0.409832 + 0.426095I$ $a = -2.07083 + 0.60941I$ $b = 1.030905 + 0.389819I$	$1.72799 + 0.42864I$	$6.50290 + 0.62963I$



Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.420710 - 1.046207I$ $a = 0.118047 + 1.212511I$ $b = -1.31146 - 0.77730I$	$-4.30101 + 0.38221I$	$-4.61860 + 1.03718I$
$u = 0.420710 + 1.046207I$ $a = 0.118047 - 1.212511I$ $b = -1.31146 + 0.77730I$	$-4.30101 - 0.38221I$	$-4.61860 - 1.03718I$
$u = 0.466545 - 1.067941I$ $a = -0.676119 - 1.234263I$ $b = 1.42443 + 0.26110I$	$-0.20927 - 3.41413I$	$1.14237 + 4.37134I$
$u = 0.466545 + 1.067941I$ $a = -0.676119 + 1.234263I$ $b = 1.42443 - 0.26110I$	$-0.20927 + 3.41413I$	$1.14237 - 4.37134I$
$u = 0.507937 - 1.090136I$ $a = 1.17294 + 1.14767I$ $b = -1.41610 + 0.31092I$	$-3.53941 - 7.25346I$	$-1.79132 + 7.99556I$
$u = 0.507937 + 1.090136I$ $a = 1.17294 - 1.14767I$ $b = -1.41610 - 0.31092I$	$-3.53941 + 7.25346I$	$-1.79132 - 7.99556I$
$u = 0.521676 - 1.187883I$ $a = -1.55044 - 0.27175I$ $b = 0.221875 - 0.843601I$	$-11.78025 - 5.04358I$	$-5.87133 + 3.59962I$
$u = 0.521676 + 1.187883I$ $a = -1.55044 + 0.27175I$ $b = 0.221875 + 0.843601I$	$-11.78025 + 5.04358I$	$-5.87133 - 3.59962I$
$u = 0.540037 - 1.153150I$ $a = 1.63218 + 0.62898I$ $b = -0.760093 + 0.996048I$	$-4.93845 - 6.98785I$	$-1.90680 + 3.70412I$
$u = 0.540037 + 1.153150I$ $a = 1.63218 - 0.62898I$ $b = -0.760093 - 0.996048I$	$-4.93845 + 6.98785I$	$-1.90680 - 3.70412I$

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.566926 - 1.157342I$ $a = -1.88423 - 0.65239I$ $b = 0.81009 - 1.39452I$	$-3.76417 - 11.20391I$	$0.56898 + 8.94453I$
$u = 0.566926 + 1.157342I$ $a = -1.88423 + 0.65239I$ $b = 0.81009 + 1.39452I$	$-3.76417 + 11.20391I$	$0.56898 - 8.94453I$
$u = 0.579124 - 1.168979I$ $a = 2.01876 + 0.57644I$ $b = -0.69054 + 1.62823I$	$-9.4393 - 14.9162I$	$-3.30681 + 9.03649I$
$u = 0.579124 + 1.168979I$ $a = 2.01876 - 0.57644I$ $b = -0.69054 - 1.62823I$	$-9.4393 + 14.9162I$	$-3.30681 - 9.03649I$
$u = 0.599408 - 0.347907I$ $a = 1.76872 + 0.81509I$ $b = -1.171660 - 0.255574I$	$-1.39099 + 2.85342I$	$2.51596 - 4.24653I$
$u = 0.599408 + 0.347907I$ $a = 1.76872 - 0.81509I$ $b = -1.171660 + 0.255574I$	$-1.39099 - 2.85342I$	$2.51596 + 4.24653I$
$u = 0.764801 - 0.235224I$ $a = 1.17570 + 0.79216I$ $b = -0.570895 - 0.877125I$	$-2.26669 + 2.10675I$	$0.859060 - 0.119964I$
$u = 0.764801 + 0.235224I$ $a = 1.17570 - 0.79216I$ $b = -0.570895 + 0.877125I$	$-2.26669 - 2.10675I$	$0.859060 + 0.119964I$
$u = 0.812499 - 0.287505I$ $a = -1.10734 - 1.04256I$ $b = 0.72950 + 1.27555I$	$-1.18297 + 6.07475I$	$3.41678 - 5.69062I$
$u = 0.812499 + 0.287505I$ $a = -1.10734 + 1.04256I$ $b = 0.72950 - 1.27555I$	$-1.18297 - 6.07475I$	$3.41678 + 5.69062I$

Solution to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.826187 - 0.166412I$	$-8.74276 + 0.11604I$	$-3.00473 - 0.03781I$
$a = -0.875509 - 0.634241I$		
$b = 0.044697 + 0.893833I$		
$u = 0.826187 + 0.166412I$	$-8.74276 - 0.11604I$	$-3.00473 + 0.03781I$
$a = -0.875509 + 0.634241I$		
$b = 0.044697 - 0.893833I$		
$u = 0.849369 - 0.292238I$	$-6.81464 + 9.64252I$	$-0.70577 - 5.65138I$
$a = 0.98865 + 1.13146I$		
$b = -0.65329 - 1.53644I$		
$u = 0.849369 + 0.292238I$	$-6.81464 - 9.64252I$	$-0.70577 + 5.65138I$
$a = 0.98865 - 1.13146I$		
$b = -0.65329 + 1.53644I$		

### III. u-Polynomials

Crossings	u-Polynomials at each crossings
$c_1$	$(u^2 + u + 1)^3(u^{64} + 4u^{63} + \dots + 4u + 1)$
$c_2$	$(u^2 + u + 1)^3(u^{64} + 32u^{63} + \dots + 4u + 1)$
$c_3, c_8$	$u^6(u^{64} + u^{63} + \dots - 32u + 64)$
$c_4$	$(u^2 - u + 1)^3(u^{64} + 4u^{63} + \dots + 4u + 1)$
$c_5$	$(u^2 + u + 1)^3(u^{64} + 4u^{63} + \dots - 393u + 306)$
$c_6, c_7$	$(u^3 + u^2 + 2u + 1)^2(u^{64} + 3u^{63} + \dots + 3u + 1)$
$c_9$	$(u^3 + u^2 - 1)^2(u^{64} + 3u^{63} + \dots - 139u + 34)$
$c_{10}$	$(u^3 - u^2 + 2u - 1)^2(u^{64} + 3u^{63} + \dots + 3u + 1)$
$c_{11}$	$(u^3 + u^2 - 1)^2(u^{64} + 13u^{63} + \dots + 9803u + 563)$

#### IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
$c_1, c_4$	$(y^2 + y + 1)^3(y^{64} + 32y^{63} + \dots + 4y + 1)$
$c_2$	$(y^2 + y + 1)^3(y^{64} + 4y^{63} + \dots + 32y + 1)$
$c_3, c_8$	$y^6(y^{64} - 35y^{63} + \dots - 62464y + 4096)$
$c_5$	$(y^2 + y + 1)^3(y^{64} - 24y^{63} + \dots - 628749y + 93636)$
$c_6$	$(y^3 + 3y^2 + 2y - 1)^2(y^{64} + 59y^{63} + \dots + 9y + 1)$
$c_7, c_{10}$	$(y^3 + 3y^2 + 2y - 1)^2(y^{64} + 59y^{63} + \dots + 9y + 1)$
$c_9$	$(y^3 - y^2 + 2y - 1)^2(y^{64} + 7y^{63} + \dots + 48679y + 1156)$
$c_{11}$	$(y^3 - y^2 + 2y - 1)^2(y^{64} + 27y^{63} + \dots - 7846307y + 316969)$