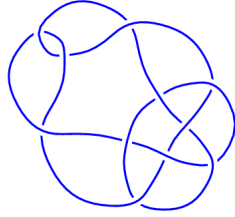
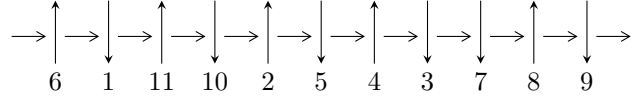


11a₁₃₅ (K11a₁₃₅)

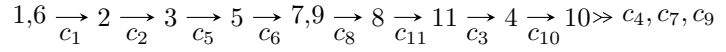


1

Arc Sequences



Solving Sequence



Representation Ideals

$$I = \bigcap_{i=1}^4 I_i^u$$

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

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

$$I_3^u = \langle b^{54} - 5b^{53} + \dots - 529b + 44, \\ 8.06320 \times 10^{139}b^{53} - 3.78957 \times 10^{140}b^{52} + \dots + 4.24820 \times 10^{140}a - 9.65184 \times 10^{141}, \\ 8.49640 \times 10^{140}u + 1.00393 \times 10^{140}b^{53} + \dots + 8.83760 \times 10^{142}b - 8.86168 \times 10^{141} \rangle$$

$$I_4^u = \langle u^{36} - 6u^{35} + \dots + u + 4, -1271u^{35} + 7400u^{34} + \dots + 559b + 6593, \\ 1511u^{35} - 17846u^{34} + \dots + 2236a - 43197 \rangle$$

There are 4 irreducible components with 104 representations.

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

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

(i) Arc colorings

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

$$a_6 = \begin{pmatrix} 0 \\ \frac{2}{5}a^3 - \frac{1}{5}a^2 + \frac{3}{5}a + \frac{2}{5} \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 1 \\ \frac{2}{5}a^3 - \frac{1}{5}a^2 + \frac{3}{5}a + \frac{7}{5} \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -\frac{2}{5}a^3 + \frac{1}{5}a^2 - \frac{3}{5}a - \frac{2}{5} \\ \frac{2}{5}a^3 - \frac{1}{5}a^2 + \frac{3}{5}a + \frac{7}{5} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -\frac{2}{5}a^3 + \frac{1}{5}a^2 - \frac{3}{5}a - \frac{2}{5} \\ \frac{2}{5}a^3 - \frac{1}{5}a^2 + \frac{3}{5}a + \frac{7}{5} \end{pmatrix}$$

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

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

$$a_8 = \begin{pmatrix} \frac{2}{5}a^3 - \frac{1}{5}a^2 + \frac{3}{5}a + \frac{7}{5} \\ \frac{1}{5}a^3 - \frac{3}{5}a^2 + \frac{4}{5}a - \frac{4}{5} \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} a^2 \\ \frac{3}{5}a^3 - \frac{4}{5}a^2 + \frac{2}{5}a + \frac{8}{5} \end{pmatrix}$$

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

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

(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
$u = -0.500000 - 0.866025I$ $a = -0.973561 - 0.421254I$ $b = -1.00000$	$-1.64493 + 2.02988I$	$-7.50000 - 7.79423I$
$u = -0.500000 + 0.866025I$ $a = -0.973561 + 0.421254I$ $b = -1.00000$	$-1.64493 - 2.02988I$	$-7.50000 + 7.79423I$
$u = -0.500000 - 0.866025I$ $a = 0.97356 - 1.31080I$ $b = -1.00000$	$-1.64493 + 2.02988I$	$-7.50000 - 7.79423I$
$u = -0.500000 + 0.866025I$ $a = 0.97356 + 1.31080I$ $b = -1.00000$	$-1.64493 - 2.02988I$	$-7.50000 + 7.79423I$

II.

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

(i) Arc colorings

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

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

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

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

$$a_5 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u^3 \\ u^5 + u^3 + u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u^8 - u^7 - u^4 - u^3 + u^2 + 3 \\ 2u^9 - u^8 + 3u^7 - u^6 + 6u^5 - 4u^4 + 8u^3 - 5u^2 + 4u - 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} u^9 - u^8 + u^7 + 3u^5 - 2u^4 + 3u^3 - u^2 + 2u + 2 \\ u^9 - u^8 + 2u^7 - u^6 + 4u^5 - 3u^4 + 6u^3 - 4u^2 + 4u - 1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -2u^9 + 2u^8 - 4u^7 + 2u^6 - 7u^5 + 7u^4 - 10u^3 + 9u^2 - 8u + 3 \\ u^9 + u^7 + 2u^5 - u^4 + 2u^3 - u^2 + 1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^9 - 2u^8 + 2u^7 - 3u^6 + 3u^5 - 7u^4 + 6u^3 - 9u^2 + 4u - 4 \\ -u^9 + u^8 - u^7 + u^6 - 3u^5 + 3u^4 - 3u^3 + 3u^2 - 2u \end{pmatrix}$$

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

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

(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
$u = -0.959043 - 0.878682I$ $a = -0.164415 + 0.151502I$ $b = 0.403043 + 0.198949I$	$4.80462 + 3.47437I$	$3.99287 - 12.44497I$
$u = -0.959043 + 0.878682I$ $a = -0.164415 - 0.151502I$ $b = 0.403043 - 0.198949I$	$4.80462 - 3.47437I$	$3.99287 + 12.44497I$
$u = -0.127642 - 1.018333I$ $a = -0.976414 + 0.047787I$ $b = -0.463656 + 0.708869I$	$-1.78029 + 4.07054I$	$-3.97032 - 7.89370I$
$u = -0.127642 + 1.018333I$ $a = -0.976414 - 0.047787I$ $b = -0.463656 - 0.708869I$	$-1.78029 - 4.07054I$	$-3.97032 + 7.89370I$
$u = 0.017671 - 0.535344I$ $a = 2.64366 - 0.19676I$ $b = 0.107691 - 1.094784I$	$0.41119 - 3.68242I$	$-1.80179 + 6.14716I$
$u = 0.017671 + 0.535344I$ $a = 2.64366 + 0.19676I$ $b = 0.107691 + 1.094784I$	$0.41119 + 3.68242I$	$-1.80179 - 6.14716I$
$u = 0.766035 - 0.955271I$ $a = -1.00445 + 2.19705I$ $b = -0.61139 - 1.42806I$	$3.81810 - 8.61429I$	$2.88207 + 9.27981I$
$u = 0.766035 + 0.955271I$ $a = -1.00445 - 2.19705I$ $b = -0.61139 + 1.42806I$	$3.81810 + 8.61429I$	$2.88207 - 9.27981I$
$u = 0.802978 - 0.812239I$ $a = 1.00162 - 1.89487I$ $b = -0.43569 + 1.47399I$	$4.26091 + 2.70997I$	$3.89717 - 4.51185I$
$u = 0.802978 + 0.812239I$ $a = 1.00162 + 1.89487I$ $b = -0.43569 - 1.47399I$	$4.26091 - 2.70997I$	$3.89717 + 4.51185I$

$$\text{III. } I_3^u = \langle b^{54} - 5b^{53} + \dots - 529b + 44, 8.06 \times 10^{139} b^{53} - 3.79 \times 10^{140} b^{52} + \dots + 4.25 \times 10^{140} a - 9.65 \times 10^{141}, 8.50 \times 10^{140} u + 1.00 \times 10^{140} b^{53} + \dots + 8.84 \times 10^{142} b - 8.86 \times 10^{141} \rangle$$

(i) Arc colorings

$$\begin{aligned} a_1 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_6 &= \begin{pmatrix} 0 \\ -0.118159b^{53} + 0.517616b^{52} + \dots - 104.016b + 10.4299 \end{pmatrix} \\ a_2 &= \begin{pmatrix} 1 \\ 0.0791035b^{53} - 0.361649b^{52} + \dots + 28.3579b - 0.476072 \end{pmatrix} \\ a_3 &= \begin{pmatrix} -0.0791035b^{53} + 0.361649b^{52} + \dots - 28.3579b + 1.47607 \\ 0.0791035b^{53} - 0.361649b^{52} + \dots + 28.3579b - 0.476072 \end{pmatrix} \\ a_5 &= \begin{pmatrix} 0.118159b^{53} - 0.517616b^{52} + \dots + 104.016b - 10.4299 \\ 0.108011b^{53} - 0.488970b^{52} + \dots + 42.6098b - 1.09144 \end{pmatrix} \\ a_7 &= \begin{pmatrix} -0.226170b^{53} + 1.00659b^{52} + \dots - 146.626b + 11.5214 \\ -0.0974566b^{53} + 0.427831b^{52} + \dots - 76.6581b + 8.69667 \end{pmatrix} \\ a_9 &= \begin{pmatrix} -0.189803b^{53} + 0.892042b^{52} + \dots - 223.445b + 22.7198 \\ b \end{pmatrix} \\ a_8 &= \begin{pmatrix} -0.0259327b^{53} + 0.118038b^{52} + \dots + 24.7444b - 1.91443 \\ 0.000842886b^{53} + 0.00446555b^{52} + \dots - 29.0013b + 4.04339 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} 0.0569716b^{53} - 0.281472b^{52} + \dots + 77.6859b - 7.35132 \\ -b^2 \end{pmatrix} \\ a_4 &= \begin{pmatrix} -0.115939b^{53} + 0.497037b^{52} + \dots - 27.1615b + 1.78118 \\ 0.0398718b^{53} - 0.191165b^{52} + \dots - 3.38416b + 2.65132 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} 0.0220435b^{53} - 0.151085b^{52} + \dots + 59.8995b - 2.90022 \\ 0.00201076b^{53} + 0.00692089b^{52} + \dots - 36.0512b + 2.98915 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} 0.0220435b^{53} - 0.151085b^{52} + \dots + 59.8995b - 2.90022 \\ 0.00201076b^{53} + 0.00692089b^{52} + \dots - 36.0512b + 2.98915 \end{pmatrix} \end{aligned}$$

(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
$u = -0.740227 + 0.958313I$ $a = -0.83078 + 2.42491I$ $b = -1.23050 - 1.60076I$	$1.92805 - 8.81809I$	$-3.51760 + 9.35403I$
$u = -0.740227 - 0.958313I$ $a = -0.83078 - 2.42491I$ $b = -1.23050 + 1.60076I$	$1.92805 + 8.81809I$	$-3.51760 - 9.35403I$
$u = 0.144711 - 0.987236I$ $a = -1.044320 - 0.252570I$ $b = -1.10548 - 0.93118I$	$-3.43692 - 4.10370I$	$-10.33067 + 7.76154I$
$u = 0.144711 + 0.987236I$ $a = -1.044320 + 0.252570I$ $b = -1.10548 + 0.93118I$	$-3.43692 + 4.10370I$	$-10.33067 - 7.76154I$
$u = -0.770533 - 0.784290I$ $a = 1.53553 + 1.36774I$ $b = -1.00807 - 1.68610I$	$2.45928 - 3.09185I$	$-2.04409 + 4.31047I$
$u = -0.770533 + 0.784290I$ $a = 1.53553 - 1.36774I$ $b = -1.00807 + 1.68610I$	$2.45928 + 3.09185I$	$-2.04409 - 4.31047I$
$u = 0.785462 - 0.911233I$ $a = -1.04193 + 2.09558I$ $b = -0.810627 - 0.965025I$	$5.75923 - 7.48234I$	$4.88411 + 7.87589I$
$u = 0.785462 + 0.911233I$ $a = -1.04193 - 2.09558I$ $b = -0.810627 + 0.965025I$	$5.75923 + 7.48234I$	$4.88411 - 7.87589I$
$u = 0.504183 + 0.966350I$ $a = 0.992670 - 0.899903I$ $b = -0.809221 - 0.348625I$	$-1.43447 + 1.57559I$	$-0.45968 + 6.99556I$
$u = 0.504183 - 0.966350I$ $a = 0.992670 + 0.899903I$ $b = -0.809221 + 0.348625I$	$-1.43447 - 1.57559I$	$-0.45968 - 6.99556I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.799598 + 0.863452I$ $a = 0.472052 + 1.331296I$ $b = -0.753138 - 1.063977I$	$5.90777 - 1.53174I$	$5.51904 + 2.02847I$
$u = 0.799598 - 0.863452I$ $a = 0.472052 - 1.331296I$ $b = -0.753138 + 1.063977I$	$5.90777 + 1.53174I$	$5.51904 - 2.02847I$
$u = 0.522984 - 0.315101I$ $a = 1.14627 + 0.90462I$ $b = -0.541670 - 0.765569I$	$0.23096 - 2.37565I$	$1.69627 + 5.05605I$
$u = 0.522984 + 0.315101I$ $a = 1.14627 - 0.90462I$ $b = -0.541670 + 0.765569I$	$0.23096 + 2.37565I$	$1.69627 - 5.05605I$
$u = -0.786810 + 1.024737I$ $a = -0.87495 + 1.40397I$ $b = -0.499560 - 1.264317I$	$6.54280 - 9.46925I$	$4.33045 + 8.20563I$
$u = -0.786810 - 1.024737I$ $a = -0.87495 - 1.40397I$ $b = -0.499560 + 1.264317I$	$6.54280 + 9.46925I$	$4.33045 - 8.20563I$
$u = -0.194164 + 0.737666I$ $a = -3.27600 - 0.27489I$ $b = -0.393595 - 0.629207I$	$0.15408 - 4.76928I$	$-1.41513 + 11.31767I$
$u = -0.194164 - 0.737666I$ $a = -3.27600 + 0.27489I$ $b = -0.393595 + 0.629207I$	$0.15408 + 4.76928I$	$-1.41513 - 11.31767I$
$u = -0.241884 - 0.503654I$ $a = 0.93986 + 1.89203I$ $b = -0.363999 - 1.059617I$	$0.79481 - 2.83207I$	$2.50674 - 1.28047I$
$u = -0.241884 + 0.503654I$ $a = 0.93986 - 1.89203I$ $b = -0.363999 + 1.059617I$	$0.79481 + 2.83207I$	$2.50674 + 1.28047I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.898179 - 0.746104I$ $a = 0.595344 + 1.207397I$ $b = -0.349108 - 1.259595I$	$7.41344 - 3.23384I$	$5.98510 + 2.95350I$
$u = -0.898179 + 0.746104I$ $a = 0.595344 - 1.207397I$ $b = -0.349108 + 1.259595I$	$7.41344 + 3.23384I$	$5.98510 - 2.95350I$
$u = 0.291946 - 1.107071I$ $a = -0.323787 - 0.014224I$ $b = -0.311394 - 0.647844I$	$-0.60671 - 3.68820I$	$4.86231 + 6.92207I$
$u = 0.291946 + 1.107071I$ $a = -0.323787 + 0.014224I$ $b = -0.311394 + 0.647844I$	$-0.60671 + 3.68820I$	$4.86231 - 6.92207I$
$u = -0.770533 + 0.784290I$ $a = -0.44956 + 1.58387I$ $b = 0.151642 - 0.255883I$	$2.45928 + 3.09185I$	$-2.04409 - 4.31047I$
$u = -0.770533 - 0.784290I$ $a = -0.44956 - 1.58387I$ $b = 0.151642 + 0.255883I$	$2.45928 - 3.09185I$	$-2.04409 + 4.31047I$
$u = 0.802525$ $a = 0.064178 + 0.713542I$ $b = 0.219481 - 0.777240I$	3.09479	9.01783
$u = 0.802525$ $a = 0.064178 - 0.713542I$ $b = 0.219481 + 0.777240I$	3.09479	9.01783
$u = -0.194164 + 0.737666I$ $a = -0.1051245 - 0.0794208I$ $b = 0.24714 - 1.64517I$	$0.15408 - 4.76928I$	$-1.41513 + 11.31767I$
$u = -0.194164 - 0.737666I$ $a = -0.1051245 + 0.0794208I$ $b = 0.24714 + 1.64517I$	$0.15408 + 4.76928I$	$-1.41513 - 11.31767I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.740227 - 0.958313I$ $a = 0.17325 + 1.77767I$ $b = 0.279114 - 0.386141I$	$1.92805 + 8.81809I$	$-3.51760 - 9.35403I$
$u = -0.740227 + 0.958313I$ $a = 0.17325 - 1.77767I$ $b = 0.279114 + 0.386141I$	$1.92805 - 8.81809I$	$-3.51760 + 9.35403I$
$u = 0.291946 + 1.107071I$ $a = 0.931124 + 0.230119I$ $b = 0.646966 - 0.516614I$	$-0.60671 + 3.68820I$	$4.86231 - 6.92207I$
$u = 0.291946 - 1.107071I$ $a = 0.931124 - 0.230119I$ $b = 0.646966 + 0.516614I$	$-0.60671 - 3.68820I$	$4.86231 + 6.92207I$
$u = -0.241884 - 0.503654I$ $a = 2.35199 - 0.56436I$ $b = 0.686698 - 0.816102I$	$0.79481 - 2.83207I$	$2.50674 - 1.28047I$
$u = -0.241884 + 0.503654I$ $a = 2.35199 + 0.56436I$ $b = 0.686698 + 0.816102I$	$0.79481 + 2.83207I$	$2.50674 + 1.28047I$
$u = 0.144711 + 0.987236I$ $a = 1.17591 + 1.35422I$ $b = 0.694713 - 0.161571I$	$-3.43692 + 4.10370I$	$-10.33067 - 7.76154I$
$u = 0.144711 - 0.987236I$ $a = 1.17591 - 1.35422I$ $b = 0.694713 + 0.161571I$	$-3.43692 - 4.10370I$	$-10.33067 + 7.76154I$
$u = -0.818350 + 0.893459I$ $a = -0.350459 + 0.093702I$ $b = 0.789809 - 0.525186I$	$6.46144 - 3.05379I$	$5.97423 + 2.71426I$
$u = -0.818350 - 0.893459I$ $a = -0.350459 - 0.093702I$ $b = 0.789809 + 0.525186I$	$6.46144 + 3.05379I$	$5.97423 - 2.71426I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.522984 - 0.315101I$		
$a = 0.220722 - 1.030082I$	$0.23096 - 2.37565I$	$1.69627 + 5.05605I$
$b = 0.852048 - 0.137605I$		
$u = 0.522984 + 0.315101I$		
$a = 0.220722 + 1.030082I$	$0.23096 + 2.37565I$	$1.69627 - 5.05605I$
$b = 0.852048 + 0.137605I$		
$u = -0.898179 + 0.746104I$		
$a = -0.594838 + 0.861512I$	$7.41344 + 3.23384I$	$5.98510 - 2.95350I$
$b = 0.874324 - 0.984284I$		
$u = -0.898179 - 0.746104I$		
$a = -0.594838 - 0.861512I$	$7.41344 - 3.23384I$	$5.98510 + 2.95350I$
$b = 0.874324 + 0.984284I$		
$u = 0.504183 - 0.966350I$		
$a = 0.867903 - 0.476539I$	$-1.43447 - 1.57559I$	$-0.45968 - 6.99556I$
$b = 0.929423 - 0.017439I$		
$u = 0.504183 + 0.966350I$		
$a = 0.867903 + 0.476539I$	$-1.43447 + 1.57559I$	$-0.45968 + 6.99556I$
$b = 0.929423 + 0.017439I$		
$u = -0.786810 - 1.024737I$		
$a = 0.67436 + 1.65262I$	$6.54280 + 9.46925I$	$4.33045 - 8.20563I$
$b = 0.990241 - 0.929170I$		
$u = -0.786810 + 1.024737I$		
$a = 0.67436 - 1.65262I$	$6.54280 - 9.46925I$	$4.33045 + 8.20563I$
$b = 0.990241 + 0.929170I$		
$u = -0.818350 - 0.893459I$		
$a = 0.013291 + 1.076528I$	$6.46144 + 3.05379I$	$5.97423 - 2.71426I$
$b = 1.005787 - 0.379819I$		
$u = -0.818350 + 0.893459I$		
$a = 0.013291 - 1.076528I$	$6.46144 - 3.05379I$	$5.97423 + 2.71426I$
$b = 1.005787 + 0.379819I$		

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.785462 - 0.911233I$ $a = -1.79873 + 1.10105I$ $b = 1.09759 - 1.87961I$	$5.75923 - 7.48234I$	$4.88411 + 7.87589I$
$u = 0.785462 + 0.911233I$ $a = -1.79873 - 1.10105I$ $b = 1.09759 + 1.87961I$	$5.75923 + 7.48234I$	$4.88411 - 7.87589I$
$u = 0.799598 + 0.863452I$ $a = 0.53604 + 2.57871I$ $b = 1.21139 - 1.71770I$	$5.90777 - 1.53174I$	$5.51904 + 2.02847I$
$u = 0.799598 - 0.863452I$ $a = 0.53604 - 2.57871I$ $b = 1.21139 + 1.71770I$	$5.90777 + 1.53174I$	$5.51904 - 2.02847I$

$$\text{IV. } I_4^u = \langle u^{36} - 6u^{35} + \dots + u + 4, -1271u^{35} + 7400u^{34} + \dots + 559b + 6593, 1511u^{35} - 17846u^{34} + \dots + 2236a - 43197 \rangle$$

(i) Arc colorings

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

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

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

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

$$a_5 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u^3 \\ u^5 + u^3 + u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.675760u^{35} + 7.98122u^{34} + \dots + 27.4079u + 19.3189 \\ 2.27370u^{35} - 13.2379u^{34} + \dots - 13.8336u - 11.7943 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -5.13551u^{35} + 22.9168u^{34} + \dots - 13.4794u + 0.555009 \\ 11.4633u^{35} - 59.1413u^{34} + \dots + 2.49732u - 22.1485 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 2.05322u^{35} - 7.18515u^{34} + \dots + 17.4490u + 7.42889 \\ -0.159213u^{35} + 0.654741u^{34} + \dots - 7.64580u - 1.40072 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -4.34571u^{35} + 24.2531u^{34} + \dots + 1.93202u + 12.1552 \\ 1.29875u^{35} - 5.67800u^{34} + \dots + 5.43649u + 1.81932 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 5.53712u^{35} - 21.7594u^{34} + \dots + 26.2039u + 8.03444 \\ -7.89624u^{35} + 42.0340u^{34} + \dots + 5.69052u + 20.5420 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 5.53712u^{35} - 21.7594u^{34} + \dots + 26.2039u + 8.03444 \\ -7.89624u^{35} + 42.0340u^{34} + \dots + 5.69052u + 20.5420 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.848515 - 0.073137I$ $a = -0.708084 - 0.620130I$ $b = 0.741423 + 0.831359I$	$1.04891 - 7.93873I$	$2.26099 + 7.53856I$
$u = -0.848515 + 0.073137I$ $a = -0.708084 + 0.620130I$ $b = 0.741423 - 0.831359I$	$1.04891 + 7.93873I$	$2.26099 - 7.53856I$
$u = -0.824017 - 0.898169I$ $a = -0.177149 + 0.497820I$ $b = 0.921405 + 0.086126I$	$6.48061 + 3.07379I$	$6.45709 - 2.41299I$
$u = -0.824017 + 0.898169I$ $a = -0.177149 - 0.497820I$ $b = 0.921405 - 0.086126I$	$6.48061 - 3.07379I$	$6.45709 + 2.41299I$
$u = -0.754047 - 0.880053I$ $a = 0.256067 - 0.953865I$ $b = -1.57066 - 0.07535I$	$1.51994 + 2.85709I$	$-2.33106 - 2.86602I$
$u = -0.754047 + 0.880053I$ $a = 0.256067 + 0.953865I$ $b = -1.57066 + 0.07535I$	$1.51994 - 2.85709I$	$-2.33106 + 2.86602I$
$u = -0.483436 - 0.080826I$ $a = 1.52835 + 0.78222I$ $b = -0.758556 - 0.609588I$	$-1.25585 - 1.57291I$	$-2.37601 + 4.05394I$
$u = -0.483436 + 0.080826I$ $a = 1.52835 - 0.78222I$ $b = -0.758556 + 0.609588I$	$-1.25585 + 1.57291I$	$-2.37601 - 4.05394I$
$u = -0.335316 - 1.103161I$ $a = 0.986796 + 0.482008I$ $b = 1.076210 - 0.827984I$	$-2.43737 + 11.97936I$	$-3.58846 - 9.69532I$
$u = -0.335316 + 1.103161I$ $a = 0.986796 - 0.482008I$ $b = 1.076210 + 0.827984I$	$-2.43737 - 11.97936I$	$-3.58846 + 9.69532I$

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.304491 - 0.889790I$ $a = -0.062800 - 1.255707I$ $b = -1.142483 - 0.222558I$	$-3.69796 + 0.78585I$	$-10.32257 - 1.08257I$
$u = -0.304491 + 0.889790I$ $a = -0.062800 + 1.255707I$ $b = -1.142483 + 0.222558I$	$-3.69796 - 0.78585I$	$-10.32257 + 1.08257I$
$u = -0.276741 - 0.944175I$ $a = -1.25934 - 0.87235I$ $b = -1.18704 + 0.84945I$	$-3.77194 + 4.33449I$	$-10.34773 - 8.70742I$
$u = -0.276741 + 0.944175I$ $a = -1.25934 + 0.87235I$ $b = -1.18704 - 0.84945I$	$-3.77194 - 4.33449I$	$-10.34773 + 8.70742I$
$u = -0.185132 - 1.158738I$ $a = 0.116551 + 0.668626I$ $b = 0.655109 + 0.395481I$	$-3.33480 - 4.43993I$	$-6.66340 + 7.47745I$
$u = -0.185132 + 1.158738I$ $a = 0.116551 - 0.668626I$ $b = 0.655109 - 0.395481I$	$-3.33480 + 4.43993I$	$-6.66340 - 7.47745I$
$u = 0.021281 - 0.766965I$ $a = -1.40357 - 1.58774I$ $b = -1.045681 + 0.299865I$	$-2.80406 - 0.04358I$	$-9.18489 - 0.34635I$
$u = 0.021281 + 0.766965I$ $a = -1.40357 + 1.58774I$ $b = -1.045681 - 0.299865I$	$-2.80406 + 0.04358I$	$-9.18489 + 0.34635I$
$u = 0.374008 - 0.626804I$ $a = 0.891587 + 0.075576I$ $b = 0.070132 - 0.290278I$	$0.10177 - 1.47413I$	$1.25501 + 4.83821I$
$u = 0.374008 + 0.626804I$ $a = 0.891587 - 0.075576I$ $b = 0.070132 + 0.290278I$	$0.10177 + 1.47413I$	$1.25501 - 4.83821I$

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.670636 - 0.904481I$ $a = 0.853772 - 0.895928I$ $b = -0.023486 + 0.449791I$	$0.69868 - 2.21160I$	$-2.61972 + 2.06632I$
$u = 0.670636 + 0.904481I$ $a = 0.853772 + 0.895928I$ $b = -0.023486 - 0.449791I$	$0.69868 + 2.21160I$	$-2.61972 - 2.06632I$
$u = 0.700901 - 0.854931I$ $a = 0.21075 + 1.52850I$ $b = -0.322329 - 0.571982I$	$0.84484 - 3.07899I$	$-2.36753 + 4.61435I$
$u = 0.700901 + 0.854931I$ $a = 0.21075 - 1.52850I$ $b = -0.322329 + 0.571982I$	$0.84484 + 3.07899I$	$-2.36753 - 4.61435I$
$u = 0.789000 - 0.963507I$ $a = -0.51131 + 2.47418I$ $b = -1.06736 - 1.45192I$	$2.81727 - 8.47181I$	$-5.83967 + 8.29612I$
$u = 0.789000 + 0.963507I$ $a = -0.51131 - 2.47418I$ $b = -1.06736 + 1.45192I$	$2.81727 + 8.47181I$	$-5.83967 - 8.29612I$
$u = 0.798120 - 1.025270I$ $a = 0.57651 - 2.10645I$ $b = 1.23838 + 1.24673I$	$5.0855 - 17.6564I$	$0.86604 + 10.01914I$
$u = 0.798120 + 1.025270I$ $a = 0.57651 + 2.10645I$ $b = 1.23838 - 1.24673I$	$5.0855 + 17.6564I$	$0.86604 - 10.01914I$
$u = 0.836947 - 0.813811I$ $a = 1.45743 - 1.45510I$ $b = -0.90494 + 1.42986I$	$3.28088 + 2.39771I$	$-4.49853 - 2.73594I$
$u = 0.836947 + 0.813811I$ $a = 1.45743 + 1.45510I$ $b = -0.90494 - 1.42986I$	$3.28088 - 2.39771I$	$-4.49853 + 2.73594I$

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.880565 - 1.020470I$ $a = 0.032721 + 0.717303I$ $b = -0.616024 - 0.418194I$	$4.23977 - 3.68667I$	$-1.55636 + 11.71183I$
$u = 0.880565 + 1.020470I$ $a = 0.032721 - 0.717303I$ $b = -0.616024 + 0.418194I$	$4.23977 + 3.68667I$	$-1.55636 - 11.71183I$
$u = 0.911501 - 0.758905I$ $a = -1.10120 + 1.05489I$ $b = 1.12689 - 1.25578I$	$5.92417 + 11.34297I$	$2.20430 - 5.55458I$
$u = 0.911501 + 0.758905I$ $a = -1.10120 - 1.05489I$ $b = 1.12689 + 1.25578I$	$5.92417 - 11.34297I$	$2.20430 + 5.55458I$
$u = 1.028738 - 0.773325I$ $a = 0.187909 - 0.308356I$ $b = -0.190982 + 0.521409I$	$4.99883 - 3.21347I$	$19.6525 - 3.8446I$
$u = 1.028738 + 0.773325I$ $a = 0.187909 + 0.308356I$ $b = -0.190982 - 0.521409I$	$4.99883 + 3.21347I$	$19.6525 + 3.8446I$

V. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u^2 + u + 1)^2(u^{10} - u^9 + \dots - u + 1)$ $(1 + 4u^2 + 5u^3 + 11u^4 + 10u^5 + 31u^6 + 10u^7 + 51u^8 + 18u^9 + 52u^{10} + 46u^{11} + 20u^{12} + 82u^{13} + 19u^{14})$ $(u^{36} + 6u^{35} + \dots - u + 4)$
c_2, c_6	$(u^2 + u + 1)^2(u^{10} + 3u^9 + \dots + 9u + 1)$ $(-1 - 8u - 38u^2 - 125u^3 - 371u^4 - 994u^5 - 2159u^6 - 3498u^7 - 3863u^8 - 1472u^9 + 5076u^{10} + 19u^{11})$ $(u^{36} + 10u^{35} + \dots + 31u + 16)$
c_3, c_7	$(u^4 + u^3 + 3u^2 + u + 1)(u^{10} + u^8 + 2u^7 - u^5 + 3u^4 + u^3 - u^2 + 1)$ $(u^{36} + 2u^{35} + \dots + 2u + 1)(u^{54} + 4u^{53} + \dots + 9u + 2)$
c_4, c_8	$(u^4 + u^3 + 3u^2 + u + 1)(u^{10} - u^8 + u^7 + 3u^6 - u^5 + 2u^3 + u^2 + 1)$ $(u^{36} + 6u^{34} + \dots - 5u + 2)(u^{54} + 2u^{53} + \dots - 1697u + 407)$
c_5	$(u^2 - u + 1)^2(u^{10} + u^9 + \dots + u + 1)$ $(1 + 4u^2 + 5u^3 + 11u^4 + 10u^5 + 31u^6 + 10u^7 + 51u^8 + 18u^9 + 52u^{10} + 46u^{11} + 20u^{12} + 82u^{13} + 19u^{14})$ $(u^{36} + 6u^{35} + \dots - u + 4)$
c_9, c_{11}	$(u + 1)^4(u^{10} + 2u^9 + \dots - 2u + 1)$ $(u^{36} + 6u^{35} + \dots + 4u + 1)(u^{54} - 5u^{53} + \dots - 529u + 44)$
c_{10}	$u^4(u^{10} - 8u^9 + \dots - 94u + 21)$ $(-4 - 10u + 17u^2 + 97u^3 + 66u^4 - 286u^5 - 619u^6 - 33u^7 + 1451u^8 + 1900u^9 - 382u^{10} - 361u^{11} + 19u^{12})$ $(u^{36} - 19u^{35} + \dots - u + 2)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_5	$(y^2 + y + 1)^2(y^{10} + 3y^9 + \dots + 9y + 1)$ $(-1 - 8y - 38y^2 - 125y^3 - 371y^4 - 994y^5 - 2159y^6 - 3498y^7 - 3863y^8 - 1472y^9 + 5076y^{10} - \dots)$ $(y^{36} + 10y^{35} + \dots + 31y + 16)$
c_2, c_6	$(y^2 + y + 1)^2(y^{10} + 11y^9 + \dots - 23y + 1)$ $(-1 - 12y - 186y^2 - 985y^3 - 4983y^4 + 674y^5 - 1.43 \times 10^4 y^6 - 6.34 \times 10^4 y^7 + 6.50 \times 10^4 y^8 - \dots)$ $(y^{36} + 34y^{35} + \dots - 6849y + 256)$
c_3, c_7	$(y^4 + 5y^3 + 9y^2 + 5y + 1)$ $(y^{10} + 2y^9 + y^8 + 2y^7 + 8y^6 - 5y^5 + 13y^4 - 7y^3 + 7y^2 - 2y + 1)$ $(y^{36} + 24y^{35} + \dots + 44y + 1)(y^{54} - 8y^{53} + \dots + 87y + 4)$
c_4	$(y^4 + 5y^3 + 9y^2 + 5y + 1)$ $(y^{10} - 2y^9 + 7y^8 - 7y^7 + 13y^6 - 5y^5 + 8y^4 + 2y^3 + y^2 + 2y + 1)$ $(y^{36} + 12y^{35} + \dots + 27y + 4)$ $(y^{54} + 12y^{53} + \dots + 4226411y + 165649)$
c_8	$(y^4 + 5y^3 + 9y^2 + 5y + 1)$ $(y^{10} - 2y^9 + 7y^8 - 7y^7 + 13y^6 - 5y^5 + 8y^4 + 2y^3 + y^2 + 2y + 1)$ $(y^{36} + 12y^{35} + \dots + 27y + 4)$ $(y^{54} + 12y^{53} + \dots + 4226411y + 165649)$
c_9, c_{11}	$(y - 1)^4(y^{10} + 10y^9 + \dots - 2y + 1)(y^{36} - 8y^{35} + \dots + 28y + 1)$ $(y^{54} + 23y^{53} + \dots + 25783y + 1936)$
c_{10}	$y^4(y^{10} + 4y^9 + \dots + 488y + 441)$ $(-16 + 236y - 1701y^2 + 7933y^3 - 2.65 \times 10^4 y^4 + 6.67 \times 10^4 y^5 - 1.31 \times 10^5 y^6 + 2.12 \times 10^5 y^7 - \dots)$ $(y^{36} - y^{35} + \dots + 67y + 4)$