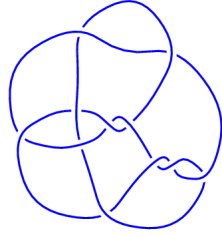
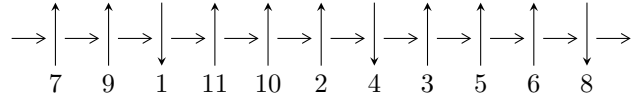


11a₃₁₂ (K11a₃₁₂)

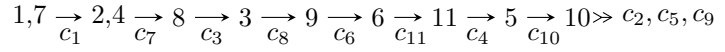


1

Arc Sequences



Solving Sequence



Representation Ideals

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

$$\begin{aligned} I_1^u &= \langle b^{48} + b^{47} + \dots + 160b + 293, 3.34435 \times 10^{80}u - 8.50411 \times 10^{78}b^{47} + \dots - 9.94682 \times 10^{80}b - 4.86540 \times 10^{80} \\ &\quad 1.21498 \times 10^{87}b^{47} + 1.80854 \times 10^{89}b^{46} + \dots + 4.76053 \times 10^{90}a + 4.53633 \times 10^{91} \rangle \\ I_2^u &= \langle u^{12} - 3u^{11} + 3u^{10} - u^9 + 2u^8 - 4u^7 + 3u^6 - 2u^5 + 2u^4 + u^3 - 2u^2 + 1, \\ &\quad - u^9 + 2u^8 - u^7 + u^6 - 3u^5 + 2u^4 - u^3 + 2u^2 + b - u - 1, \\ &\quad - u^{10} + 2u^9 - u^8 + u^7 - 3u^6 + 2u^5 - 2u^4 + 3u^3 - u^2 + a - u - 1 \rangle \\ I_3^u &= \langle u^{23} + 24u^{22} + \dots + 3840u + 256, -7u^{22} + 478u^{21} + \dots + 256a - 44288, \\ &\quad 385u^{22} + 9312u^{21} + \dots + 128b + 81792 \rangle \end{aligned}$$

There are 3 irreducible components with 83 representations.

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

$$\mathbf{I. } I_1^u = \langle b^{48} + b^{47} + \dots + 160b + 293, 3.34 \times 10^{80}u - 8.50 \times 10^{78}b^{47} + \dots - 9.95 \times 10^{80}b - 4.87 \times 10^{80}, 1.21 \times 10^{87}b^{47} + 1.81 \times 10^{89}b^{46} + \dots + 4.76 \times 10^{90}a + 4.54 \times 10^{91} \rangle$$

(i) Arc colorings

$$\begin{aligned} a_1 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_7 &= \begin{pmatrix} -0.000255220b^{47} - 0.0379903b^{46} + \dots - 2.84235b - 9.52904 \\ b \end{pmatrix} \\ a_2 &= \begin{pmatrix} 0.0377351b^{47} + 0.0418803b^{46} + \dots + 9.48821b + 0.925220 \\ -b^2 \end{pmatrix} \\ a_4 &= \begin{pmatrix} 0 \\ 0.0254283b^{47} + 0.0239377b^{46} + \dots + 2.97422b + 1.45481 \end{pmatrix} \\ a_8 &= \begin{pmatrix} -0.000255220b^{47} - 0.0379903b^{46} + \dots - 2.84235b - 9.52904 \\ 0.000364134b^{47} + 0.00613682b^{46} + \dots - 1.05074b + 1.19871 \end{pmatrix} \\ a_3 &= \begin{pmatrix} 0.0254283b^{47} + 0.0239377b^{46} + \dots + 2.97422b + 1.45481 \\ 0.0254283b^{47} + 0.0239377b^{46} + \dots + 2.97422b + 1.45481 \end{pmatrix} \\ a_9 &= \begin{pmatrix} -0.0210767b^{47} - 0.0454997b^{46} + \dots - 4.93964b - 5.07804 \\ -0.0204573b^{47} - 0.00137254b^{46} + \dots - 3.14803b + 5.64971 \end{pmatrix} \\ a_6 &= \begin{pmatrix} -0.00440036b^{47} + 0.00369281b^{46} + \dots + 2.27005b + 1.52734 \\ b^3 + b \end{pmatrix} \\ a_{11} &= \begin{pmatrix} -0.00325336b^{47} - 0.0223904b^{46} + \dots - 5.72379b - 2.19641 \\ -0.00425863b^{47} - 0.0449491b^{46} + \dots - 6.99224b - 9.82668 \end{pmatrix} \\ a_5 &= \begin{pmatrix} -0.00298386b^{47} - 0.0152709b^{46} + \dots - 4.37555b - 1.16930 \\ 0.0266581b^{47} + 0.0179830b^{46} + \dots + 2.88126b - 1.53338 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -0.00493869b^{47} - 0.0539919b^{46} + \dots - 6.15638b - 8.70294 \\ 0.00662005b^{47} - 0.0400467b^{46} + \dots - 8.53585b - 11.4767 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -0.00493869b^{47} - 0.0539919b^{46} + \dots - 6.15638b - 8.70294 \\ 0.00662005b^{47} - 0.0400467b^{46} + \dots - 8.53585b - 11.4767 \end{pmatrix} \end{aligned}$$

(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 |
|------------------------------------------------------------------------------------------|---------------------------------------|-----------------------|
| $u = 0.877439 - 0.744862I$ $a = -0.965420 + 0.090581I$ $b = -1.407324 - 0.123988I$ | $0.46900 + 9.27166I$ | $4.93820 - 8.27362I$ |
| $u = 0.877439 + 0.744862I$ $a = -0.965420 - 0.090581I$ $b = -1.407324 + 0.123988I$ | $0.46900 - 9.27166I$ | $4.93820 + 8.27362I$ |
| $u = 0.877439 - 0.744862I$ $a = -0.970106 - 0.140001I$ $b = -1.167429 - 0.563919I$ | $-0.87002 + 1.69689I$ | $2.92498 - 2.46866I$ |
| $u = 0.877439 + 0.744862I$ $a = -0.970106 + 0.140001I$ $b = -1.167429 + 0.563919I$ | $-0.87002 - 1.69689I$ | $2.92498 + 2.46866I$ |
| $u = -0.754878$ $a = -1.190113 + 0.035905I$ $b = -0.82210 - 1.57135I$ | $-3.66858 + 6.44354I$ | $-1.59106 - 5.29417I$ |
| $u = -0.754878$ $a = -1.190113 - 0.035905I$ $b = -0.82210 + 1.57135I$ | $-3.66858 - 6.44354I$ | $-1.59106 + 5.29417I$ |
| $u = 0.877439 - 0.744862I$ $a = -1.104040 + 0.345072I$ $b = -0.554508 - 1.009701I$ | $4.59206 + 2.82812I$ | $9.37379 - 2.97945I$ |
| $u = 0.877439 + 0.744862I$ $a = -1.104040 - 0.345072I$ $b = -0.554508 + 1.009701I$ | $4.59206 - 2.82812I$ | $9.37379 + 2.97945I$ |
| $u = 0.877439 - 0.744862I$ $a = -0.655169 - 0.222089I$ $b = -0.512781 - 0.176265I$ | $-1.06564 + 2.82812I$ | $7.40422 - 2.97945I$ |
| $u = 0.877439 + 0.744862I$ $a = -0.655169 + 0.222089I$ $b = -0.512781 + 0.176265I$ | $-1.06564 - 2.82812I$ | $7.40422 + 2.97945I$ |

| Solution to I_1^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|------------------------------------------------------------------------------------------|---------------------------------------|-------------------------|
| $u = 0.877439 - 0.744862I$ $a = 0.159590 + 0.864045I$ $b = -0.465784 - 0.043673I$ | $-4.07009 + 0.24963I$ | $-0.213168 + 0.588510I$ |
| $u = 0.877439 + 0.744862I$ $a = 0.159590 - 0.864045I$ $b = -0.465784 + 0.043673I$ | $-4.07009 - 0.24963I$ | $-0.213168 - 0.588510I$ |
| $u = -0.754878$ $a = -0.668981 + 0.098424I$ $b = -0.44089 - 1.82899I$ | $-5.00760 - 1.13123I$ | $-3.60429 + 0.51079I$ |
| $u = -0.754878$ $a = -0.668981 - 0.098424I$ $b = -0.44089 + 1.82899I$ | $-5.00760 + 1.13123I$ | $-3.60429 - 0.51079I$ |
| $u = 0.877439 - 0.744862I$ $a = -1.54126 - 0.20865I$ $b = -0.240367 - 1.260872I$ | $-4.07009 + 5.40662I$ | $-0.21317 - 6.54740I$ |
| $u = 0.877439 + 0.744862I$ $a = -1.54126 + 0.20865I$ $b = -0.240367 + 1.260872I$ | $-4.07009 - 5.40662I$ | $-0.21317 + 6.54740I$ |
| $u = 0.877439 - 0.744862I$ $a = -0.499665 - 0.348447I$ $b = -0.220687 - 1.217463I$ | $-4.07009 + 0.24963I$ | $-0.213168 + 0.588510I$ |
| $u = 0.877439 + 0.744862I$ $a = -0.499665 + 0.348447I$ $b = -0.220687 + 1.217463I$ | $-4.07009 - 0.24963I$ | $-0.213168 - 0.588510I$ |
| $u = -0.754878$ $a = 1.63121 + 2.14161I$ $b = -0.172710 - 1.289021I$ | $-8.20767 + 2.57849I$ | $-6.74243 - 3.56796I$ |
| $u = -0.754878$ $a = 1.63121 - 2.14161I$ $b = -0.172710 + 1.289021I$ | $-8.20767 - 2.57849I$ | $-6.74243 + 3.56796I$ |

| Solution to I_1^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|----------------------------------------------------------------------------------------|---------------------------------------|-----------------------|
| $u = -0.754878$ $a = -0.928965 + 1.049034I$ $b = -0.171893 - 1.389675I$ | -5.20322 | 0.874953 |
| $u = -0.754878$ $a = -0.928965 - 1.049034I$ $b = -0.171893 + 1.389675I$ | -5.20322 | 0.874953 |
| $u = 0.877439 + 0.744862I$ $a = 0.319425 - 0.406274I$ $b = 0.003311 - 1.250182I$ | $0.46900 + 3.61542I$ | $4.93820 - 2.31472I$ |
| $u = 0.877439 - 0.744862I$ $a = 0.319425 + 0.406274I$ $b = 0.003311 + 1.250182I$ | $0.46900 - 3.61542I$ | $4.93820 + 2.31472I$ |
| $u = 0.877439 + 0.744862I$ $a = 1.41167 - 0.43019I$ $b = 0.089556 - 1.152971I$ | $-0.87002 - 1.69689I$ | $2.92498 + 2.46866I$ |
| $u = 0.877439 - 0.744862I$ $a = 1.41167 + 0.43019I$ $b = 0.089556 + 1.152971I$ | $-0.87002 + 1.69689I$ | $2.92498 - 2.46866I$ |
| $u = -0.754878$ $a = -1.08906 + 2.34860I$ $b = 0.11559 - 1.41262I$ | $-5.00760 + 1.13123I$ | $-3.60429 - 0.51079I$ |
| $u = -0.754878$ $a = -1.08906 - 2.34860I$ $b = 0.11559 + 1.41262I$ | $-5.00760 - 1.13123I$ | $-3.60429 + 0.51079I$ |
| $u = -0.754878$ $a = -1.98744 + 2.05449I$ $b = 0.234132 - 1.197833I$ | $-3.66858 - 6.44354I$ | $-1.59106 + 5.29417I$ |
| $u = -0.754878$ $a = -1.98744 - 2.05449I$ $b = 0.234132 + 1.197833I$ | $-3.66858 + 6.44354I$ | $-1.59106 - 5.29417I$ |

| Solution to I_1^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|-----------------------------------------------------------------------------------------|---------------------------------------|----------------------|
| $u = -0.754878$ $a = 1.69097 + 0.76269I$ $b = 0.312893 - 1.010356I$ | 0.454474 | 2.84453 |
| $u = -0.754878$ $a = 1.69097 - 0.76269I$ $b = 0.312893 + 1.010356I$ | 0.454474 | 2.84453 |
| $u = 0.877439 + 0.744862I$ $a = 1.64206 - 0.07485I$ $b = 0.328612 - 1.331728I$ | $0.46900 - 9.27166I$ | $4.93820 + 8.27362I$ |
| $u = 0.877439 - 0.744862I$ $a = 1.64206 + 0.07485I$ $b = 0.328612 + 1.331728I$ | $0.46900 + 9.27166I$ | $4.93820 - 8.27362I$ |
| $u = 0.877439 - 0.744862I$ $a = -0.540284 - 0.867399I$ $b = 0.347952 - 0.310629I$ | $-0.87002 + 3.95936I$ | $2.92498 - 3.49024I$ |
| $u = 0.877439 + 0.744862I$ $a = -0.540284 + 0.867399I$ $b = 0.347952 + 0.310629I$ | $-0.87002 - 3.95936I$ | $2.92498 + 3.49024I$ |
| $u = 0.877439 + 0.744862I$ $a = 0.980831 - 0.111936I$ $b = 0.383023 - 0.964868I$ | $-1.06564 - 2.82812I$ | $7.40422 + 2.97945I$ |
| $u = 0.877439 - 0.744862I$ $a = 0.980831 + 0.111936I$ $b = 0.383023 + 0.964868I$ | $-1.06564 + 2.82812I$ | $7.40422 - 2.97945I$ |
| $u = 0.877439 + 0.744862I$ $a = 0.715030 - 0.368754I$ $b = 0.484357 - 1.213986I$ | $-0.87002 - 3.95936I$ | $2.92498 + 3.49024I$ |
| $u = 0.877439 - 0.744862I$ $a = 0.715030 + 0.368754I$ $b = 0.484357 + 1.213986I$ | $-0.87002 + 3.95936I$ | $2.92498 - 3.49024I$ |

| Solution to I_1^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|----------------------------|---------------------------------------|-----------------------|
| $u = 0.877439 + 0.744862I$ | | |
| $a = 0.117866 + 0.948484I$ | $0.46900 + 3.61542I$ | $4.93820 - 2.31472I$ |
| $b = 0.631559 - 0.239514I$ | | |
| $u = 0.877439 - 0.744862I$ | | |
| $a = 0.117866 - 0.948484I$ | $0.46900 - 3.61542I$ | $4.93820 + 2.31472I$ |
| $b = 0.631559 + 0.239514I$ | | |
| $u = -0.754878$ | | |
| $a = 1.002573 + 0.090934I$ | $-8.20767 - 2.57849I$ | $-6.74243 + 3.56796I$ |
| $b = 0.66006 - 1.66847I$ | | |
| $u = -0.754878$ | | |
| $a = 1.002573 - 0.090934I$ | $-8.20767 + 2.57849I$ | $-6.74243 - 3.56796I$ |
| $b = 0.66006 + 1.66847I$ | | |
| $u = 0.877439 - 0.744862I$ | | |
| $a = 0.511246 - 0.144564I$ | $4.59206 + 2.82812I$ | $9.37379 - 2.97945I$ |
| $b = 0.790704 - 0.425774I$ | | |
| $u = 0.877439 + 0.744862I$ | | |
| $a = 0.511246 + 0.144564I$ | $4.59206 - 2.82812I$ | $9.37379 + 2.97945I$ |
| $b = 0.790704 + 0.425774I$ | | |
| $u = 0.877439 + 0.744862I$ | | |
| $a = 0.958026 - 0.005356I$ | $-4.07009 - 5.40662I$ | $-0.21317 + 6.54740I$ |
| $b = 1.294726 - 0.286176I$ | | |
| $u = 0.877439 - 0.744862I$ | | |
| $a = 0.958026 + 0.005356I$ | $-4.07009 + 5.40662I$ | $-0.21317 - 6.54740I$ |
| $b = 1.294726 + 0.286176I$ | | |

II.

$$I_2^u = \langle u^{12} - 3u^{11} + \dots - 2u^2 + 1, -u^9 + 2u^8 + \dots + b - 1, -u^{10} + 2u^9 + \dots + a - 1 \rangle$$

(i) Arc colorings

$$\begin{aligned} a_1 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_7 &= \begin{pmatrix} u^{10} - 2u^9 + u^8 - u^7 + 3u^6 - 2u^5 + 2u^4 - 3u^3 + u^2 + u + 1 \\ u^9 - 2u^8 + u^7 - u^6 + 3u^5 - 2u^4 + u^3 - 2u^2 + u + 1 \end{pmatrix} \\ a_2 &= \begin{pmatrix} u^{10} - 3u^9 + 3u^8 - u^7 + 2u^6 - 4u^5 + 3u^4 - 2u^3 + 2u^2 + u - 1 \\ u^{11} - 3u^{10} + 3u^9 - u^8 + 2u^7 - 4u^6 + 3u^5 - 2u^4 + 2u^3 + u^2 - 2u + 1 \end{pmatrix} \\ a_4 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\ a_8 &= \begin{pmatrix} u^{10} - 2u^9 + u^8 - u^7 + 3u^6 - 2u^5 + 2u^4 - 3u^3 + u^2 + u + 1 \\ u^{11} - 2u^{10} + u^9 - u^8 + 3u^7 - 2u^6 + 2u^5 - 3u^4 + u^3 + u^2 + u \end{pmatrix} \\ a_3 &= \begin{pmatrix} u \\ u \end{pmatrix} \\ a_9 &= \begin{pmatrix} u^4 - u^3 + 1 \\ u^{11} - 3u^{10} + 3u^9 - 2u^8 + 4u^7 - 5u^6 + 4u^5 - 4u^4 + 3u^3 \end{pmatrix} \\ a_6 &= \begin{pmatrix} -u^{11} + 3u^{10} - 3u^9 + u^8 - 2u^7 + 4u^6 - 3u^5 + 2u^4 - u^3 - 2u^2 + 2u \\ -u^{11} + 3u^{10} - 3u^9 + 2u^8 - 4u^7 + 5u^6 - 4u^5 + 5u^4 - 4u^3 + 1 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} -u^9 + 2u^8 - u^7 - 2u^5 + 2u^4 - u^3 + u^2 - u - 1 \\ -u^{10} + 2u^9 - u^8 - 2u^6 + 2u^5 - u^4 + u^3 - u^2 - 2u \end{pmatrix} \\ a_5 &= \begin{pmatrix} u^{11} - 2u^{10} + u^9 + u^7 - u^6 + u^5 - u^4 - u^3 + 2u^2 \\ 2u^{11} - 4u^{10} + 2u^9 - u^8 + 5u^7 - 4u^6 + 2u^5 - 4u^4 + 2u^3 + 3u^2 + u - 1 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -u^5 + u^4 - 2u + 1 \\ -u^{11} + u^{10} + 2u^9 - 3u^8 - 2u^6 + 4u^5 - 2u^4 + 3u^3 - 6u^2 + 1 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -u^5 + u^4 - 2u + 1 \\ -u^{11} + u^{10} + 2u^9 - 3u^8 - 2u^6 + 4u^5 - 2u^4 + 3u^3 - 6u^2 + 1 \end{pmatrix} \end{aligned}$$

(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 |
|-----------------------------|---------------------------------------|-----------------------|
| $u = -0.794800 - 0.771002I$ | | |
| $a = -0.600212 - 0.129579I$ | $-6.79522 + 1.91915I$ | $0.40771 - 1.45870I$ |
| $b = 0.240699 + 1.306194I$ | | |
| $u = -0.794800 + 0.771002I$ | | |
| $a = -0.600212 + 0.129579I$ | $-6.79522 - 1.91915I$ | $0.40771 + 1.45870I$ |
| $b = 0.240699 - 1.306194I$ | | |
| $u = -0.585052 - 0.215239I$ | | |
| $a = 0.90210 + 1.32919I$ | $-4.12723 - 1.52744I$ | $6.19652 + 4.95399I$ |
| $b = -0.17391 - 1.59240I$ | | |
| $u = -0.585052 + 0.215239I$ | | |
| $a = 0.90210 - 1.32919I$ | $-4.12723 + 1.52744I$ | $6.19652 - 4.95399I$ |
| $b = -0.17391 + 1.59240I$ | | |
| $u = -0.104192 - 0.971564I$ | | |
| $a = 0.471297 - 0.711794I$ | $-1.99720 + 6.23322I$ | $3.71112 - 3.63849I$ |
| $b = -0.445009 - 1.143310I$ | | |
| $u = -0.104192 + 0.971564I$ | | |
| $a = 0.471297 + 0.711794I$ | $-1.99720 - 6.23322I$ | $3.71112 + 3.63849I$ |
| $b = -0.445009 + 1.143310I$ | | |
| $u = 0.756574 - 0.540849I$ | | |
| $a = 1.35649 + 0.50596I$ | $1.54867 + 1.75409I$ | $7.03852 - 3.77129I$ |
| $b = 0.506197 + 0.617660I$ | | |
| $u = 0.756574 + 0.540849I$ | | |
| $a = 1.35649 - 0.50596I$ | $1.54867 - 1.75409I$ | $7.03852 + 3.77129I$ |
| $b = 0.506197 - 0.617660I$ | | |
| $u = 0.985889 - 0.677032I$ | | |
| $a = -0.921548 - 0.118288I$ | $-2.01027 + 3.15177I$ | $-2.73217 - 5.71624I$ |
| $b = -0.357408 - 0.662175I$ | | |
| $u = 0.985889 + 0.677032I$ | | |
| $a = -0.921548 + 0.118288I$ | $-2.01027 - 3.15177I$ | $-2.73217 + 5.71624I$ |
| $b = -0.357408 + 0.662175I$ | | |

| | Solution to I_2^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|-------|------------------------|---------------------------------------|----------------------|
| $u =$ | $1.241581 - 0.484929I$ | $3.51165 + 5.19940I$ | $5.87830 - 4.31149I$ |
| $a =$ | $0.791873 - 0.390324I$ | | |
| $b =$ | $0.229430 + 0.594825I$ | | |
| $u =$ | $1.241581 + 0.484929I$ | $3.51165 - 5.19940I$ | $5.87830 + 4.31149I$ |
| $a =$ | $0.791873 + 0.390324I$ | | |
| $b =$ | $0.229430 - 0.594825I$ | | |

$$\text{III. } I_3^u = \langle u^{23} + 24u^{22} + \dots + 3840u + 256, -7u^{22} + 478u^{21} + \dots + 256a - 44288, 385u^{22} + 9312u^{21} + \dots + 128b + 81792 \rangle$$

(i) Arc colorings

$$\begin{aligned} a_1 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_7 &= \begin{pmatrix} \frac{7}{256}u^{22} - \frac{239}{128}u^{21} + \dots + \frac{2195}{2}u + 173 \\ -\frac{385}{128}u^{22} - \frac{291}{4}u^{21} + \dots - 9751u - 639 \end{pmatrix} \\ a_2 &= \begin{pmatrix} -0.0625000u^{22} - 1.43750u^{21} + \dots - 119.500u - 7.50000 \\ -\frac{1}{16}u^{22} - \frac{11}{8}u^{21} + \dots - 112u^2 - \frac{15}{2}u \end{pmatrix} \\ a_4 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\ a_8 &= \begin{pmatrix} \frac{7}{256}u^{22} - \frac{239}{128}u^{21} + \dots + \frac{2195}{2}u + 173 \\ \frac{323}{128}u^{22} + \frac{1761}{32}u^{21} + \dots - 68u + 7 \end{pmatrix} \\ a_3 &= \begin{pmatrix} u \\ u \end{pmatrix} \\ a_9 &= \begin{pmatrix} -0.535156u^{22} - 6.14844u^{21} + \dots + 12008.5u + 943 \\ \frac{251}{128}u^{22} + \frac{203}{4}u^{21} + \dots + 10843u + 777 \end{pmatrix} \\ a_6 &= \begin{pmatrix} -6.53906u^{22} - 146.352u^{21} + \dots - 6763u - 352.500 \\ -\frac{845}{128}u^{22} - \frac{9107}{64}u^{21} + \dots + \frac{755}{2}u + 122 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} -u^{22} - \frac{369}{16}u^{21} + \dots - 3695u - \frac{527}{2} \\ -\frac{15}{16}u^{22} - \frac{173}{8}u^{21} + \dots - \frac{7151}{2}u - 256 \end{pmatrix} \\ a_5 &= \begin{pmatrix} -\frac{5}{2}u^{22} - \frac{233}{4}u^{21} + \dots - \frac{50255}{4}u - 920 \\ -\frac{21}{8}u^{22} - \frac{971}{16}u^{21} + \dots - 12023u - 880 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} \frac{187}{32}u^{22} + \frac{1083}{8}u^{21} + \dots + \frac{45649}{2}u + 1641 \\ \frac{17}{4}u^{22} + \frac{1519}{16}u^{21} + \dots + 6584u + 440 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} \frac{187}{32}u^{22} + \frac{1083}{8}u^{21} + \dots + \frac{45649}{2}u + 1641 \\ \frac{17}{4}u^{22} + \frac{1519}{16}u^{21} + \dots + 6584u + 440 \end{pmatrix} \end{aligned}$$

(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 |
|-----------------------------|---------------------------------------|------------------------|
| $u = -1.81045 - 1.25979I$ | | |
| $a = -0.384884 + 0.000406I$ | $-5.82775 - 3.98753I$ | $-2.21274 + 8.17133I$ |
| $b = -0.044762 + 1.270849I$ | | |
| $u = -1.81045 + 1.25979I$ | | |
| $a = -0.384884 - 0.000406I$ | $-5.82775 + 3.98753I$ | $-2.21274 - 8.17133I$ |
| $b = -0.044762 - 1.270849I$ | | |
| $u = -1.61732 - 0.72115I$ | | |
| $a = 0.598438 + 0.349505I$ | $2.45199 - 6.58203I$ | $4.53835 + 6.99896I$ |
| $b = 0.276976 - 1.131584I$ | | |
| $u = -1.61732 + 0.72115I$ | | |
| $a = 0.598438 - 0.349505I$ | $2.45199 + 6.58203I$ | $4.53835 - 6.99896I$ |
| $b = 0.276976 + 1.131584I$ | | |
| $u = -1.54739 - 1.95109I$ | | |
| $a = 0.180148 - 0.166472I$ | $-7.64064 + 1.90172I$ | $-11.16155 - 1.95097I$ |
| $b = -0.147192 - 1.228998I$ | | |
| $u = -1.54739 + 1.95109I$ | | |
| $a = 0.180148 + 0.166472I$ | $-7.64064 - 1.90172I$ | $-11.16155 + 1.95097I$ |
| $b = -0.147192 + 1.228998I$ | | |
| $u = -1.38910 - 0.96754I$ | | |
| $a = -0.850202 - 0.022291I$ | $-7.16797 - 6.55570I$ | $1.22391 + 3.26324I$ |
| $b = -0.37473 + 1.45394I$ | | |
| $u = -1.38910 + 0.96754I$ | | |
| $a = -0.850202 + 0.022291I$ | $-7.16797 + 6.55570I$ | $1.22391 - 3.26324I$ |
| $b = -0.37473 - 1.45394I$ | | |
| $u = -1.32811 - 0.93882I$ | | |
| $a = 0.969920 + 0.035356I$ | $-9.7130 - 11.5082I$ | $-0.75618 + 6.89858I$ |
| $b = 0.48719 - 1.49237I$ | | |
| $u = -1.32811 + 0.93882I$ | | |
| $a = 0.969920 - 0.035356I$ | $-9.7130 + 11.5082I$ | $-0.75618 - 6.89858I$ |
| $b = 0.48719 + 1.49237I$ | | |

| Solution to I_3^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|-------------------------------------------------------------------------------------------|---------------------------------------|------------------------|
| $u = -1.29755 - 0.91346I$ $a = -1.043014 - 0.072514I$ $b = -0.57325 + 1.48723I$ | $-4.6506 - 16.0409I$ | $3.32343 + 8.47375I$ |
| $u = -1.29755 + 0.91346I$ $a = -1.043014 + 0.072514I$ $b = -0.57325 - 1.48723I$ | $-4.6506 + 16.0409I$ | $3.32343 - 8.47375I$ |
| $u = -0.85316 - 1.96961I$ $a = -0.019134 + 0.283785I$ $b = 0.318171 + 1.163071I$ | $-2.31364 + 7.21005I$ | $-0.81443 - 11.11700I$ |
| $u = -0.85316 + 1.96961I$ $a = -0.019134 - 0.283785I$ $b = 0.318171 - 1.163071I$ | $-2.31364 - 7.21005I$ | $-0.81443 + 11.11700I$ |
| $u = -0.682066 - 0.429866I$ $a = 1.47318 + 0.50585I$ $b = 0.670861 - 0.027425I$ | $4.83020 - 5.52175I$ | $12.07498 + 4.89921I$ |
| $u = -0.682066 + 0.429866I$ $a = 1.47318 - 0.50585I$ $b = 0.670861 + 0.027425I$ | $4.83020 + 5.52175I$ | $12.07498 - 4.89921I$ |
| $u = -0.571769 - 0.344867I$ $a = -1.53803 - 0.31651I$ $b = -0.575175 - 0.039007I$ | $-0.29865 - 2.39912I$ | $6.29196 + 4.13143I$ |
| $u = -0.571769 + 0.344867I$ $a = -1.53803 + 0.31651I$ $b = -0.575175 + 0.039007I$ | $-0.29865 + 2.39912I$ | $6.29196 - 4.13143I$ |
| $u = -0.521712$ $a = 1.80595$ $b = 0.450637$ | 1.73407 | 6.87043 |
| $u = -0.417460 - 0.759198I$ $a = -0.953255 - 0.351915I$ $b = -0.737153 - 0.407888I$ | $6.36396 + 1.94185I$ | $12.44424 - 2.77963I$ |

| Solution to I_3^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|-----------------------------|---------------------------------------|-----------------------|
| $u = -0.417460 + 0.759198I$ | | |
| $a = -0.953255 + 0.351915I$ | $6.36396 - 1.94185I$ | $12.44424 + 2.77963I$ |
| $b = -0.737153 + 0.407888I$ | | |
| $u = -0.224766 - 0.469687I$ | | |
| $a = 1.163861 - 0.054909I$ | $0.892504 + 0.454173I$ | $10.11280 - 4.18130I$ |
| $b = 0.473749 + 0.279232I$ | | |
| $u = -0.224766 + 0.469687I$ | | |
| $a = 1.163861 + 0.054909I$ | $0.892504 - 0.454173I$ | $10.11280 + 4.18130I$ |
| $b = 0.473749 - 0.279232I$ | | |

IV. u-Polynomials

| Crossings | u-Polynomials at each crossings |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c_1, c_8 | $(u^{12} + 6u^{10} - u^9 + 14u^8 - 4u^7 + 17u^6 - 6u^5 + 12u^4 - 3u^3 + 5u^2 - u + 1)$ $(u^{23} + 10u^{21} + \dots + 3u - 1)(u^{48} + u^{47} + \dots + 160u + 293)$ |
| c_2, c_6 | $(u^{12} + 6u^{10} + u^9 + 14u^8 + 4u^7 + 17u^6 + 6u^5 + 12u^4 + 3u^3 + 5u^2 + u + 1)$ $(u^{23} + 10u^{21} + \dots + 3u - 1)(u^{48} + u^{47} + \dots + 160u + 293)$ |
| c_3 | $(u^3 - u^2 + 1)^{16}$ $(u^{12} + 3u^{11} + 3u^{10} + u^9 + 2u^8 + 4u^7 + 3u^6 + 2u^5 + 2u^4 - u^3 - 2u^2 + 1)$ $(u^{23} + 24u^{22} + \dots + 3840u + 256)$ |
| c_4 | $(u^8 - 3u^7 + 7u^6 - 10u^5 + 11u^4 - 10u^3 + 6u^2 - 4u + 1)^6$ $(u^{12} + 2u^{10} + 3u^9 + 4u^8 - 4u^7 + 12u^6 - 7u^5 + 3u^4 - 4u^3 + 4u^2 + 2u + 1)$ $(u^{23} + 21u^{22} + \dots - 11268u - 1192)$ |
| c_5 | $(u^8 - u^7 - 3u^6 + 2u^5 + 3u^4 - 2u - 1)^6$ $(u^{12} - 6u^{10} + 13u^8 - u^7 - 10u^6 + 4u^5 - 2u^4 - 5u^3 + 4u^2 + 2u + 1)$ $(u^{23} + 7u^{22} + \dots + 20u - 8)$ |
| c_7, c_{11} | $(u^{12} - u^{11} - u^{10} + u^9 + u^8 - u^7 - u^5 + 2u^4 + 2u^3 + 1)$ $(u^{23} + u^{22} + \dots + 3u^2 - 1)(u^{48} + 3u^{47} + \dots + 890u + 173)$ |
| c_9, c_{10} | $(u^8 - u^7 - 3u^6 + 2u^5 + 3u^4 - 2u - 1)^6$ $(u^{12} - 6u^{10} + 13u^8 + u^7 - 10u^6 - 4u^5 - 2u^4 + 5u^3 + 4u^2 - 2u + 1)$ $(u^{23} + 7u^{22} + \dots + 20u - 8)$ |

V. Riley Polynomials

| Crossings | Riley Polynomials at each crossings |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c_1, c_2, c_6 c_8 | $(y^{12} + 12y^{11} + \dots + 9y + 1)(y^{23} + 20y^{22} + \dots + 13y - 1)$ $(y^{48} + 39y^{47} + \dots - 564720y + 85849)$ |
| c_3 | $(y^3 - y^2 + 2y - 1)^{16}$ $(y^{12} - 3y^{11} + 7y^{10} - 7y^9 + 6y^8 + 6y^7 - 7y^6 + 14y^5 - 3y^3 + 8y^2 - 4y + 1)$ $(y^{23} - 4y^{22} + \dots + 131072y - 65536)$ |
| c_4 | $(y^8 + 5y^7 + 11y^6 + 6y^5 - 17y^4 - 34y^3 - 22y^2 - 4y + 1)^6$ $(y^{12} + 4y^{11} + \dots + 4y + 1)(y^{23} + 9y^{22} + \dots + 1.91157 \times 10^7 y - 1420864)$ |
| c_5, c_9, c_{10} | $(y^8 - 7y^7 + 19y^6 - 22y^5 + 3y^4 + 14y^3 - 6y^2 - 4y + 1)^6$ $(y^{12} - 12y^{11} + \dots + 4y + 1)(y^{23} - 19y^{22} + \dots + 144y - 64)$ |
| c_7, c_{11} | $(y^{12} - 3y^{11} + 5y^{10} - 5y^9 + 5y^8 + y^7 + y^5 + 10y^4 - 4y^3 + 4y^2 + 1)$ $(y^{23} - 3y^{22} + \dots + 6y - 1)(y^{48} - 13y^{47} + \dots - 826008y + 29929)$ |