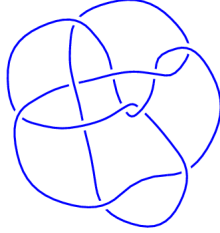
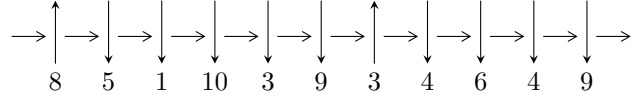


11n₁₆₄ (K11n₁₆₄)

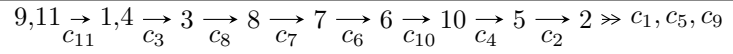


1

Arc Sequences



Solving Sequence



Representation Ideals

$$I = \bigcap_{i=1}^9 I_i^u$$

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

$$I_2^u = \langle u + 2, b - 1, 2a + 1 \rangle$$

$$I_3^u = \langle u^4 - u^3 - 2u^2 + 3, b - 1, -u^3 - 2u^2 + 3a + 2u + 6 \rangle$$

$$I_4^u = \langle u^8 - u^7 - 4u^6 + 5u^5 + 4u^4 - 3u^3 + 4u^2 - u + 1, a - 1, u^7 + 2u^6 - 8u^5 - 4u^4 + 17u^3 + 8u^2 + 5b + 3u + 3 \rangle$$

$$I_5^u = \langle u^8 + u^7 + u^6 + u^5 - 14u^4 - 11u^3 + 25u^2 + 4u + 1, b - 1, \\ 245u^7 + 100u^6 + 114u^5 + 113u^4 - 3551u^3 - 609u^2 + 306a + 7571u - 2588 \rangle$$

$$I_6^u = \langle u^{10} - 2u^8 - 2u^7 + u^6 + u^5 + 5u^4 + 2u^3 - 2u^2 - u + 1, a + 1, \\ 90u^9 - u^8 - 136u^7 - 188u^6 + 16u^5 + 28u^4 + 502u^3 + 134u^2 + 107b + 23u - 32 \rangle$$

$$I_7^u = \langle u^{10} - u^9 - 6u^8 + 6u^7 + 15u^6 - 19u^5 - 10u^4 + 17u^3 - u + 1, a - 1, \\ -34u^9 + 115u^8 + 314u^7 - 601u^6 - 1020u^5 + 1584u^4 + 1174u^3 - 1466u^2 + 373b - 786u + 239 \rangle$$

$$I_8^u = \langle u - 1, a + 2, b - 1 \rangle$$

$$I_9^u = \langle u - 1, b, a + 1 \rangle$$

There are 9 irreducible components with 44 representations.

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

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

(i) Arc colorings

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

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

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

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

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

$$a_{10} = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

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

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

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

(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 |
|---------------------|---------------------------------------|------------|
| $u = -1.00000$ | | |
| $a = 1.00000$ | -1.64493 | -6.00000 |
| $b = -1.00000$ | | |

$$\text{II. } I_2^u = \langle u + 2, b - 1, 2a + 1 \rangle$$

(i) Arc colorings

$$a_9 = \begin{pmatrix} 0 \\ -2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -\frac{1}{2} \\ 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -\frac{1}{2} \\ -1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} \frac{1}{2} \\ -1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -2 \\ -2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -\frac{1}{2} \\ -5 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -\frac{1}{2} \\ -3 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{1}{2} \\ 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} \frac{3}{2} \\ 1 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -\frac{5}{2} \\ -3 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -\frac{5}{2} \\ -3 \end{pmatrix}$$

(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 |
|---------------------|---------------------------------------|------------|
| $u = -2.00000$ | | |
| $a = -0.500000$ | -4.93480 | -18.0000 |
| $b = 1.00000$ | | |

$$\text{III. } I_3^u = \langle u^4 - u^3 - 2u^2 + 3, b - 1, -u^3 - 2u^2 + 3a + 2u + 6 \rangle$$

(i) Arc colorings

$$a_9 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

$$a_1 = \begin{pmatrix} \frac{1}{3}u^3 + \frac{2}{3}u^2 - \frac{2}{3}u - 2 \\ u^3 - u - 2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_7 = \begin{pmatrix} -\frac{2}{3}u^3 - \frac{1}{3}u^2 + \frac{4}{3}u + 1 \\ -u^3 + 2u + 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -\frac{2}{3}u^3 - \frac{1}{3}u^2 + \frac{4}{3}u + 1 \\ u^2 - 2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{1}{3}u^3 + \frac{2}{3}u^2 - \frac{2}{3}u - 1 \\ 1 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} \frac{4}{3}u^3 + \frac{2}{3}u^2 - \frac{8}{3}u - 2 \\ 2u^3 - 3u - 2 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} \frac{4}{3}u^3 + \frac{2}{3}u^2 - \frac{8}{3}u - 2 \\ 2u^3 - 3u - 2 \end{pmatrix}$$

(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 |
|---|---------------------------------------|-----------------------|
| $u = -0.953264 - 0.702911I$ $a = -0.905826 + 0.839043I$ $b = 1.00000$ | $-1.64493 - 4.05977I$ | $-6.00000 + 6.92820I$ |
| $u = -0.953264 + 0.702911I$ $a = -0.905826 - 0.839043I$ $b = 1.00000$ | $-1.64493 + 4.05977I$ | $-6.00000 - 6.92820I$ |
| $u = 1.45326 - 0.16311I$ $a = -0.594174 - 0.550367I$ $b = 1.00000$ | $-1.64493 - 4.05977I$ | $-6.00000 + 6.92820I$ |
| $u = 1.45326 + 0.16311I$ $a = -0.594174 + 0.550367I$ $b = 1.00000$ | $-1.64493 + 4.05977I$ | $-6.00000 - 6.92820I$ |

IV.

$$I_4^u = \langle u^8 - u^7 - 4u^6 + 5u^5 + 4u^4 - 3u^3 + 4u^2 - u + 1, a - 1, u^7 + 2u^6 + \dots + 5b + 3 \rangle$$

(i) Arc colorings

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

(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 |
|---|---------------------------------------|-----------------------|
| $u = -1.54196 - 0.09585I$ $a = 1.00000$ $b = -1.39025 - 1.48565I$ | $-10.45923 + 2.83405I$ | $-9.78328 - 2.02620I$ |
| $u = -1.54196 + 0.09585I$ $a = 1.00000$ $b = -1.39025 + 1.48565I$ | $-10.45923 - 2.83405I$ | $-9.78328 + 2.02620I$ |
| $u = -0.071127 - 0.527859I$ $a = 1.00000$ $b = -0.303360 - 0.370916I$ | $-0.769995 - 1.158598I$ | $-7.36601 + 5.92276I$ |
| $u = -0.071127 + 0.527859I$ $a = 1.00000$ $b = -0.303360 + 0.370916I$ | $-0.769995 + 1.158598I$ | $-7.36601 - 5.92276I$ |
| $u = 0.383744 - 0.530909I$ $a = 1.00000$ $b = 0.14466 + 1.52506I$ | $5.09476 + 1.30932I$ | $-1.82878 - 5.39060I$ |
| $u = 0.383744 + 0.530909I$ $a = 1.00000$ $b = 0.14466 - 1.52506I$ | $5.09476 - 1.30932I$ | $-1.82878 + 5.39060I$ |
| $u = 1.72934 - 0.67148I$ $a = 1.00000$ $b = -1.45105 + 1.21686I$ | $-11.1373 + 13.1502I$ | $-9.02192 - 6.51668I$ |
| $u = 1.72934 + 0.67148I$ $a = 1.00000$ $b = -1.45105 - 1.21686I$ | $-11.1373 - 13.1502I$ | $-9.02192 + 6.51668I$ |

$$\mathbf{V. } I_5^u = \langle u^8 + u^7 + \cdots + 4u + 1, b - 1, 245u^7 + 100u^6 + \cdots + 306a - 2588 \rangle$$

(i) Arc colorings

$$\begin{aligned}
a_9 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\
a_{11} &= \begin{pmatrix} -0.800654u^7 - 0.326797u^6 + \cdots - 24.7418u + 8.45752 \\ 1 \end{pmatrix} \\
a_1 &= \begin{pmatrix} -0.800654u^7 - 0.326797u^6 + \cdots - 24.7418u + 8.45752 \\ -0.0457516u^7 - 0.0424837u^6 + \cdots - 1.09477u + 0.526144 \end{pmatrix} \\
a_4 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\
a_3 &= \begin{pmatrix} 0.892157u^7 + 0.578431u^6 + \cdots + 25.7647u - 2.67647 \\ -0.00326797u^7 - 0.133987u^6 + \cdots + 1.45752u - 0.212418 \end{pmatrix} \\
a_8 &= \begin{pmatrix} u \\ u \end{pmatrix} \\
a_7 &= \begin{pmatrix} -0.663399u^7 - 0.866013u^6 + \cdots - 15.4575u - 8.45425 \\ 0.0228758u^7 - 0.0620915u^6 + \cdots - 0.535948u - 0.513072 \end{pmatrix} \\
a_6 &= \begin{pmatrix} -0.663399u^7 - 0.866013u^6 + \cdots - 15.4575u - 8.45425 \\ -0.0392157u^7 - 0.107843u^6 + \cdots - 2.00980u - 0.715686 \end{pmatrix} \\
a_{10} &= \begin{pmatrix} -0.800654u^7 - 0.326797u^6 + \cdots - 24.7418u + 9.45752 \\ 1 \end{pmatrix} \\
a_5 &= \begin{pmatrix} -0.800654u^7 - 0.326797u^6 + \cdots - 24.7418u + 10.4575 \\ 1 \end{pmatrix} \\
a_2 &= \begin{pmatrix} -0.790850u^7 - 0.424837u^6 + \cdots - 23.6144u + 8.92810 \\ -0.0359477u^7 - 0.140523u^6 + \cdots + 0.0326797u + 0.996732 \end{pmatrix} \\
a_2 &= \begin{pmatrix} -0.790850u^7 - 0.424837u^6 + \cdots - 23.6144u + 8.92810 \\ -0.0359477u^7 - 0.140523u^6 + \cdots + 0.0326797u + 0.996732 \end{pmatrix}
\end{aligned}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

| Solution to I_5^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|--|---------------------------------------|----------------------|
| $u = -1.68284 - 0.47999I$ $a = -0.770185 + 0.073218I$ $b = 1.00000$ | $-4.93480 - 4.05977I$ | $-18.0000 + 6.9282I$ |
| $u = -1.68284 + 0.47999I$ $a = -0.770185 - 0.073218I$ $b = 1.00000$ | $-4.93480 + 4.05977I$ | $-18.0000 - 6.9282I$ |
| $u = -0.080297 - 0.175165I$ $a = 10.47588 + 4.41339I$ $b = 1.00000$ | $-4.93480 - 4.05977I$ | $-18.0000 + 6.9282I$ |
| $u = -0.080297 + 0.175165I$ $a = 10.47588 - 4.41339I$ $b = 1.00000$ | $-4.93480 + 4.05977I$ | $-18.0000 - 6.9282I$ |
| $u = -0.06811 - 2.18939I$ $a = 0.0810688 - 0.0341535I$ $b = 1.00000$ | $-4.93480 - 4.05977I$ | $-18.0000 + 6.9282I$ |
| $u = -0.06811 + 2.18939I$ $a = 0.0810688 + 0.0341535I$ $b = 1.00000$ | $-4.93480 + 4.05977I$ | $-18.0000 - 6.9282I$ |
| $u = 1.331243 - 0.246470I$ $a = -1.286760 + 0.122326I$ $b = 1.00000$ | $-4.93480 + 4.05977I$ | $-18.0000 - 6.9282I$ |
| $u = 1.331243 + 0.246470I$ $a = -1.286760 - 0.122326I$ $b = 1.00000$ | $-4.93480 - 4.05977I$ | $-18.0000 + 6.9282I$ |

$$\text{VI. } I_6^u = \langle u^{10} - 2u^8 + \dots - u + 1, a + 1, 90u^9 - u^8 + \dots + 107b - 32 \rangle$$

(i) Arc colorings

$$\begin{aligned}
a_9 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\
a_{11} &= \begin{pmatrix} -1 \\ -0.841121u^9 + 0.00934579u^8 + \dots - 0.214953u + 0.299065 \end{pmatrix} \\
a_1 &= \begin{pmatrix} -1 \\ -0.841121u^9 + 0.00934579u^8 + \dots - 0.214953u + 0.299065 \end{pmatrix} \\
a_4 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\
a_3 &= \begin{pmatrix} -0.841121u^9 + 0.00934579u^8 + \dots - 0.214953u + 1.29907 \\ -0.523364u^9 + 0.0280374u^8 + \dots + 0.355140u + 1.89720 \end{pmatrix} \\
a_8 &= \begin{pmatrix} u \\ u \end{pmatrix} \\
a_7 &= \begin{pmatrix} -0.158879u^9 - 0.00934579u^8 + \dots + 2.21495u + 0.700935 \\ 0.242991u^9 + 0.308411u^8 + \dots + 2.90654u - 0.130841 \end{pmatrix} \\
a_6 &= \begin{pmatrix} -0.158879u^9 - 0.00934579u^8 + \dots + 2.21495u + 0.700935 \\ -0.168224u^9 + 0.401869u^8 + \dots + 2.75701u - 0.140187 \end{pmatrix} \\
a_{10} &= \begin{pmatrix} -0.841121u^9 + 0.00934579u^8 + \dots - 0.214953u - 0.700935 \\ -0.841121u^9 + 0.00934579u^8 + \dots - 0.214953u + 0.299065 \end{pmatrix} \\
a_5 &= \begin{pmatrix} 0.542056u^9 + 0.149533u^8 + \dots + 1.56075u - 1.21495 \\ -0.299065u^9 + 0.158879u^8 + \dots + 1.34579u - 1.91589 \end{pmatrix} \\
a_2 &= \begin{pmatrix} -0.411215u^9 + 0.0934579u^8 + \dots + 0.850467u - 1.00935 \\ -1.25234u^9 + 0.102804u^8 + \dots + 0.635514u + 0.289720 \end{pmatrix} \\
a_2 &= \begin{pmatrix} -0.411215u^9 + 0.0934579u^8 + \dots + 0.850467u - 1.00935 \\ -1.25234u^9 + 0.102804u^8 + \dots + 0.635514u + 0.289720 \end{pmatrix}
\end{aligned}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

| Solution to I_6^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|--|---------------------------------------|-----------------------|
| $u = -1.166725 - 0.740897I$ $a = -1.00000$ $b = 0.080620 + 1.156626I$ | $2.01963 - 4.25086I$ | $-7.08888 + 9.27894I$ |
| $u = -1.166725 + 0.740897I$ $a = -1.00000$ $b = 0.080620 - 1.156626I$ | $2.01963 + 4.25086I$ | $-7.08888 - 9.27894I$ |
| $u = -0.697636 - 0.376843I$ $a = -1.00000$ $b = 1.73896I$ | 4.38002 | -7.67593 |
| $u = -0.697636 + 0.376843I$ $a = -1.00000$ $b = -1.73896I$ | 4.38002 | -7.67593 |
| $u = -0.052327 - 1.130604I$ $a = -1.00000$ $b = -0.921638 - 0.078376I$ | $-4.20964 + 3.82188I$ | $-5.57316 - 2.67833I$ |
| $u = -0.052327 + 1.130604I$ $a = -1.00000$ $b = -0.921638 + 0.078376I$ | $-4.20964 - 3.82188I$ | $-5.57316 + 2.67833I$ |
| $u = 0.476249 - 0.265165I$ $a = -1.00000$ $b = -0.080620 + 1.156626I$ | $2.01963 + 4.25086I$ | $-7.08888 - 9.27894I$ |
| $u = 0.476249 + 0.265165I$ $a = -1.00000$ $b = -0.080620 - 1.156626I$ | $2.01963 - 4.25086I$ | $-7.08888 + 9.27894I$ |
| $u = 1.44044 - 0.33592I$ $a = -1.00000$ $b = 0.921638 + 0.078376I$ | $-4.20964 + 3.82188I$ | $-5.57316 - 2.67833I$ |
| $u = 1.44044 + 0.33592I$ $a = -1.00000$ $b = 0.921638 - 0.078376I$ | $-4.20964 - 3.82188I$ | $-5.57316 + 2.67833I$ |

VII. $I_7^u = \langle u^{10} - u^9 + \dots - u + 1, a - 1, -34u^9 + 115u^8 + \dots + 373b + 239 \rangle$

(i) Arc colorings

$$\begin{aligned}
 a_9 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\
 a_{11} &= \begin{pmatrix} 1 \\ 0.0911528u^9 - 0.308311u^8 + \dots + 2.10724u - 0.640751 \end{pmatrix} \\
 a_1 &= \begin{pmatrix} 1 \\ 0.0911528u^9 - 0.308311u^8 + \dots + 2.10724u - 0.640751 \end{pmatrix} \\
 a_4 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\
 a_3 &= \begin{pmatrix} -0.0911528u^9 + 0.308311u^8 + \dots - 2.10724u + 1.64075 \\ 0.525469u^9 + 0.281501u^8 + \dots + 3.20643u + 0.541555 \end{pmatrix} \\
 a_8 &= \begin{pmatrix} u \\ u \end{pmatrix} \\
 a_7 &= \begin{pmatrix} 0.627346u^9 - 0.592493u^8 + \dots + 2.03217u - 0.292225 \\ 0.241287u^9 - 0.227882u^8 + \dots + 0.166220u - 1.34316 \end{pmatrix} \\
 a_6 &= \begin{pmatrix} 0.627346u^9 - 0.592493u^8 + \dots + 2.03217u - 0.292225 \\ 0.294906u^9 - 0.0563003u^8 + \dots + 0.758713u - 1.30831 \end{pmatrix} \\
 a_{10} &= \begin{pmatrix} 0.0911528u^9 - 0.308311u^8 + \dots + 2.10724u + 0.359249 \\ 0.0911528u^9 - 0.308311u^8 + \dots + 2.10724u - 0.640751 \end{pmatrix} \\
 a_5 &= \begin{pmatrix} 0.589812u^9 - 0.112601u^8 + \dots - 0.482574u - 0.616622 \\ 0.498660u^9 + 0.195710u^8 + \dots - 2.58981u - 0.975871 \end{pmatrix} \\
 a_2 &= \begin{pmatrix} -0.512064u^9 - 0.238606u^8 + \dots - 0.308311u + 1.21716 \\ -0.420912u^9 - 0.546917u^8 + \dots + 1.79893u - 0.423592 \end{pmatrix} \\
 a_2 &= \begin{pmatrix} -0.512064u^9 - 0.238606u^8 + \dots - 0.308311u + 1.21716 \\ -0.420912u^9 - 0.546917u^8 + \dots + 1.79893u - 0.423592 \end{pmatrix}
 \end{aligned}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

| Solution to I_7^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|--|---------------------------------------|------------------------|
| $u = -1.71113 - 0.65182I$ $a = 1.00000$ $b = -1.35702 - 1.30951I$ | $-11.35778 - 4.96850I$ | $-10.07956 + 2.53316I$ |
| $u = -1.71113 + 0.65182I$ $a = 1.00000$ $b = -1.35702 + 1.30951I$ | $-11.35778 + 4.96850I$ | $-10.07956 - 2.53316I$ |
| $u = -1.03645$ $a = 1.00000$ $b = -0.726984$ | -1.48837 | -7.29892 |
| $u = -0.441631$ $a = 1.00000$ $b = -0.726984$ | -1.48837 | -7.29892 |
| $u = 0.191152 - 0.322929I$ $a = 1.00000$ $b = -0.279490 - 1.212040I$ | $2.23236 - 3.66584I$ | $-2.77098 - 1.99903I$ |
| $u = 0.191152 + 0.322929I$ $a = 1.00000$ $b = -0.279490 + 1.212040I$ | $2.23236 + 3.66584I$ | $-2.77098 + 1.99903I$ |
| $u = 1.168062 - 0.677685I$ $a = 1.00000$ $b = -0.279490 + 1.212040I$ | $2.23236 + 3.66584I$ | $-2.77098 + 1.99903I$ |
| $u = 1.168062 + 0.677685I$ $a = 1.00000$ $b = -0.279490 - 1.212040I$ | $2.23236 - 3.66584I$ | $-2.77098 - 1.99903I$ |
| $u = 1.59095 - 0.07875I$ $a = 1.00000$ $b = -1.35702 + 1.30951I$ | $-11.35778 + 4.96850I$ | $-10.07956 - 2.53316I$ |
| $u = 1.59095 + 0.07875I$ $a = 1.00000$ $b = -1.35702 - 1.30951I$ | $-11.35778 - 4.96850I$ | $-10.07956 + 2.53316I$ |

VIII. $I_8^u = \langle u - 1, a + 2, b - 1 \rangle$

(i) Arc colorings

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

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

$$a_1 = \begin{pmatrix} -2 \\ -1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

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

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

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

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

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

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

(ii) Obstruction class = -1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

| Solution to I_g^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---------------------|---------------------------------------|------------|
| $u = 1.00000$ | | |
| $a = -2.00000$ | -4.93480 | -18.0000 |
| $b = 1.00000$ | | |

$$\text{IX. } I_9^u = \langle u - 1, b, a + 1 \rangle$$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

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

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

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

(ii) Obstruction class = 1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

| Solution to I_9^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---------------------|---------------------------------------|------------|
| $u = 1.00000$ | | |
| $a = -1.00000$ | -3.28987 | -12.0000 |
| $b = 0$ | | |

X. u-Polynomials

| Crossings | u-Polynomials at each crossings |
|--------------------|--|
| c_1 | $u(u+1)^3(u^4-3u^3+4u^2+1)(u^4+u^3+6u^2+4u+7)^2$ $(u^5+2u^3-2u^2-u+1)^2$ $(u^8-u^7+9u^6-4u^5+26u^4-2u^3+28u^2+10)$ $(u^{10}+5u^8+8u^6+3u^4+2u^2+4)$ |
| c_2 | $(u-1)^2(u+1)(u+2)(u^4-u^3-2u^2+3)$ $(u^8-u^7-4u^6+5u^5+4u^4-3u^3+4u^2-u+1)$ $(u^8+u^7+u^6+u^5-14u^4-11u^3+25u^2+4u+1)$ $(u^{10}-2u^8-2u^7+u^6+u^5+5u^4+2u^3-2u^2-u+1)$ $(u^{10}-u^9-6u^8+6u^7+15u^6-19u^5-10u^4+17u^3-u+1)$ |
| c_3, c_9 | $u(u-1)^2(u+1)(u^2-u+1)^2(u^4-u^3+2u+1)^2$ $(u^8+3u^7+6u^6+5u^5+4u^4-u^3-3u+3)$ $(u^{10}+4u^9+11u^8+19u^7+25u^6+21u^5+12u^4+u^3-2u^2-u+1)$ $(u^{10}+5u^9+13u^8+22u^7+30u^6+33u^5+25u^4+6u^3-6u^2-5u-1)$ |
| c_4, c_{10} | $u(u-1)^{14}(u+1)(u^5+4u^4+9u^3+11u^2+10u+4)^2$ $(u^8+6u^7+20u^6+42u^5+68u^4+82u^3+74u^2+32u+8)$ $(u^{10}+4u^8+u^6-7u^4-2u^2+4)$ |
| c_5, c_8, c_{11} | $(u-1)(u+1)^2(u+2)(u^4-u^3-2u^2+3)$ $(u^8-u^7-4u^6+5u^5+4u^4-3u^3+4u^2-u+1)$ $(u^8+u^7+u^6+u^5-14u^4-11u^3+25u^2+4u+1)$ $(u^{10}-2u^8+2u^7+u^6-u^5+5u^4-2u^3-2u^2+u+1)$ $(u^{10}-u^9-6u^8+6u^7+15u^6-19u^5-10u^4+17u^3-u+1)$ |
| c_6 | $u(u-1)^3(u^2-u+1)^2(u^4-u^3+2u+1)^2$ $(u^8+3u^7+6u^6+5u^5+4u^4-u^3-3u+3)$ $(u^{10}-4u^9+11u^8-19u^7+25u^6-21u^5+12u^4-u^3-2u^2+u+1)$ $(u^{10}+5u^9+13u^8+22u^7+30u^6+33u^5+25u^4+6u^3-6u^2-5u-1)$ |
| c_7 | $(u)(u-1)^4(u+1)^2(u+3)(12+6u+9u^2+u^4)^2(1+3u^3-u^4+u^5)^2$ $(u^5-u^4+5u^3-2u^2-2u+3)^2$ $(u^8+2u^7+9u^6+10u^5+31u^4+30u^3+27u^2+26u+12)$ |

XI. Riley Polynomials

| Crossings | Riley Polynomials at each crossings |
|-----------------------------|--|
| c_1 | $y(y-1)^3(y^4 - y^3 + 18y^2 + 8y + 1)(y^4 + 11y^3 + 42y^2 + 68y + 49)^2$ $(y^5 + 4y^4 + 2y^3 - 8y^2 + 5y - 1)^2(y^5 + 5y^4 + 8y^3 + 3y^2 + 2y + 4)^2$ $(y^8 + 17y^7 + \dots + 560y + 100)$ |
| c_2, c_5, c_8 c_{11} | $(y-4)(y-1)^3(y^4 - 5y^3 + 10y^2 - 12y + 9)$ $(y^8 - 9y^7 + 34y^6 - 55y^5 + 14y^4 + 25y^3 + 18y^2 + 7y + 1)$ $(y^8 + y^7 - 29y^6 + 43y^5 + 262y^4 - 827y^3 + 685y^2 + 34y + 1)$ $(y^{10} - 13y^9 + \dots - y + 1)$ $(y^{10} - 4y^9 + 6y^8 + 2y^7 - 19y^6 + 27y^5 + 9y^4 - 20y^3 + 18y^2 - 5y + 1)$ |
| c_3, c_6, c_9 | $y(y-1)^3(y^2 + y + 1)^2(y^4 - y^3 + 6y^2 - 4y + 1)^2$ $(y^8 + 3y^7 + 14y^6 + 29y^5 + 50y^4 + 65y^3 + 18y^2 - 9y + 9)$ $(y^{10} + y^9 + 9y^8 + 16y^7 + 26y^6 + 39y^5 + 63y^4 - 66y^3 + 46y^2 - 13y + 1)$ $(y^{10} + 6y^9 + \dots - 5y + 1)$ |
| c_4, c_{10} | $y(y-1)^{15}(y^5 + 2y^4 + 13y^3 + 27y^2 + 12y - 16)^2$ $(y^5 + 4y^4 + y^3 - 7y^2 - 2y + 4)^2$ $(y^8 + 4y^7 + 32y^6 + 120y^5 + 328y^4 + 972y^3 + 1316y^2 + 160y + 64)$ |
| c_7 | $y(y-9)(y-1)^6(y^4 + 18y^3 + 105y^2 + 180y + 144)^2$ $(y^5 + 5y^4 + 9y^3 + 2y^2 - 1)^2(y^5 + 9y^4 + 17y^3 - 18y^2 + 16y - 9)^2$ $(y^8 + 14y^7 + 103y^6 + 392y^5 + 767y^4 + 470y^3 - 87y^2 - 28y + 144)$ |