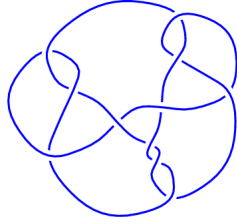
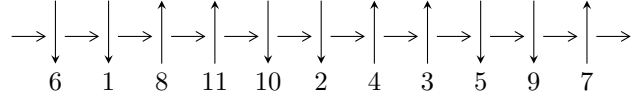


11a₁₉₈ (K11a₁₉₈)

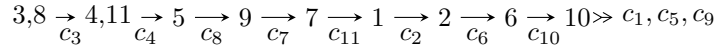


1

Arc Sequences



Solving Sequence



Representation Ideals

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

$$I_1^u = \langle u^{17} + 5u^{16} + \dots - 16u - 4, -5u^{16} - 19u^{15} + \dots + 8a + 18, 3u^{16} + 15u^{15} + \dots + 4b - 14 \rangle$$

$$I_2^u = \langle a^{48} - 9a^{47} + \dots - 600335a + 85141, \\ 3.73313 \times 10^{215}u + 3.32000 \times 10^{212}a^{47} + \dots + 2.35744 \times 10^{218}a - 4.24455 \times 10^{217}, \\ 5.07705 \times 10^{217}b + 7.64915 \times 10^{214}a^{47} + \dots + 5.44599 \times 10^{220}a - 9.83232 \times 10^{219} \rangle$$

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

$$I_4^u = \langle a^4 + 2a^3 + 2a^2 - 2a + 1, -a^3 - 2a^2 + 2b - 3a + 2, a^3 + 3a^2 + 3a + 2u - 1 \rangle$$

There are 4 irreducible components with 73 representations.

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

$$\mathbf{I. } I_1^u = \langle u^{17} + 5u^{16} + \dots - 16u - 4, -5u^{16} - 19u^{15} + \dots + 8a + 18, 3u^{16} + 15u^{15} + \dots + 4b - 14 \rangle$$

(i) Arc colorings

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

$$a_8 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} \frac{5}{8}u^{16} + \frac{19}{8}u^{15} + \dots - \frac{43}{8}u - \frac{9}{4} \\ -\frac{3}{4}u^{16} - \frac{15}{4}u^{15} + \dots + \frac{53}{4}u + \frac{7}{2} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -\frac{1}{8}u^{16} - \frac{3}{8}u^{15} + \dots - \frac{1}{8}u + \frac{3}{4} \\ -\frac{1}{4}u^{16} - \frac{3}{4}u^{15} + \dots + \frac{5}{4}u + \frac{1}{2} \end{pmatrix}$$

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

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

$$a_1 = \begin{pmatrix} -\frac{7}{8}u^{16} - \frac{29}{8}u^{15} + \dots + \frac{49}{8}u + \frac{3}{4} \\ \frac{3}{4}u^{16} + \frac{15}{4}u^{15} + \dots - \frac{65}{4}u - \frac{11}{2} \end{pmatrix}$$

$$a_2 = \begin{pmatrix} \frac{3}{8}u^{16} + \frac{13}{8}u^{15} + \dots - \frac{29}{8}u - \frac{1}{4} \\ -\frac{1}{4}u^{16} - \frac{5}{4}u^{15} + \dots + \frac{19}{4}u + \frac{3}{2} \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -\frac{5}{8}u^{16} - \frac{19}{8}u^{15} + \dots + \frac{43}{8}u + \frac{9}{4} \\ -\frac{3}{4}u^{16} - \frac{9}{4}u^{15} + \dots + \frac{15}{4}u + \frac{1}{2} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{5}{8}u^{16} + \frac{19}{8}u^{15} + \dots + \frac{9}{8}u + \frac{3}{4} \\ -\frac{3}{4}u^{16} - \frac{15}{4}u^{15} + \dots + \frac{79}{4}u + \frac{13}{2} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{5}{8}u^{16} + \frac{19}{8}u^{15} + \dots + \frac{9}{8}u + \frac{3}{4} \\ -\frac{3}{4}u^{16} - \frac{15}{4}u^{15} + \dots + \frac{79}{4}u + \frac{13}{2} \end{pmatrix}$$

(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
$u = -0.890867 - 0.377667I$		
$a = 0.539314 - 0.319140I$	$-3.61361 + 10.59007I$	$-4.60527 - 8.92878I$
$b = 0.055589 + 1.256593I$		
$u = -0.890867 + 0.377667I$		
$a = 0.539314 + 0.319140I$	$-3.61361 - 10.59007I$	$-4.60527 + 8.92878I$
$b = 0.055589 - 1.256593I$		
$u = -0.660302 - 0.842733I$		
$a = 1.022382 - 0.230270I$	$-5.05206 - 5.24154I$	$-7.63274 + 4.49417I$
$b = -0.342598 - 0.021836I$		
$u = -0.660302 + 0.842733I$		
$a = 1.022382 + 0.230270I$	$-5.05206 + 5.24154I$	$-7.63274 - 4.49417I$
$b = -0.342598 + 0.021836I$		
$u = -0.650467 - 0.269191I$		
$a = -0.586208 + 0.134225I$	$1.27984 + 1.28287I$	$3.35042 - 1.93548I$
$b = -0.399598 - 0.545705I$		
$u = -0.650467 + 0.269191I$		
$a = -0.586208 - 0.134225I$	$1.27984 - 1.28287I$	$3.35042 + 1.93548I$
$b = -0.399598 + 0.545705I$		
$u = -0.34289 - 1.49249I$		
$a = -0.42197 + 1.89700I$	$-9.6338 + 15.0660I$	$-7.10421 - 9.07102I$
$b = 0.30432 + 2.76943I$		
$u = -0.34289 + 1.49249I$		
$a = -0.42197 - 1.89700I$	$-9.6338 - 15.0660I$	$-7.10421 + 9.07102I$
$b = 0.30432 - 2.76943I$		
$u = -0.24757 - 1.43191I$		
$a = 0.14316 - 1.60229I$	$-4.23745 + 4.56036I$	$-1.76092 - 2.27650I$
$b = -0.07637 - 2.06869I$		
$u = -0.24757 + 1.43191I$		
$a = 0.14316 + 1.60229I$	$-4.23745 - 4.56036I$	$-1.76092 + 2.27650I$
$b = -0.07637 + 2.06869I$		

Solution to I_1^μ	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.244707 - 1.043022I$ $a = -0.676808 - 0.521819I$ $b = -0.265385 - 0.332464I$	$-0.92388 + 2.05590I$	$-0.93009 - 3.10857I$
$u = -0.244707 + 1.043022I$ $a = -0.676808 + 0.521819I$ $b = -0.265385 + 0.332464I$	$-0.92388 - 2.05590I$	$-0.93009 + 3.10857I$
$u = -0.09876 - 1.57175I$ $a = -0.498949 + 1.308383I$ $b = -1.08605 + 2.18629I$	$-13.35055 - 2.91507I$	$-10.99366 + 2.99630I$
$u = -0.09876 + 1.57175I$ $a = -0.498949 - 1.308383I$ $b = -1.08605 - 2.18629I$	$-13.35055 + 2.91507I$	$-10.99366 - 2.99630I$
$u = 0.384204 - 0.955896I$ $a = 0.642349 - 0.376214I$ $b = 0.567403 + 0.592762I$	$-4.00659 - 3.27252I$	$-10.51806 + 4.95844I$
$u = 0.384204 + 0.955896I$ $a = 0.642349 + 0.376214I$ $b = 0.567403 - 0.592762I$	$-4.00659 + 3.27252I$	$-10.51806 - 4.95844I$
$u = 0.502705$ $a = -0.826549$ $b = 0.485388$	-1.52550	-5.61093

$$\text{II. } I_2^u = \langle a^{48} - 9a^{47} + \dots - 600335a + 85141, 3.73 \times 10^{215}u + 3.32 \times 10^{212}a^{47} + \dots + 2.36 \times 10^{218}a - 4.24 \times 10^{217}, 5.08 \times 10^{217}b + 7.65 \times 10^{214}a^{47} + \dots + 5.45 \times 10^{220}a - 9.83 \times 10^{219} \rangle$$

(i) Arc colorings

$$\begin{aligned} a_3 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_8 &= \begin{pmatrix} 0 \\ -0.000889334a^{47} + 0.00741298a^{46} + \dots - 631.493a + 113.700 \end{pmatrix} \\ a_4 &= \begin{pmatrix} 1 \\ 0.00140582a^{47} - 0.0117179a^{46} + \dots + 996.831a - 179.439 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} a \\ -0.00150661a^{47} + 0.0125616a^{46} + \dots - 1072.67a + 193.662 \end{pmatrix} \\ a_5 &= \begin{pmatrix} 0.00161507a^{47} - 0.0134714a^{46} + \dots + 1152.13a - 206.838 \\ 0.00318100a^{47} - 0.0265306a^{46} + \dots + 2270.66a - 409.342 \end{pmatrix} \\ a_9 &= \begin{pmatrix} -0.000889334a^{47} + 0.00741298a^{46} + \dots - 631.493a + 113.700 \\ -0.000889334a^{47} + 0.00741298a^{46} + \dots - 631.493a + 113.700 \end{pmatrix} \\ a_7 &= \begin{pmatrix} 0.000889334a^{47} - 0.00741298a^{46} + \dots + 631.493a - 113.700 \\ -0.00242386a^{47} + 0.0202200a^{46} + \dots - 1729.94a + 311.520 \end{pmatrix} \\ a_1 &= \begin{pmatrix} -0.00293506a^{47} + 0.0245002a^{46} + \dots - 2111.51a + 381.909 \\ 0.00279784a^{47} - 0.0233572a^{46} + \dots + 2021.07a - 366.050 \end{pmatrix} \\ a_2 &= \begin{pmatrix} 0.00101649a^{47} - 0.00851942a^{46} + \dots + 755.817a - 136.531 \\ -0.00540231a^{47} + 0.0451071a^{46} + \dots - 3907.07a + 709.468 \end{pmatrix} \\ a_6 &= \begin{pmatrix} 0.00129382a^{47} - 0.0107981a^{46} + \dots + 923.935a - 165.818 \\ 0.00307678a^{47} - 0.0256702a^{46} + \dots + 2198.86a - 396.261 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -0.000239898a^{47} + 0.00200855a^{46} + \dots - 180.087a + 32.9896 \\ -0.00174651a^{47} + 0.0145702a^{46} + \dots - 1253.75a + 226.652 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -0.000239898a^{47} + 0.00200855a^{46} + \dots - 180.087a + 32.9896 \\ -0.00174651a^{47} + 0.0145702a^{46} + \dots - 1253.75a + 226.652 \end{pmatrix} \end{aligned}$$

(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
$u = 0.466344 - 0.139064I$ $a = -1.18593 - 1.46874I$ $b = -0.442122 + 1.016798I$	$0.81638 - 4.44188I$	$2.19708 + 6.84090I$
$u = 0.466344 + 0.139064I$ $a = -1.18593 + 1.46874I$ $b = -0.442122 - 1.016798I$	$0.81638 + 4.44188I$	$2.19708 - 6.84090I$
$u = 0.518255 - 0.626071I$ $a = -1.151291 - 0.224523I$ $b = 0.358584 + 0.050223I$	$-2.06743 + 1.34975I$	$-3.70130 - 0.61741I$
$u = 0.518255 + 0.626071I$ $a = -1.151291 + 0.224523I$ $b = 0.358584 - 0.050223I$	$-2.06743 - 1.34975I$	$-3.70130 + 0.61741I$
$u = 0.186022 - 1.063965I$ $a = -0.916877 - 0.413619I$ $b = 0.139632 - 0.048558I$	$-1.95017 + 2.09169I$	$-5.42289 - 2.15037I$
$u = 0.186022 + 1.063965I$ $a = -0.916877 + 0.413619I$ $b = 0.139632 + 0.048558I$	$-1.95017 - 2.09169I$	$-5.42289 + 2.15037I$
$u = -0.105109 - 1.230929I$ $a = -0.782932 - 0.414854I$ $b = 0.004171 - 0.225782I$	$-1.53555 + 2.45321I$	$-1.73083 - 3.64393I$
$u = -0.105109 + 1.230929I$ $a = -0.782932 + 0.414854I$ $b = 0.004171 + 0.225782I$	$-1.53555 - 2.45321I$	$-1.73083 + 3.64393I$
$u = -0.554352$ $a = -0.740835 - 0.680093I$ $b = -0.693878 + 0.451548I$	2.09657	5.17704
$u = -0.554352$ $a = -0.740835 + 0.680093I$ $b = -0.693878 - 0.451548I$	2.09657	5.17704

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.23640 + 1.53629I$ $a = -0.609636 - 1.013421I$ $b = -1.13996 - 1.90519I$	$-12.00219 - 6.17786I$	$-9.83600 + 3.42505I$
$u = -0.23640 - 1.53629I$ $a = -0.609636 + 1.013421I$ $b = -1.13996 + 1.90519I$	$-12.00219 + 6.17786I$	$-9.83600 - 3.42505I$
$u = 0.772868 - 0.366845I$ $a = -0.536799 - 0.512090I$ $b = -0.099304 + 1.173842I$	$-1.01177 - 5.79366I$	$-1.10840 + 5.84891I$
$u = 0.772868 + 0.366845I$ $a = -0.536799 + 0.512090I$ $b = -0.099304 - 1.173842I$	$-1.01177 + 5.79366I$	$-1.10840 - 5.84891I$
$u = 0.139725 + 1.381279I$ $a = -0.29262 - 2.38176I$ $b = -0.98238 - 3.18787I$	$-4.08023 + 6.55700I$	$-5.63713 - 6.78251I$
$u = 0.139725 - 1.381279I$ $a = -0.29262 + 2.38176I$ $b = -0.98238 + 3.18787I$	$-4.08023 - 6.55700I$	$-5.63713 + 6.78251I$
$u = 0.29578 - 1.47095I$ $a = -0.18443 - 1.56957I$ $b = 0.05504 - 2.08463I$	$-6.94105 - 9.69379I$	$-4.61840 + 5.69034I$
$u = 0.29578 + 1.47095I$ $a = -0.18443 + 1.56957I$ $b = 0.05504 + 2.08463I$	$-6.94105 + 9.69379I$	$-4.61840 - 5.69034I$
$u = -0.23640 + 1.53629I$ $a = -0.12964 - 1.84162I$ $b = 0.56745 - 2.71046I$	$-12.00219 - 6.17786I$	$-9.83600 + 3.42505I$
$u = -0.23640 - 1.53629I$ $a = -0.12964 + 1.84162I$ $b = 0.56745 + 2.71046I$	$-12.00219 + 6.17786I$	$-9.83600 - 3.42505I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.16919 - 1.49858I$		
$a = -0.09153 - 1.54673I$	$-8.88235 - 1.10950I$	$-6.99514 - 0.17623I$
$b = 0.04522 - 2.04098I$		
$u = 0.16919 + 1.49858I$		
$a = -0.09153 + 1.54673I$	$-8.88235 + 1.10950I$	$-6.99514 + 0.17623I$
$b = 0.04522 + 2.04098I$		
$u = -0.105109 - 1.230929I$		
$a = -0.07652 - 1.62634I$	$-1.53555 + 2.45321I$	$-1.73083 - 3.64393I$
$b = -0.21286 - 1.82635I$		
$u = -0.105109 + 1.230929I$		
$a = -0.07652 + 1.62634I$	$-1.53555 - 2.45321I$	$-1.73083 + 3.64393I$
$b = -0.21286 + 1.82635I$		
$u = -0.761584 - 0.575116I$		
$a = 0.203429 - 0.419558I$	$-5.05945 + 2.59591I$	$-7.61304 - 3.04974I$
$b = -0.068534 + 1.114124I$		
$u = -0.761584 + 0.575116I$		
$a = 0.203429 + 0.419558I$	$-5.05945 - 2.59591I$	$-7.61304 + 3.04974I$
$b = -0.068534 - 1.114124I$		
$u = 0.29578 + 1.47095I$		
$a = 0.31932 - 1.99740I$	$-6.94105 + 9.69379I$	$-4.61840 - 5.69034I$
$b = -0.40043 - 2.85834I$		
$u = 0.29578 - 1.47095I$		
$a = 0.31932 + 1.99740I$	$-6.94105 - 9.69379I$	$-4.61840 + 5.69034I$
$b = -0.40043 + 2.85834I$		
$u = 0.518255 - 0.626071I$		
$a = 0.466736 - 0.173905I$	$-2.06743 + 1.34975I$	$-3.70130 - 0.61741I$
$b = 0.207194 - 0.528373I$		
$u = 0.518255 + 0.626071I$		
$a = 0.466736 + 0.173905I$	$-2.06743 - 1.34975I$	$-3.70130 + 0.61741I$
$b = 0.207194 + 0.528373I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.772868 + 0.366845I$		
$a = 0.655414 - 0.003636I$	$-1.01177 + 5.79366I$	$-1.10840 - 5.84891I$
$b = 0.335184 + 0.624587I$		
$u = 0.772868 - 0.366845I$		
$a = 0.655414 + 0.003636I$	$-1.01177 - 5.79366I$	$-1.10840 + 5.84891I$
$b = 0.335184 - 0.624587I$		
$u = 0.16919 + 1.49858I$		
$a = 0.711118 - 1.168245I$	$-8.88235 + 1.10950I$	$-6.99514 + 0.17623I$
$b = 1.25831 - 2.02902I$		
$u = 0.16919 - 1.49858I$		
$a = 0.711118 + 1.168245I$	$-8.88235 - 1.10950I$	$-6.99514 - 0.17623I$
$b = 1.25831 + 2.02902I$		
$u = -0.059730 + 1.371063I$		
$a = 0.74073 - 2.25028I$	$-4.45021 - 0.95435I$	$-6.93920 + 1.02665I$
$b = 1.39689 - 3.03706I$		
$u = -0.059730 - 1.371063I$		
$a = 0.74073 + 2.25028I$	$-4.45021 + 0.95435I$	$-6.93920 - 1.02665I$
$b = 1.39689 + 3.03706I$		
$u = 0.139725 - 1.381279I$		
$a = 0.770884 - 0.370544I$	$-4.08023 - 6.55700I$	$-5.63713 + 6.78251I$
$b = -0.065350 - 0.295704I$		
$u = 0.139725 + 1.381279I$		
$a = 0.770884 + 0.370544I$	$-4.08023 + 6.55700I$	$-5.63713 - 6.78251I$
$b = -0.065350 + 0.295704I$		
$u = -0.059730 - 1.371063I$		
$a = 0.818424 - 0.361459I$	$-4.45021 + 0.95435I$	$-6.93920 - 1.02665I$
$b = -0.127869 - 0.221365I$		
$u = -0.059730 + 1.371063I$		
$a = 0.818424 + 0.361459I$	$-4.45021 - 0.95435I$	$-6.93920 + 1.02665I$
$b = -0.127869 + 0.221365I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.186022 - 1.063965I$		
$a = 0.933580 - 1.021606I$	$-1.95017 + 2.09169I$	$-5.42289 - 2.15037I$
$b = 1.039427 - 0.748159I$		
$u = 0.186022 + 1.063965I$		
$a = 0.933580 + 1.021606I$	$-1.95017 - 2.09169I$	$-5.42289 + 2.15037I$
$b = 1.039427 + 0.748159I$		
$u = -0.761584 - 0.575116I$		
$a = 1.062986 - 0.130786I$	$-5.05945 + 2.59591I$	$-7.61304 - 3.04974I$
$b = -0.400062 + 0.004585I$		
$u = -0.761584 + 0.575116I$		
$a = 1.062986 + 0.130786I$	$-5.05945 - 2.59591I$	$-7.61304 + 3.04974I$
$b = -0.400062 - 0.004585I$		
$u = 0.466344 - 0.139064I$		
$a = 1.18545 - 1.21183I$	$0.81638 - 4.44188I$	$2.19708 + 6.84090I$
$b = 0.961879 + 0.383035I$		
$u = 0.466344 + 0.139064I$		
$a = 1.18545 + 1.21183I$	$0.81638 + 4.44188I$	$2.19708 - 6.84090I$
$b = 0.961879 - 0.383035I$		
$u = -0.216364$		
$a = 3.33097 - 3.65605I$	0.115142	1.63344
$b = 0.763756 + 0.821482I$		
$u = -0.216364$		
$a = 3.33097 + 3.65605I$	0.115142	1.63344
$b = 0.763756 - 0.821482I$		

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

(i) Arc colorings

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

$$a_8 = \begin{pmatrix} 0 \\ -\frac{1}{2}a^3 - 1 \end{pmatrix}$$

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

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

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

$$a_9 = \begin{pmatrix} -\frac{1}{2}a^3 - 1 \\ -\frac{1}{2}a^3 - 1 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} \frac{1}{2}a^3 + 1 \\ 0 \end{pmatrix}$$

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

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

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

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

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

(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
$u = 1.00000I$		
$a = -1.36603 - 0.36603I$	$-1.64493 - 4.05977I$	$-4.00000 + 6.92820I$
$b = -0.500000 - 0.866025I$		
$u = -1.00000I$		
$a = -1.36603 + 0.36603I$	$-1.64493 + 4.05977I$	$-4.00000 - 6.92820I$
$b = -0.500000 + 0.866025I$		
$u = -1.00000I$		
$a = 0.36603 - 1.36603I$	$-1.64493 - 4.05977I$	$-4.00000 + 6.92820I$
$b = -0.500000 - 0.866025I$		
$u = 1.00000I$		
$a = 0.36603 + 1.36603I$	$-1.64493 + 4.05977I$	$-4.00000 - 6.92820I$
$b = -0.500000 + 0.866025I$		

IV.

$$I_4^u = \langle a^4 + 2a^3 + 2a^2 - 2a + 1, -a^3 - 2a^2 + 2b - 3a + 2, a^3 + 3a^2 + 3a + 2u - 1 \rangle$$

(i) Arc colorings

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

$$a_8 = \begin{pmatrix} 0 \\ -\frac{1}{2}a^3 - \frac{3}{2}a^2 - \frac{3}{2}a + \frac{1}{2} \end{pmatrix}$$

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

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

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

$$a_9 = \begin{pmatrix} -\frac{1}{2}a^3 - \frac{3}{2}a^2 - \frac{3}{2}a + \frac{1}{2} \\ -\frac{1}{2}a^3 - \frac{3}{2}a^2 - \frac{3}{2}a + \frac{1}{2} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} \frac{1}{2}a^3 + \frac{3}{2}a^2 + \frac{3}{2}a - \frac{1}{2} \\ 0 \end{pmatrix}$$

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

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

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

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

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

(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
$u = -1.00000I$ $a = -1.36603 - 1.36603I$ $b = -0.500000 - 0.866025I$	-1.64493	-4.00000
$u = 1.00000I$ $a = -1.36603 + 1.36603I$ $b = -0.500000 + 0.866025I$	-1.64493	-4.00000
$u = 1.00000I$ $a = 0.366025 - 0.366025I$ $b = -0.500000 - 0.866025I$	-1.64493	-4.00000
$u = -1.00000I$ $a = 0.366025 + 0.366025I$ $b = -0.500000 + 0.866025I$	-1.64493	-4.00000

V. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_5, c_6 c_9	$(u^4 - u^2 + 1)^2(u^{17} - 5u^{15} + \dots + u - 1)(u^{48} + u^{47} + \dots + 2u + 1)$
c_2, c_{10}	$(u^2 + u + 1)^4(u^{17} + 10u^{16} + \dots + 3u + 1)(u^{48} + 23u^{47} + \dots + 2u + 1)$
c_3, c_7, c_8	$(u^2 + 1)^4(u^{17} + 5u^{16} + \dots - 16u - 4)$ $(1 - 13u^2 + 32u^3 - 35u^4 + 8u^5 + 74u^6 - 168u^7 + 286u^8 - 350u^9 + 441u^{10} - 486u^{11} + 580u^{12} - \dots)$
c_4, c_{11}	$(u^4 - u^2 + 1)^2(u^{17} + 7u^{15} + \dots + 3u - 1)$ $(u^{48} + 3u^{47} + \dots + 1432u + 517)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_5, c_6 c_9	$(y^2 - y + 1)^4(y^{17} - 10y^{16} + \dots + 3y - 1)(y^{48} - 23y^{47} + \dots - 2y + 1)$
c_2, c_{10}	$(y^2 + y + 1)^4(y^{17} - 2y^{16} + \dots - 5y - 1)(y^{48} + 5y^{47} + \dots - 30y + 1)$
c_3, c_7, c_8	$(y + 1)^8(y^{17} + 15y^{16} + \dots + 40y - 16)$ $(1 - 26y + 99y^2 + 34y^3 - 639y^4 - 1046y^5 + 238y^6 + 6186y^7 + 1.94 \times 10^4 y^8 + 3.86 \times 10^4 y^9 + \dots)$
c_4, c_{11}	$(y^2 - y + 1)^4(y^{17} + 14y^{16} + \dots + 7y - 1)$ $(y^{48} + 13y^{47} + \dots - 341422y + 267289)$