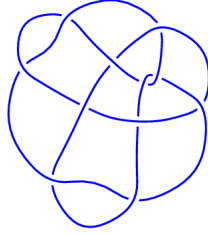
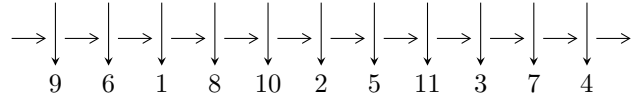


11a<sub>329</sub> (K11a<sub>329</sub>)

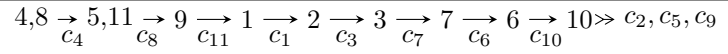


1

**Arc Sequences**



**Solving Sequence**



**Representation Ideals**

$$I = \bigcap_{i=1}^5 I_i^u$$

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

$$I_2^u = \langle u^8 + 5u^6 - 3u^5 + 10u^4 - 9u^3 + 9u^2 - 7u + 3, u^6 - u^5 + 3u^4 - 7u^3 + 6u^2 + 2b - 10u + 5, \\ - 5u^7 - 22u^5 + 12u^4 - 41u^3 + 24u^2 + 6a - 27u + 11 \rangle$$

$$I_3^u = \langle u^8 - u^7 + 4u^6 - 2u^5 + 6u^4 - 2u^3 + 5u^2 - u + 1, b + u, -2u^7 + u^6 - 7u^5 + u^4 - 10u^3 + a - 7u \rangle$$

$$I_4^u = \langle u^{27} + u^{26} + \dots + 4u - 1, b - u, 7480949u^{26} + 102501940u^{25} + \dots + 35850519a + 58313900 \rangle$$

$$I_5^u = \langle u^{64} + 5u^{63} + \dots + 9u + 1, \\ - 1.25488 \times 10^{119}u^{63} - 5.93390 \times 10^{119}u^{62} + \dots + 1.36032 \times 10^{119}b - 4.57609 \times 10^{119}, \\ - 7.61826 \times 10^{119}u^{63} - 3.45060 \times 10^{120}u^{62} + \dots + 4.08097 \times 10^{119}a + 8.20476 \times 10^{119} \rangle$$

There are 5 irreducible components with 110 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>”

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

(i) Arc colorings

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

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

$$a_5 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} u^2 - 2u \\ u^2 + u - 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -u^2 \\ -u \end{pmatrix}$$

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

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

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

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

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

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

(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
$u = -0.341164 - 1.161541I$		
$a = 1.57395 + 0.36899I$	$7.76697 - 7.91583I$	$-2.23117 + 8.07622I$
$b = 0.341164 + 1.161541I$		
$u = -0.341164 + 1.161541I$		
$a = 1.57395 - 0.36899I$	$7.76697 + 7.91583I$	$-2.23117 - 8.07622I$
$b = 0.341164 - 1.161541I$		
$u = 0.682328$		
$a = -1.14790$	$-2.37447$	$-16.5377$
$b = -0.682328$		

$$\text{II. } I_2^u = \langle u^8 + 5u^6 - 3u^5 + 10u^4 - 9u^3 + 9u^2 - 7u + 3, u^6 - u^5 + 3u^4 - 7u^3 + 6u^2 + 2b - 10u + 5, -5u^7 - 22u^5 + \dots + 6a + 11 \rangle$$

(i) Arc colorings

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

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

$$a_5 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} -\frac{1}{6}u^7 - \frac{1}{3}u^5 + \dots + \frac{3}{2}u + \frac{1}{6} \\ \frac{1}{2}u^7 + 2u^5 + \dots + \frac{5}{2}u + \frac{1}{2} \end{pmatrix}$$

$$a_1 = \begin{pmatrix} \frac{5}{6}u^7 + \frac{1}{2}u^6 + \dots - \frac{1}{2}u + \frac{2}{3} \\ -\frac{1}{2}u^6 + \frac{1}{2}u^5 + \dots + 5u - \frac{5}{2} \end{pmatrix}$$

$$a_2 = \begin{pmatrix} \frac{2}{3}u^7 + u^6 + \dots - 3u + \frac{13}{3} \\ -\frac{1}{2}u^7 - \frac{1}{2}u^6 + \dots + \frac{5}{2}u + 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -\frac{7}{6}u^7 + u^6 + \dots - \frac{13}{2}u + \frac{19}{6} \\ u^7 - \frac{1}{2}u^6 + \dots + 4u + \frac{1}{2} \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} \frac{1}{6}u^7 + 2u^6 + \dots - \frac{9}{2}u + \frac{5}{6} \\ u^7 - u^6 + 5u^5 - 6u^4 + 13u^3 - 11u^2 + 11u - 5 \end{pmatrix}$$

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

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

(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
$u = -0.63156 - 1.63091I$		
$a = -0.379420 + 0.298919I$	$7.71788 + 3.38562I$	$-9.43066 - 4.92823I$
$b = 0.095575 - 1.200895I$		
$u = -0.63156 + 1.63091I$		
$a = -0.379420 - 0.298919I$	$7.71788 - 3.38562I$	$-9.43066 + 4.92823I$
$b = 0.095575 + 1.200895I$		
$u = -0.095575 - 1.200895I$		
$a = 0.307939 + 0.630003I$	$7.71788 - 3.38562I$	$-9.43066 + 4.92823I$
$b = 0.63156 - 1.63091I$		
$u = -0.095575 + 1.200895I$		
$a = 0.307939 - 0.630003I$	$7.71788 + 3.38562I$	$-9.43066 - 4.92823I$
$b = 0.63156 + 1.63091I$		
$u = 0.154365 - 1.248591I$		
$a = -0.807775 - 0.482499I$	$2.15173 + 2.37936I$	$-12.06934 - 4.77691I$
$b = -0.572771 - 0.314492I$		
$u = 0.154365 + 1.248591I$		
$a = -0.807775 + 0.482499I$	$2.15173 - 2.37936I$	$-12.06934 + 4.77691I$
$b = -0.572771 + 0.314492I$		
$u = 0.572771 - 0.314492I$		
$a = -0.28741 - 1.78865I$	$2.15173 - 2.37936I$	$-12.06934 + 4.77691I$
$b = -0.154365 - 1.248591I$		
$u = 0.572771 + 0.314492I$		
$a = -0.28741 + 1.78865I$	$2.15173 + 2.37936I$	$-12.06934 - 4.77691I$
$b = -0.154365 + 1.248591I$		

$$\text{III. } I_3^u = \langle u^8 - u^7 + 4u^6 - 2u^5 + 6u^4 - 2u^3 + 5u^2 - u + 1, b + u, -2u^7 + u^6 - 7u^5 + u^4 - 10u^3 + a - 7u \rangle$$

(i) Arc colorings

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

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

$$a_5 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} 4u^7 - 2u^6 + 12u^5 - u^4 + 16u^3 + 10u + 1 \\ -u^6 - 2u^4 - u^3 - 3u^2 - 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 2u^7 - u^6 + 7u^5 - u^4 + 10u^3 + 8u \\ -u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -u^6 - u^5 - 3u^4 - 2u^3 - 5u^2 - 2u - 3 \\ -u^7 - 2u^5 - u^4 - 2u^3 - u^2 - u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} u^7 - u^6 + 3u^5 - 2u^4 + 4u^3 - 2u^2 + 2u - 1 \\ -u^2 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} u^7 - 2u^6 + 5u^5 - 5u^4 + 7u^3 - 6u^2 + 6u - 3 \\ u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 3u^7 - 2u^6 + 10u^5 - 2u^4 + 13u^3 - u^2 + 9u \\ 0 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 3u^7 - 2u^6 + 10u^5 - 2u^4 + 13u^3 - u^2 + 9u \\ 0 \end{pmatrix}$$

(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
$u = -0.506251 - 0.960489I$	$5.85877 + 1.31073I$	$-1.64360 - 0.98117I$
$a = 0.249506 + 0.196383I$		
$b = 0.506251 + 0.960489I$		
$u = -0.506251 + 0.960489I$	$5.85877 - 1.31073I$	$-1.64360 + 0.98117I$
$a = 0.249506 - 0.196383I$		
$b = 0.506251 - 0.960489I$		
$u = 0.118520 - 0.521695I$	$-0.789792 - 1.148197I$	$0.97016 - 3.66325I$
$a = 0.08323 - 2.62717I$		
$b = -0.118520 + 0.521695I$		
$u = 0.118520 + 0.521695I$	$-0.789792 + 1.148197I$	$0.97016 + 3.66325I$
$a = 0.08323 + 2.62717I$		
$b = -0.118520 - 0.521695I$		
$u = 0.302896 - 1.275447I$	$5.44517 + 5.83722I$	$-3.39356 - 6.57107I$
$a = -1.64863 - 0.55513I$		
$b = -0.302896 + 1.275447I$		
$u = 0.302896 + 1.275447I$	$5.44517 - 5.83722I$	$-3.39356 + 6.57107I$
$a = -1.64863 + 0.55513I$		
$b = -0.302896 - 1.275447I$		
$u = 0.584835 - 1.175859I$	$2.64533 + 4.83456I$	$-3.93301 - 10.95748I$
$a = -0.684107 - 0.080025I$		
$b = -0.584835 + 1.175859I$		
$u = 0.584835 + 1.175859I$	$2.64533 - 4.83456I$	$-3.93301 + 10.95748I$
$a = -0.684107 + 0.080025I$		
$b = -0.584835 - 1.175859I$		

$$\text{IV. } I_4^u = \langle u^{27} + u^{26} + \cdots + 4u - 1, b - u, 7.48 \times 10^6 u^{26} + 1.03 \times 10^8 u^{25} + \cdots + 3.59 \times 10^7 a + 5.83 \times 10^7 \rangle$$

(i) Arc colorings

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

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

$$a_5 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -0.208671u^{26} - 2.85915u^{25} + \cdots + 7.44217u - 1.62658 \\ u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -3.27801u^{26} + 5.32766u^{25} + \cdots + 46.4586u - 8.94242 \\ 1.20999u^{26} - 3.00055u^{25} + \cdots - 9.39324u + 2.65048 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.208671u^{26} - 2.85915u^{25} + \cdots + 6.44217u - 1.62658 \\ u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -2.58876u^{26} - 0.102742u^{25} + \cdots - 3.92105u - 2.07685 \\ 0.977408u^{26} + 0.220438u^{25} + \cdots - 3.89929u + 0.517993 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 2.65048u^{26} + 3.86047u^{25} + \cdots + 0.791902u + 1.20867 \\ -u^2 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} 3.03935u^{26} + 5.72431u^{25} + \cdots + 8.43055u - 4.17643 \\ -0.810224u^{26} - 2.02363u^{25} + \cdots - 2.57059u + 0.767074 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -0.606939u^{26} - 0.979932u^{25} + \cdots + 15.1011u - 3.18665 \\ 0.175698u^{26} - 1.25035u^{25} + \cdots - 0.849262u + 0.717414 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -0.606939u^{26} - 0.979932u^{25} + \cdots + 15.1011u - 3.18665 \\ 0.175698u^{26} - 1.25035u^{25} + \cdots - 0.849262u + 0.717414 \end{pmatrix}$$

(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
$u = -0.886580 - 0.019207I$	$0.96030 - 6.99778I$	$-11.49841 + 6.31594I$
$a = -1.057338 - 0.497197I$		
$b = -0.886580 - 0.019207I$		
$u = -0.886580 + 0.019207I$	$0.96030 + 6.99778I$	$-11.49841 - 6.31594I$
$a = -1.057338 + 0.497197I$		
$b = -0.886580 + 0.019207I$		
$u = -0.580317 - 0.090563I$	$3.08469 + 2.64958I$	$-9.08747 - 2.09938I$
$a = -0.597417 - 1.252033I$		
$b = -0.580317 - 0.090563I$		
$u = -0.580317 + 0.090563I$	$3.08469 - 2.64958I$	$-9.08747 + 2.09938I$
$a = -0.597417 + 1.252033I$		
$b = -0.580317 + 0.090563I$		
$u = -0.47966 - 1.48279I$	$10.7046 - 17.4305I$	$-4.97020 + 8.80041I$
$a = -1.135589 + 0.392236I$		
$b = -0.47966 - 1.48279I$		
$u = -0.47966 + 1.48279I$	$10.7046 + 17.4305I$	$-4.97020 - 8.80041I$
$a = -1.135589 - 0.392236I$		
$b = -0.47966 + 1.48279I$		
$u = -0.45771 - 1.48529I$	$12.64958 - 6.10710I$	$-1.83403 + 3.86721I$
$a = -0.908211 + 0.286969I$		
$b = -0.45771 - 1.48529I$		
$u = -0.45771 + 1.48529I$	$12.64958 + 6.10710I$	$-1.83403 - 3.86721I$
$a = -0.908211 - 0.286969I$		
$b = -0.45771 + 1.48529I$		
$u = -0.236028 - 1.095624I$	$4.10301 + 1.11169I$	$-6.68347 - 2.36909I$
$a = -0.798201 - 0.061958I$		
$b = -0.236028 - 1.095624I$		
$u = -0.236028 + 1.095624I$	$4.10301 - 1.11169I$	$-6.68347 + 2.36909I$
$a = -0.798201 + 0.061958I$		
$b = -0.236028 + 1.095624I$		

Solution to $I_4^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.045846 - 1.255568I$ $a = -1.24858 + 0.95153I$ $b = -0.045846 - 1.255568I$	$6.76407 + 1.62647I$	$-5.58254 - 2.60825I$
$u = -0.045846 + 1.255568I$ $a = -1.24858 - 0.95153I$ $b = -0.045846 + 1.255568I$	$6.76407 - 1.62647I$	$-5.58254 + 2.60825I$
$u = -0.029913 - 1.343504I$ $a = 0.37553 + 1.49753I$ $b = -0.029913 - 1.343504I$	$9.97119 + 1.49427I$	$0.080207 - 0.920031I$
$u = -0.029913 + 1.343504I$ $a = 0.37553 - 1.49753I$ $b = -0.029913 + 1.343504I$	$9.97119 - 1.49427I$	$0.080207 + 0.920031I$
$u = -0.003006 - 1.229038I$ $a = 1.65700 + 1.48184I$ $b = -0.003006 - 1.229038I$	$9.55943 - 6.00813I$	$-1.22265 + 6.13894I$
$u = -0.003006 + 1.229038I$ $a = 1.65700 - 1.48184I$ $b = -0.003006 + 1.229038I$	$9.55943 + 6.00813I$	$-1.22265 - 6.13894I$
$u = 0.10388 - 1.45531I$ $a = 0.370550 + 0.378802I$ $b = 0.10388 - 1.45531I$	$10.25314 + 0.47528I$	$-1.44372 - 0.05064I$
$u = 0.10388 + 1.45531I$ $a = 0.370550 - 0.378802I$ $b = 0.10388 + 1.45531I$	$10.25314 - 0.47528I$	$-1.44372 + 0.05064I$
$u = 0.114320 - 0.213263I$ $a = -1.14807 - 5.10834I$ $b = 0.114320 - 0.213263I$	$-1.14394 - 1.30778I$	$-18.3250 + 4.6536I$
$u = 0.114320 + 0.213263I$ $a = -1.14807 + 5.10834I$ $b = 0.114320 + 0.213263I$	$-1.14394 + 1.30778I$	$-18.3250 - 4.6536I$

Solution to $I_4^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.275286$ $a = -0.867193$ $b = 0.275286$	-0.622366	-16.1230
$u = 0.47037 - 1.48644I$ $a = 1.021555 + 0.423137I$ $b = 0.47037 - 1.48644I$	$7.11389 + 11.36346I$	$-6.87134 - 6.73077I$
$u = 0.47037 + 1.48644I$ $a = 1.021555 - 0.423137I$ $b = 0.47037 + 1.48644I$	$7.11389 - 11.36346I$	$-6.87134 + 6.73077I$
$u = 0.524847 - 1.241397I$ $a = 0.633730 + 0.220695I$ $b = 0.524847 - 1.241397I$	$2.50522 + 4.33326I$	$-7.76207 + 3.39042I$
$u = 0.524847 + 1.241397I$ $a = 0.633730 - 0.220695I$ $b = 0.524847 + 1.241397I$	$2.50522 - 4.33326I$	$-7.76207 - 3.39042I$
$u = 0.868007 - 0.115359I$ $a = 0.768649 + 0.417549I$ $b = 0.868007 - 0.115359I$	$-2.19193 - 1.02446I$	$-11.23776 + 6.18138I$
$u = 0.868007 + 0.115359I$ $a = 0.768649 - 0.417549I$ $b = 0.868007 + 0.115359I$	$-2.19193 + 1.02446I$	$-11.23776 - 6.18138I$

$$\mathbf{V. } I_5^u = \langle u^{64} + 5u^{63} + \cdots + 9u + 1, -1.25 \times 10^{119}u^{63} - 5.93 \times 10^{119}u^{62} + \cdots + 1.36 \times 10^{119}b - 4.58 \times 10^{119}, -7.62 \times 10^{119}u^{63} - 3.45 \times 10^{120}u^{62} + \cdots + 4.08 \times 10^{119}a + 8.20 \times 10^{119} \rangle$$

(i) Arc colorings

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

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

$$a_5 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 1.86678u^{63} + 8.45535u^{62} + \cdots + 13.0919u - 2.01050 \\ 0.922490u^{63} + 4.36213u^{62} + \cdots + 19.0193u + 3.36397 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -2.07092u^{63} - 9.95817u^{62} + \cdots - 51.5217u - 6.64500 \\ -0.765928u^{63} - 3.73638u^{62} + \cdots - 20.4529u - 4.25401 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0.944287u^{63} + 4.09322u^{62} + \cdots - 5.92732u - 5.37447 \\ 0.922490u^{63} + 4.36213u^{62} + \cdots + 19.0193u + 3.36397 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -1.92058u^{63} - 9.65347u^{62} + \cdots - 55.0762u - 11.3256 \\ 0.0555653u^{63} + 0.244446u^{62} + \cdots + 4.82412u + 0.229347 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 5.08294u^{63} + 24.8391u^{62} + \cdots + 104.384u + 17.2019 \\ -0.828932u^{63} - 4.33500u^{62} + \cdots - 13.7757u + 0.631299 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} -3.21107u^{63} - 15.6228u^{62} + \cdots - 65.7787u - 11.6119 \\ 0.348757u^{63} + 1.59825u^{62} + \cdots + 16.3904u + 1.14200 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 1.54638u^{63} + 7.15847u^{62} + \cdots + 9.16166u - 2.57721 \\ 0.647718u^{63} + 2.94801u^{62} + \cdots + 12.6636u + 2.49217 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 1.54638u^{63} + 7.15847u^{62} + \cdots + 9.16166u - 2.57721 \\ 0.647718u^{63} + 2.94801u^{62} + \cdots + 12.6636u + 2.49217 \end{pmatrix}$$

(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
$u = -1.382925 - 0.232456I$		
$a = -0.191453 - 0.574145I$	$6.90028 - 0.03721I$	$0.411884 + 0.803036I$
$b = -0.201492 - 1.219098I$		
$u = -1.382925 + 0.232456I$		
$a = -0.191453 + 0.574145I$	$6.90028 + 0.03721I$	$0.411884 - 0.803036I$
$b = -0.201492 + 1.219098I$		
$u = -1.197287 - 0.312647I$		
$a = -0.707406 - 0.535648I$	$5.08314 - 11.58171I$	$-7.27818 + 8.68080I$
$b = -0.398045 - 1.299042I$		
$u = -1.197287 + 0.312647I$		
$a = -0.707406 + 0.535648I$	$5.08314 + 11.58171I$	$-7.27818 - 8.68080I$
$b = -0.398045 + 1.299042I$		
$u = -1.04393 - 1.82190I$		
$a = 0.279733 - 0.006501I$	$8.11459 + 3.37630I$	$11.59173 - 5.43442I$
$b = -0.087790 + 1.202473I$		
$u = -1.04393 + 1.82190I$		
$a = 0.279733 + 0.006501I$	$8.11459 - 3.37630I$	$11.59173 + 5.43442I$
$b = -0.087790 - 1.202473I$		
$u = -0.685111 - 0.128372I$		
$a = 1.26615 + 1.28343I$	$1.25382 - 4.32436I$	$-10.17044 + 8.05596I$
$b = 0.294249 + 1.039513I$		
$u = -0.685111 + 0.128372I$		
$a = 1.26615 - 1.28343I$	$1.25382 + 4.32436I$	$-10.17044 - 8.05596I$
$b = 0.294249 - 1.039513I$		
$u = -0.62803 - 1.48659I$		
$a = 0.863992 - 0.003752I$	$11.25573 - 7.19139I$	$-1.56014 + 5.45704I$
$b = 0.090336 + 1.330560I$		
$u = -0.62803 + 1.48659I$		
$a = 0.863992 + 0.003752I$	$11.25573 + 7.19139I$	$-1.56014 - 5.45704I$
$b = 0.090336 - 1.330560I$		

Solution to $I_5^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.612602 - 0.471856I$ $a = 0.025706 - 1.164301I$ $b = 0.232794 - 1.231506I$	$2.52109 + 1.66996I$	$-6.36037 + 2.48874I$
$u = -0.612602 + 0.471856I$ $a = 0.025706 + 1.164301I$ $b = 0.232794 + 1.231506I$	$2.52109 - 1.66996I$	$-6.36037 - 2.48874I$
$u = -0.39852 - 1.36564I$ $a = 0.121970 + 0.518027I$ $b = -0.214549 - 0.185839I$	$5.08106 + 2.21530I$	$-7.36537 - 6.15916I$
$u = -0.39852 + 1.36564I$ $a = 0.121970 - 0.518027I$ $b = -0.214549 + 0.185839I$	$5.08106 - 2.21530I$	$-7.36537 + 6.15916I$
$u = -0.398045 - 1.299042I$ $a = -0.753479 + 0.292200I$ $b = -1.197287 - 0.312647I$	$5.08314 - 11.58171I$	$-7.27818 + 8.68080I$
$u = -0.398045 + 1.299042I$ $a = -0.753479 - 0.292200I$ $b = -1.197287 + 0.312647I$	$5.08314 + 11.58171I$	$-7.27818 - 8.68080I$
$u = -0.339847 - 1.221777I$ $a = 0.956485 + 0.589998I$ $b = 0.120701 + 0.199374I$	$6.38478 - 6.22988I$	$-5.40289 + 5.47727I$
$u = -0.339847 + 1.221777I$ $a = 0.956485 - 0.589998I$ $b = 0.120701 - 0.199374I$	$6.38478 + 6.22988I$	$-5.40289 - 5.47727I$
$u = -0.297614 - 1.338772I$ $a = 1.48376 - 0.36485I$ $b = 0.452635 + 1.145973I$	$5.87133 - 7.92548I$	$-6.67034 + 8.79925I$
$u = -0.297614 + 1.338772I$ $a = 1.48376 + 0.36485I$ $b = 0.452635 - 1.145973I$	$5.87133 + 7.92548I$	$-6.67034 - 8.79925I$

Solution to $I_5^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.271195 - 1.153981I$ $a = 1.63456 - 0.62464I$ $b = 0.336277 + 1.364756I$	$4.73825 - 4.95632I$	$-9.13606 + 0.42300I$
$u = -0.271195 + 1.153981I$ $a = 1.63456 + 0.62464I$ $b = 0.336277 - 1.364756I$	$4.73825 + 4.95632I$	$-9.13606 - 0.42300I$
$u = -0.269264 - 0.401570I$ $a = 1.63873 - 1.71309I$ $b = 0.463669 - 0.019406I$	$-1.16995 - 1.22634I$	$-14.0955 + 5.1640I$
$u = -0.269264 + 0.401570I$ $a = 1.63873 + 1.71309I$ $b = 0.463669 + 0.019406I$	$-1.16995 + 1.22634I$	$-14.0955 - 5.1640I$
$u = -0.230618 - 0.105542I$ $a = -1.51626 - 2.95895I$ $b = 0.276431 - 1.243722I$	$2.72784 + 2.52152I$	$-6.98017 - 1.90432I$
$u = -0.230618 + 0.105542I$ $a = -1.51626 + 2.95895I$ $b = 0.276431 + 1.243722I$	$2.72784 - 2.52152I$	$-6.98017 + 1.90432I$
$u = -0.214549 - 0.185839I$ $a = -0.89406 + 2.51300I$ $b = -0.39852 - 1.36564I$	$5.08106 + 2.21530I$	$-7.36537 - 6.15916I$
$u = -0.214549 + 0.185839I$ $a = -0.89406 - 2.51300I$ $b = -0.39852 + 1.36564I$	$5.08106 - 2.21530I$	$-7.36537 + 6.15916I$
$u = -0.201492 - 1.219098I$ $a = -0.686845 - 0.005818I$ $b = -1.382925 - 0.232456I$	$6.90028 - 0.03721I$	$0.411884 + 0.803036I$
$u = -0.201492 + 1.219098I$ $a = -0.686845 + 0.005818I$ $b = -1.382925 + 0.232456I$	$6.90028 + 0.03721I$	$0.411884 - 0.803036I$

Solution to $I_5^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.151131 - 1.300520I$		
$a = 0.803730 - 0.343215I$	$3.42651 - 2.86570I$	$-5.40728 + 4.03056I$
$b = 0.920222 - 0.395412I$		
$u = -0.151131 + 1.300520I$		
$a = 0.803730 + 0.343215I$	$3.42651 + 2.86570I$	$-5.40728 - 4.03056I$
$b = 0.920222 + 0.395412I$		
$u = -0.087790 - 1.202473I$		
$a = -0.397620 - 0.281730I$	$8.11459 - 3.37630I$	$11.59173 + 5.43442I$
$b = -1.04393 + 1.82190I$		
$u = -0.087790 + 1.202473I$		
$a = -0.397620 + 0.281730I$	$8.11459 + 3.37630I$	$11.59173 - 5.43442I$
$b = -1.04393 - 1.82190I$		
$u = -0.063212 - 0.940817I$		
$a = 0.717133 - 0.574436I$	$-0.168876 - 0.846731I$	$-12.88022 + 0.77932I$
$b = 0.804979 + 0.202940I$		
$u = -0.063212 + 0.940817I$		
$a = 0.717133 + 0.574436I$	$-0.168876 + 0.846731I$	$-12.88022 - 0.77932I$
$b = 0.804979 - 0.202940I$		
$u = -0.053296 - 1.199697I$		
$a = 0.715928 - 0.774703I$	$5.82389 - 3.48280I$	$-7.27851 + 5.89972I$
$b = 0.42436 + 1.68610I$		
$u = -0.053296 + 1.199697I$		
$a = 0.715928 + 0.774703I$	$5.82389 + 3.48280I$	$-7.27851 - 5.89972I$
$b = 0.42436 - 1.68610I$		
$u = 0.090336 - 1.330560I$		
$a = -0.986962 - 0.344993I$	$11.25573 + 7.19139I$	$-1.56014 - 5.45704I$
$b = -0.62803 + 1.48659I$		
$u = 0.090336 + 1.330560I$		
$a = -0.986962 + 0.344993I$	$11.25573 - 7.19139I$	$-1.56014 + 5.45704I$
$b = -0.62803 - 1.48659I$		



Solution to $I_5^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.120701 - 0.199374I$ $a = -4.14581 + 4.49501I$ $b = -0.339847 + 1.221777I$	$6.38478 + 6.22988I$	$-5.40289 - 5.47727I$
$u = 0.120701 + 0.199374I$ $a = -4.14581 - 4.49501I$ $b = -0.339847 - 1.221777I$	$6.38478 - 6.22988I$	$-5.40289 + 5.47727I$
$u = 0.232794 - 1.231506I$ $a = -0.633433 - 0.339154I$ $b = -0.612602 - 0.471856I$	$2.52109 + 1.66996I$	$-6.36037 + 2.48874I$
$u = 0.232794 + 1.231506I$ $a = -0.633433 + 0.339154I$ $b = -0.612602 + 0.471856I$	$2.52109 - 1.66996I$	$-6.36037 - 2.48874I$
$u = 0.276431 - 1.243722I$ $a = -0.639083 + 0.172102I$ $b = -0.230618 - 0.105542I$	$2.72784 + 2.52152I$	$-6.98017 - 1.90432I$
$u = 0.276431 + 1.243722I$ $a = -0.639083 - 0.172102I$ $b = -0.230618 + 0.105542I$	$2.72784 - 2.52152I$	$-6.98017 + 1.90432I$
$u = 0.294249 - 1.039513I$ $a = -1.105037 - 0.363187I$ $b = -0.685111 + 0.128372I$	$1.25382 + 4.32436I$	$-10.17044 - 8.05596I$
$u = 0.294249 + 1.039513I$ $a = -1.105037 + 0.363187I$ $b = -0.685111 - 0.128372I$	$1.25382 - 4.32436I$	$-10.17044 + 8.05596I$
$u = 0.336277 - 1.364756I$ $a = -1.38413 - 0.51193I$ $b = -0.271195 + 1.153981I$	$4.73825 + 4.95632I$	$-9.13606 - 0.42300I$
$u = 0.336277 + 1.364756I$ $a = -1.38413 + 0.51193I$ $b = -0.271195 - 1.153981I$	$4.73825 - 4.95632I$	$-9.13606 + 0.42300I$

Solution to $I_5^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.397836 - 1.218829I$ $a = 0.644295 + 0.250433I$ $b = 1.211971 - 0.440132I$	$1.24375 + 5.55297I$	$-9.91814 - 9.36630I$
$u = 0.397836 + 1.218829I$ $a = 0.644295 - 0.250433I$ $b = 1.211971 + 0.440132I$	$1.24375 - 5.55297I$	$-9.91814 + 9.36630I$
$u = 0.42436 - 1.68610I$ $a = -0.591850 - 0.424891I$ $b = -0.053296 + 1.199697I$	$5.82389 + 3.48280I$	$-7.27851 - 5.89972I$
$u = 0.42436 + 1.68610I$ $a = -0.591850 + 0.424891I$ $b = -0.053296 - 1.199697I$	$5.82389 - 3.48280I$	$-7.27851 + 5.89972I$
$u = 0.452635 - 1.145973I$ $a = -1.69479 - 0.14216I$ $b = -0.297614 + 1.338772I$	$5.87133 + 7.92548I$	$-6.67034 - 8.79925I$
$u = 0.452635 + 1.145973I$ $a = -1.69479 + 0.14216I$ $b = -0.297614 - 1.338772I$	$5.87133 - 7.92548I$	$-6.67034 + 8.79925I$
$u = 0.463669 - 0.019406I$ $a = -2.41332 - 0.52542I$ $b = -0.269264 - 0.401570I$	$-1.16995 - 1.22634I$	$-14.0955 + 5.1640I$
$u = 0.463669 + 0.019406I$ $a = -2.41332 + 0.52542I$ $b = -0.269264 + 0.401570I$	$-1.16995 + 1.22634I$	$-14.0955 - 5.1640I$
$u = 0.804979 - 0.202940I$ $a = -0.872180 + 0.573156I$ $b = -0.063212 + 0.940817I$	$-0.168876 + 0.846731I$	$-12.88022 - 0.77932I$
$u = 0.804979 + 0.202940I$ $a = -0.872180 - 0.573156I$ $b = -0.063212 - 0.940817I$	$-0.168876 - 0.846731I$	$-12.88022 + 0.77932I$

Solution to $I_5^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.920222 - 0.395412I$	$3.42651 - 2.86570I$	$-5.40728 + 4.03056I$
$a = -0.129317 - 1.135085I$		
$b = -0.151131 - 1.300520I$		
$u = 0.920222 + 0.395412I$	$3.42651 + 2.86570I$	$-5.40728 - 4.03056I$
$a = -0.129317 + 1.135085I$		
$b = -0.151131 + 1.300520I$		
$u = 1.211971 - 0.440132I$	$1.24375 + 5.55297I$	$-9.91814 - 9.36630I$
$a = 0.590869 - 0.351158I$		
$b = 0.397836 - 1.218829I$		
$u = 1.211971 + 0.440132I$	$1.24375 - 5.55297I$	$-9.91814 + 9.36630I$
$a = 0.590869 + 0.351158I$		
$b = 0.397836 + 1.218829I$		

## VI. u-Polynomials

Crossings	u-Polynomials at each crossings
$c_1, c_{10}$	$(u^3 + u + 1)(u^8 - 5u^7 + 9u^6 - 3u^5 - 8u^4 + 7u^3 + 3u^2 - 2u + 1)$ $(u^8 + 2u^7 + 2u^6 + 3u^5 + 3u^4 + 3u^3 + 3u^2 + u + 1)$ $(u^{27} + 2u^{26} + \dots - 10u - 3)(u^{64} - 2u^{63} + \dots + 126u + 177)$
$c_2$	$(u^3 + u - 1)(u^4 - u^3 + 2u^2 + 1)^2$ $(u^8 + 3u^7 + 6u^6 + 8u^5 + 8u^4 + 7u^3 + 5u^2 + 2u + 1)$ $(u^{27} + 8u^{26} + \dots + 110u + 12)$ $(3 - 10u + 29u^2 - 61u^3 + 111u^4 - 197u^5 + 321u^6 - 546u^7 + 878u^8 - 1320u^9 + 1920u^{10} - 2400u^{11} + 2880u^{12} - 2880u^{13} + 2400u^{14} - 1920u^{15} + 1200u^{16} - 600u^{17} + 240u^{18} - 80u^{19} + 24u^{20} - 6u^{21} + 1u^{22})$
$c_3, c_7$	$(u^3 + u + 1)(u^8 + 5u^6 + 3u^5 + 10u^4 + 9u^3 + 9u^2 + 7u + 3)$ $(u^8 + u^7 + \dots + u + 1)(u^{27} + u^{26} + \dots + 4u - 1)$ $(u^{64} + 5u^{63} + \dots + 9u + 1)$
$c_4, c_{11}$	$(u^3 + u - 1)(u^8 + 5u^6 - 3u^5 + 10u^4 - 9u^3 + 9u^2 - 7u + 3)$ $(u^8 - u^7 + \dots - u + 1)(u^{27} + u^{26} + \dots + 4u - 1)$ $(u^{64} + 5u^{63} + \dots + 9u + 1)$
$c_5$	$(u^3 - 3u^2 + 4u - 1)(u^8 + 2u^6 + 2u^5 + 3u^4 + 4u^3 + 7u^2 + 7u + 3)$ $(u^8 + 3u^7 + 4u^6 + 5u^5 + 5u^4 + 4u^3 + 4u^2 + 2u + 1)$ $(u^{27} + 12u^{25} + \dots - 15u^2 - 1)(u^{64} + u^{63} + \dots + 16935u + 15481)$
$c_6$	$(u^3 + u + 1)(u^4 + u^3 + 2u^2 + 1)^2$ $(u^8 - 3u^7 + 6u^6 - 8u^5 + 8u^4 - 7u^3 + 5u^2 - 2u + 1)$ $(u^{27} + 8u^{26} + \dots + 110u + 12)(u^{64} - 6u^{63} + \dots - 60u + 9)$
$c_8$	$(u^3 - u^2 + 4u - 3)(u^4 + u + 1)^2$ $(u^8 - 6u^7 + 19u^6 - 35u^5 + 38u^4 - 25u^3 + 10u^2 - 2u + 1)$ $(u^{27} + 20u^{26} + \dots - 1284u - 180)$ $(19 - 99u + 349u^2 - 851u^3 + 1745u^4 - 3044u^5 + 4905u^6 - 7380u^7 + 1.08 \times 10^4 u^8 - 1.55 \times 10^4 u^9 + 1.55 \times 10^4 u^{10} - 1.08 \times 10^4 u^{11} + 7380u^{12} - 4905u^{13} + 3044u^{14} - 1745u^{15} + 851u^{16} - 349u^{17} + 99u^{18} - 19u^{19})$
$c_9$	$(u^3 - 3u^2 + 4u - 1)(u^8 + 2u^6 + 2u^5 + 3u^4 + 4u^3 + 7u^2 + 7u + 3)$ $(u^8 + 3u^7 + 4u^6 + 5u^5 + 5u^4 + 4u^3 + 4u^2 + 2u + 1)$ $(u^{27} + 12u^{25} + \dots - 15u^2 - 1)(u^{64} + u^{63} + \dots + 16935u + 15481)$

## VII. Riley Polynomials

Crossings	Riley Polynomials at each crossings
$c_1$	$(y^3 + 2y^2 + y - 1)(y^8 - 2y^6 - 3y^5 + y^4 + 7y^3 + 9y^2 + 5y + 1)$ $(y^8 - 7y^7 + 35y^6 - 77y^5 + 142y^4 - 91y^3 + 21y^2 + 2y + 1)$ $(y^{27} + 4y^{26} + \dots + 4y - 9)(y^{64} + 4y^{63} + \dots + 305202y + 31329)$
$c_2, c_6$	$(y^3 + 2y^2 + y - 1)(y^4 + 3y^3 + 6y^2 + 4y + 1)^2$ $(y^8 + 3y^7 + 4y^6 + 2y^4 + 11y^3 + 13y^2 + 6y + 1)$ $(y^{27} + 14y^{26} + \dots + 700y - 144)$ $(9 + 74y + 287y^2 + 703y^3 + 1253y^4 + 1885y^5 + 3237y^6 + 1.06 \times 10^4 y^7 + 4.96 \times 10^4 y^8 + 1.90 \times 10^4 y^9)$
$c_3, c_4, c_7$ $c_{11}$	$(y^3 + 2y^2 + y - 1)$ $(y^8 + 7y^7 + 24y^6 + 50y^5 + 68y^4 + 60y^3 + 33y^2 + 9y + 1)$ $(y^8 + 10y^7 + 45y^6 + 109y^5 + 142y^4 + 87y^3 + 15y^2 + 5y + 9)$ $(y^{27} + 27y^{26} + \dots - 4y - 1)(y^{64} + 49y^{63} + \dots - 3y + 1)$
$c_5, c_9$	$(y^3 - y^2 + 10y - 1)(y^8 - y^7 + \dots + 4y + 1)$ $(y^8 + 4y^7 + 10y^6 + 22y^5 + 27y^4 + 10y^3 + 11y^2 - 7y + 9)$ $(y^{27} + 24y^{26} + \dots - 30y - 1)$ $(y^{64} + 11y^{63} + \dots + 3729627377y + 239661361)$
$c_8$	$(y^3 + 7y^2 + 10y - 9)(y^4 + 2y^2 - y + 1)^2$ $(y^8 + 2y^7 + 17y^6 - 61y^5 + 52y^4 + 33y^3 + 76y^2 + 16y + 1)$ $(y^{27} - 2y^{26} + \dots + 561816y - 32400)$ $(361 + 3461y + 1.96 \times 10^4 y^2 + 7.75 \times 10^4 y^3 + 2.39 \times 10^5 y^4 + 6.17 \times 10^5 y^5 + 1.38 \times 10^6 y^6 + 1.90 \times 10^6 y^7)$
$c_{10}$	$(y^3 + 2y^2 + y - 1)(y^8 - 2y^6 - 3y^5 + y^4 + 7y^3 + 9y^2 + 5y + 1)$ $(y^8 - 7y^7 + 35y^6 - 77y^5 + 142y^4 - 91y^3 + 21y^2 + 2y + 1)$ $(y^{27} + 4y^{26} + \dots + 4y - 9)(y^{64} + 4y^{63} + \dots + 305202y + 31329)$