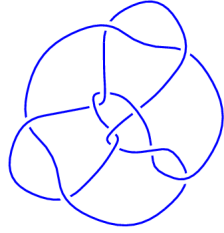
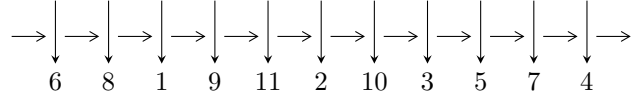


11a₃₁₈ (K11a₃₁₈)

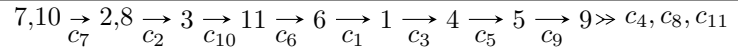


1

Arc Sequences



Solving Sequence



Representation Ideals

$$I = \bigcap_{i=1}^6 I_i^u$$

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

$$I_2^u = \langle u^4 + u - 1, u^3 + u^2 + b, u^3 + u^2 + a + 1 \rangle$$

$$I_3^u = \langle u^{12} - 2u^{10} + u^9 - 5u^7 + 6u^6 + u^5 - 9u^4 + 5u^3 + 6u^2 - 2u - 1, 352u^{11} - 94u^{10} + \dots + 697b + 936, \\ - 1440u^{11} + 638u^{10} + \dots + 697a + 2634 \rangle$$

$$I_4^u = \langle u^{18} + u^{17} + \dots + u^2 - 1, 900967u^{17} + 78843u^{16} + \dots + 1982053b - 1777862, \\ 372351u^{17} + 1342734u^{16} + \dots + 1982053a - 2640641 \rangle$$

$$I_5^u = \langle u^{20} - 8u^{18} + \dots + u - 1, -321u^{19} + 125u^{18} + \dots + 367b + 610, \\ - 1165u^{19} - 509u^{18} + \dots + 367a - 1838 \rangle$$

$$I_6^u = \langle u^{60} - u^{59} + \dots - 109u + 17, \\ - 2.09517 \times 10^{101}u^{59} + 2.44801 \times 10^{100}u^{58} + \dots + 5.25066 \times 10^{101}b + 3.92526 \times 10^{102}, \\ 1.15506 \times 10^{102}u^{59} + 7.80096 \times 10^{100}u^{58} + \dots + 8.92612 \times 10^{102}a - 5.37881 \times 10^{103} \rangle$$

There are 6 irreducible components with 115 representations.

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

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

(i) Arc colorings

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

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

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

$$a_8 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

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

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

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

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

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

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

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

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

(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
$u = 1.00000$		
$a = -1.00000$	-4.93480	-18.0000
$b = -1.00000$		

$$\text{II. } I_2^u = \langle u^4 + u - 1, u^3 + u^2 + b, u^3 + u^2 + a + 1 \rangle$$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

$$a_8 = \begin{pmatrix} -u^3 - u^2 - u - 1 \\ -u^2 \end{pmatrix}$$

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

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

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

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

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

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

$$a_9 = \begin{pmatrix} -u^3 - 1 \\ -u^3 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u^3 - 1 \\ -u^3 \end{pmatrix}$$

(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
$u = -1.22074$ $a = -0.671044$ $b = 0.328956$	-8.36260	-19.9194
$u = 0.248126 - 1.033982I$ $a = 0.788105 - 0.401358I$ $b = 1.78810 - 0.40136I$	$3.04135 - 1.96274I$	$-6.36273 + 1.58218I$
$u = 0.248126 + 1.033982I$ $a = 0.788105 + 0.401358I$ $b = 1.78810 + 0.40136I$	$3.04135 + 1.96274I$	$-6.36273 - 1.58218I$
$u = 0.724492$ $a = -1.90517$ $b = -0.905166$	-4.29983	-3.35519

$$\text{III. } I_3^u = \langle u^{12} - 2u^{10} + \dots - 2u - 1, 352u^{11} - 94u^{10} + \dots + 697b + 936, -1440u^{11} + 638u^{10} + \dots + 697a + 2634 \rangle$$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 2.06600u^{11} - 0.915352u^{10} + \dots + 3.52941u - 3.77905 \\ -0.505022u^{11} + 0.134864u^{10} + \dots - 0.529412u - 1.34290 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} -1.05022u^{11} + 0.348637u^{10} + \dots - 3.29412u + 3.57102 \\ 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -1.05022u^{11} + 0.348637u^{10} + \dots - 3.29412u + 4.57102 \\ 1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 2.06600u^{11} - 0.915352u^{10} + \dots + 3.52941u - 3.77905 \\ 0.364419u^{11} - 0.358680u^{10} + \dots - 0.294118u - 2.25825 \end{pmatrix}$$

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

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

$$a_4 = \begin{pmatrix} -0.691535u^{11} + 0.286944u^{10} + \dots - 2.76471u + 3.20660 \\ 0.566714u^{11} - 0.0774749u^{10} + \dots + 0.176471u + 0.984218 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1.25825u^{11} - 0.364419u^{10} + \dots + 2.94118u - 2.22238 \\ -0.566714u^{11} + 0.0774749u^{10} + \dots - 0.176471u - 0.984218 \end{pmatrix}$$

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

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

(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
$u = -1.36109 - 0.59989I$ $a = -0.583021 - 0.456173I$ $b = -1.49269 + 1.63300I$	-5.59278	-14.0000
$u = -1.36109 + 0.59989I$ $a = -0.583021 + 0.456173I$ $b = -1.49269 - 1.63300I$	-5.59278	-14.0000
$u = -0.849985 - 0.107756I$ $a = 0.15190 - 1.75032I$ $b = 0.189428 + 1.216412I$	2.30291	-14.0000
$u = -0.849985 + 0.107756I$ $a = 0.15190 + 1.75032I$ $b = 0.189428 - 1.216412I$	2.30291	-14.0000
$u = -0.319710$ $a = -3.19668$ $b = -1.29129$	-5.59278	-14.0000
$u = 0.128305 - 1.331903I$ $a = 0.588280 - 0.308870I$ $b = 1.75750 - 0.34178I$	2.30291	-14.0000
$u = 0.128305 + 1.331903I$ $a = 0.588280 + 0.308870I$ $b = 1.75750 + 0.34178I$	2.30291	-14.0000
$u = 0.580134$ $a = 0.411989$ $b = -1.75669$	-5.59278	-14.0000
$u = 0.721680 - 0.842764I$ $a = -0.313126 + 1.043711I$ $b = -0.710863 - 0.183182I$	2.30291	-14.0000
$u = 0.721680 + 0.842764I$ $a = -0.313126 - 1.043711I$ $b = -0.710863 + 0.183182I$	2.30291	-14.0000

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.13635$ $a = -1.17388$ $b = -0.102214$	-5.59278	-14.0000
$u = 1.32540$ $a = -0.729484$ $b = -0.336556$	-5.59278	-14.0000

IV.

$$I_4^u = \langle u^{18} + u^{17} + \dots + u^2 - 1, 9.01 \times 10^5 u^{17} + 7.88 \times 10^4 u^{16} + \dots + 1.98 \times 10^6 b - 1.78 \times 10^6, 3.72 \times 10^5 u^{17} + 1.34 \times 10^6 u^{16} + \dots + 1.98 \times 10^6 a - 2.64 \times 10^6 \rangle$$

(i) Arc colorings

$$\begin{aligned} a_7 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -0.187861u^{17} - 0.677446u^{16} + \dots + 5.62561u + 1.33228 \\ -0.454563u^{17} - 0.0397785u^{16} + \dots + 2.06932u + 0.896980 \end{pmatrix} \\ a_2 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_8 &= \begin{pmatrix} 0.0670699u^{17} + 0.526535u^{16} + \dots + 0.818316u + 1.86468 \\ 0.451948u^{17} + 0.218673u^{16} + \dots + 0.601597u + 0.0859684 \end{pmatrix} \\ a_3 &= \begin{pmatrix} 0.343733u^{17} + 0.573494u^{16} + \dots - 3.43113u + 2.30647 \\ -0.572497u^{17} + 0.268771u^{16} + \dots - 2.24851u + 0.799368 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} -0.187861u^{17} - 0.677446u^{16} + \dots + 5.62561u + 1.33228 \\ -0.171077u^{17} - 0.320336u^{16} + \dots + 1.88146u + 0.407395 \end{pmatrix} \\ a_6 &= \begin{pmatrix} u \\ u \end{pmatrix} \\ a_1 &= \begin{pmatrix} -u^2 + 1 \\ -u^2 \end{pmatrix} \\ a_4 &= \begin{pmatrix} 0.418192u^{17} + 0.463227u^{16} + \dots - 1.60927u + 1.83513 \\ -0.00845336u^{17} + 0.364603u^{16} + \dots - 1.75892u + 0.515882 \end{pmatrix} \\ a_5 &= \begin{pmatrix} -0.426645u^{17} - 0.0986240u^{16} + \dots - 0.149649u - 1.31924 \\ 0.757695u^{17} - 0.460834u^{16} + \dots + 1.61964u - 1.27985 \end{pmatrix} \\ a_9 &= \begin{pmatrix} -0.515882u^{17} - 0.507429u^{16} + \dots + 6.94486u + 1.75892 \\ 0.763966u^{17} + 0.0147246u^{16} + \dots + 3.34917u + 0.139285 \end{pmatrix} \\ a_9 &= \begin{pmatrix} -0.515882u^{17} - 0.507429u^{16} + \dots + 6.94486u + 1.75892 \\ 0.763966u^{17} + 0.0147246u^{16} + \dots + 3.34917u + 0.139285 \end{pmatrix} \end{aligned}$$

(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
$u = -1.244326 - 0.432653I$ $a = 0.640426 + 0.669927I$ $b = 1.89549 - 0.14793I$	$0.46162 - 9.59091I$	$-11.3598 + 8.6982I$
$u = -1.244326 + 0.432653I$ $a = 0.640426 - 0.669927I$ $b = 1.89549 + 0.14793I$	$0.46162 + 9.59091I$	$-11.3598 - 8.6982I$
$u = -1.219634 - 0.122646I$ $a = -0.419802 - 0.772436I$ $b = -1.84111 + 1.75570I$	$-4.77876 - 5.57099I$	$-14.6445 + 6.8943I$
$u = -1.219634 + 0.122646I$ $a = -0.419802 + 0.772436I$ $b = -1.84111 - 1.75570I$	$-4.77876 + 5.57099I$	$-14.6445 - 6.8943I$
$u = -1.155402 - 0.382844I$ $a = -0.805383 + 0.853229I$ $b = 0.0599737 + 0.0141160I$	$-8.49225 - 3.12657I$	$-16.5106 + 4.5687I$
$u = -1.155402 + 0.382844I$ $a = -0.805383 - 0.853229I$ $b = 0.0599737 - 0.0141160I$	$-8.49225 + 3.12657I$	$-16.5106 - 4.5687I$
$u = -0.52847 - 1.35181I$ $a = -0.499034 - 0.492920I$ $b = -1.82277 + 0.03177I$	$2.78527 + 3.16569I$	$-11.24611 - 7.60453I$
$u = -0.52847 + 1.35181I$ $a = -0.499034 + 0.492920I$ $b = -1.82277 - 0.03177I$	$2.78527 - 3.16569I$	$-11.24611 + 7.60453I$
$u = -0.333926$ $a = 0.716134$ $b = -0.234092$	-0.538352	-18.5399
$u = 0.148267 - 0.251923I$ $a = 2.14317 - 2.34534I$ $b = 1.168914 - 0.407268I$	$1.73441 - 2.46344I$	$-11.30045 + 4.80762I$

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.148267 + 0.251923I$ $a = 2.14317 + 2.34534I$ $b = 1.168914 + 0.407268I$	$1.73441 + 2.46344I$	$-11.30045 - 4.80762I$
$u = 0.503027 - 0.934053I$ $a = -0.870982 + 0.607288I$ $b = -1.24828 - 0.81372I$	$5.93090 + 0.43570I$	$-2.98328 - 1.68118I$
$u = 0.503027 + 0.934053I$ $a = -0.870982 - 0.607288I$ $b = -1.24828 + 0.81372I$	$5.93090 - 0.43570I$	$-2.98328 + 1.68118I$
$u = 0.969317$ $a = -1.11851$ $b = -1.01033$	-4.93604	-18.1165
$u = 1.306394 - 0.030156I$ $a = 0.225308 + 0.468162I$ $b = -0.390793 + 0.857611I$	$-7.41832 - 1.14356I$	$-14.7481 + 6.1062I$
$u = 1.306394 + 0.030156I$ $a = 0.225308 - 0.468162I$ $b = -0.390793 - 0.857611I$	$-7.41832 + 1.14356I$	$-14.7481 - 6.1062I$
$u = 1.37244 - 0.65413I$ $a = 0.787491 - 0.532626I$ $b = 1.80080 + 1.22375I$	$-3.9350 + 17.2773I$	$-12.8790 - 9.3490I$
$u = 1.37244 + 0.65413I$ $a = 0.787491 + 0.532626I$ $b = 1.80080 - 1.22375I$	$-3.9350 - 17.2773I$	$-12.8790 + 9.3490I$

$$\mathbf{V. } I_5^u = \langle u^{20} - 8u^{18} + \dots + u - 1, -321u^{19} + 125u^{18} + \dots + 367b + 610, -1165u^{19} - 509u^{18} + \dots + 367a - 1838 \rangle$$

(i) Arc colorings

$$\begin{aligned} a_7 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\ a_{10} &= \begin{pmatrix} 3.17439u^{19} + 1.38692u^{18} + \dots + 3.88283u + 5.00817 \\ 0.874659u^{19} - 0.340599u^{18} + \dots + 3.49046u - 1.66213 \end{pmatrix} \\ a_2 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_8 &= \begin{pmatrix} 0.972752u^{19} + 0.752044u^{18} + \dots + 7.23706u + 6.02997 \\ -0.681199u^{19} - 0.198910u^{18} + \dots - 1.07357u - 0.250681 \end{pmatrix} \\ a_3 &= \begin{pmatrix} -1.25068u^{19} - 0.681199u^{18} + \dots + 0.980926u + 0.675749 \\ -0.00544959u^{19} - 0.449591u^{18} + \dots - 1.15259u - 0.594005 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} 3.17439u^{19} + 1.38692u^{18} + \dots + 3.88283u + 5.00817 \\ 1.79564u^{19} - 0.359673u^{18} + \dots + 5.27793u - 0.275204 \end{pmatrix} \\ a_6 &= \begin{pmatrix} u \\ u \end{pmatrix} \\ a_1 &= \begin{pmatrix} -u^2 + 1 \\ -u^2 \end{pmatrix} \\ a_4 &= \begin{pmatrix} -0.656676u^{19} - 0.675749u^{18} + \dots + 1.61308u + 1.42234 \\ -1.02452u^{19} - 0.523161u^{18} + \dots - 2.68665u - 0.673025 \end{pmatrix} \\ a_5 &= \begin{pmatrix} -2.61035u^{19} - 1.35422u^{18} + \dots - 8.08992u - 5.52861 \\ -1.32425u^{19} + 0.749319u^{18} + \dots - 4.07902u + 1.65668 \end{pmatrix} \\ a_9 &= \begin{pmatrix} 4.12534u^{19} + 1.34060u^{18} + \dots + 10.5095u + 8.66213 \\ -0.994550u^{19} + 0.449591u^{18} + \dots - 0.847411u + 0.594005 \end{pmatrix} \\ a_9 &= \begin{pmatrix} 4.12534u^{19} + 1.34060u^{18} + \dots + 10.5095u + 8.66213 \\ -0.994550u^{19} + 0.449591u^{18} + \dots - 0.847411u + 0.594005 \end{pmatrix} \end{aligned}$$

(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
$u = -1.361797 - 0.242619I$ $a = -0.095947 + 0.513760I$ $b = 0.583410 + 0.595260I$	-7.12244	-10.1534
$u = -1.361797 + 0.242619I$ $a = -0.095947 - 0.513760I$ $b = 0.583410 - 0.595260I$	-7.12244	-10.1534
$u = -1.006884 - 0.379394I$ $a = -0.695728 - 0.774823I$ $b = -1.52282 + 1.87081I$	-5.60500 - 3.07077I	-11.10306 + 5.53745I
$u = -1.006884 + 0.379394I$ $a = -0.695728 + 0.774823I$ $b = -1.52282 - 1.87081I$	-5.60500 + 3.07077I	-11.10306 - 5.53745I
$u = -1.005264 - 0.622930I$ $a = 0.912993 + 0.311512I$ $b = 1.51476 - 0.38432I$	2.31904 - 5.08447I	-9.51292 + 2.92589I
$u = -1.005264 + 0.622930I$ $a = 0.912993 - 0.311512I$ $b = 1.51476 + 0.38432I$	2.31904 + 5.08447I	-9.51292 - 2.92589I
$u = -0.721984$ $a = -1.16680$ $b = -1.90416$	-6.32941	-27.2567
$u = -0.543411 - 0.587321I$ $a = -0.71857 - 1.38681I$ $b = -0.468357 + 0.086560I$	3.51176	-5.53076
$u = -0.543411 + 0.587321I$ $a = -0.71857 + 1.38681I$ $b = -0.468357 - 0.086560I$	3.51176	-5.53076
$u = -0.307724 - 0.858449I$ $a = -0.976897 - 0.701129I$ $b = -0.883988 - 0.244304I$	3.58542	-5.93598

Solution to I_5^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.307724 + 0.858449I$ $a = -0.976897 + 0.701129I$ $b = -0.883988 + 0.244304I$	3.58542	-5.93598
$u = 0.502690 - 0.120984I$ $a = -0.92430 + 2.61389I$ $b = 0.212461 - 0.073115I$	$2.31904 + 5.08447I$	$-9.51292 - 2.92589I$
$u = 0.502690 + 0.120984I$ $a = -0.92430 - 2.61389I$ $b = 0.212461 + 0.073115I$	$2.31904 - 5.08447I$	$-9.51292 + 2.92589I$
$u = 0.641197 - 0.460705I$ $a = 0.741778 - 0.455522I$ $b = 2.40890 + 1.17537I$	$-1.76138 + 5.90098I$	$-8.4456 - 11.9708I$
$u = 0.641197 + 0.460705I$ $a = 0.741778 + 0.455522I$ $b = 2.40890 - 1.17537I$	$-1.76138 - 5.90098I$	$-8.4456 + 11.9708I$
$u = 1.22178$ $a = -1.10145$ $b = -0.252409$	-6.32941	-27.2567
$u = 1.322278 - 0.225447I$ $a = -0.547307 + 0.865735I$ $b = -1.23645 - 1.11406I$	$-1.76138 + 5.90098I$	$-8.4456 - 11.9708I$
$u = 1.322278 + 0.225447I$ $a = -0.547307 - 0.865735I$ $b = -1.23645 + 1.11406I$	$-1.76138 - 5.90098I$	$-8.4456 + 11.9708I$
$u = 1.50902 - 0.12166I$ $a = -0.061893 + 0.356567I$ $b = -1.029644 + 0.198033I$	$-5.60500 - 3.07077I$	$-11.10306 + 5.53745I$
$u = 1.50902 + 0.12166I$ $a = -0.061893 - 0.356567I$ $b = -1.029644 - 0.198033I$	$-5.60500 + 3.07077I$	$-11.10306 - 5.53745I$

$$\text{VI. } I_6^u = \langle u^{60} - u^{59} + \dots - 109u + 17, -2.10 \times 10^{101}u^{59} + 2.45 \times 10^{100}u^{58} + \dots + 5.25 \times 10^{101}b + 3.93 \times 10^{102}, 1.16 \times 10^{102}u^{59} + 7.80 \times 10^{100}u^{58} + \dots + 8.93 \times 10^{102}a - 5.38 \times 10^{103} \rangle$$

(i) Arc colorings

$$\begin{aligned} a_7 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -0.129402u^{59} - 0.00873947u^{58} + \dots - 2.44980u + 6.02592 \\ 0.399029u^{59} - 0.0466229u^{58} + \dots + 30.8128u - 7.47574 \end{pmatrix} \\ a_2 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_8 &= \begin{pmatrix} 0.00364583u^{59} - 0.0279086u^{58} + \dots - 5.70623u - 2.88673 \\ -0.0256342u^{59} + 0.00484519u^{58} + \dots - 2.79686u + 1.81796 \end{pmatrix} \\ a_3 &= \begin{pmatrix} -0.119475u^{59} - 0.0252683u^{58} + \dots - 16.4829u - 0.102673 \\ -0.0734909u^{59} - 0.00608760u^{58} + \dots + 2.13578u + 0.830190 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} -0.129402u^{59} - 0.00873947u^{58} + \dots - 2.44980u + 6.02592 \\ 0.258596u^{59} - 0.0743158u^{58} + \dots + 17.9552u - 5.12734 \end{pmatrix} \\ a_6 &= \begin{pmatrix} u \\ u \end{pmatrix} \\ a_1 &= \begin{pmatrix} -u^2 + 1 \\ -u^2 \end{pmatrix} \\ a_4 &= \begin{pmatrix} -0.134484u^{59} - 0.0249922u^{58} + \dots - 20.5517u - 0.473246 \\ -0.194125u^{59} + 0.00761251u^{58} + \dots - 6.11851u + 2.39761 \end{pmatrix} \\ a_5 &= \begin{pmatrix} -0.0274541u^{59} + 0.0469954u^{58} + \dots + 0.202747u + 5.11716 \\ -0.429618u^{59} - 0.0280978u^{58} + \dots - 49.3590u + 7.67462 \end{pmatrix} \\ a_9 &= \begin{pmatrix} -0.362039u^{59} + 0.0499478u^{58} + \dots - 35.7935u + 6.08364 \\ -0.326932u^{59} - 0.0216627u^{58} + \dots - 24.3303u + 4.32207 \end{pmatrix} \\ a_9 &= \begin{pmatrix} -0.362039u^{59} + 0.0499478u^{58} + \dots - 35.7935u + 6.08364 \\ -0.326932u^{59} - 0.0216627u^{58} + \dots - 24.3303u + 4.32207 \end{pmatrix} \end{aligned}$$

(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
$u = -1.64506 - 0.30278I$ $a = -0.224340 + 0.448622I$ $b = 0.188420 - 0.502074I$	$-6.56195 + 4.20028I$	$-14.6505 - 7.5466I$
$u = -1.64506 + 0.30278I$ $a = -0.224340 - 0.448622I$ $b = 0.188420 + 0.502074I$	$-6.56195 - 4.20028I$	$-14.6505 + 7.5466I$
$u = -1.50639 - 0.03128I$ $a = -0.222595 + 0.473641I$ $b = -0.484555 + 0.566618I$	$-5.82415 - 2.23290I$	$-14.1085 - 2.1221I$
$u = -1.50639 + 0.03128I$ $a = -0.222595 - 0.473641I$ $b = -0.484555 - 0.566618I$	$-5.82415 + 2.23290I$	$-14.1085 + 2.1221I$
$u = -1.33093 - 0.72650I$ $a = 0.734941 + 0.513147I$ $b = 1.67915 - 1.35639I$	$-0.13405 - 10.50230I$	$-10.61660 + 7.72054I$
$u = -1.33093 + 0.72650I$ $a = 0.734941 - 0.513147I$ $b = 1.67915 + 1.35639I$	$-0.13405 + 10.50230I$	$-10.61660 - 7.72054I$
$u = -1.290139 - 0.372995I$ $a = 0.658283 - 0.351462I$ $b = -0.0637226 + 0.1194615I$	$-3.15719 - 4.84917I$	$-13.58414 + 3.73183I$
$u = -1.290139 + 0.372995I$ $a = 0.658283 + 0.351462I$ $b = -0.0637226 - 0.1194615I$	$-3.15719 + 4.84917I$	$-13.58414 - 3.73183I$
$u = -1.269273 - 0.579030I$ $a = -0.898123 - 0.557931I$ $b = -1.59647 + 1.06798I$	$-6.51599 - 10.49728I$	$-15.4762 + 6.5662I$
$u = -1.269273 + 0.579030I$ $a = -0.898123 + 0.557931I$ $b = -1.59647 - 1.06798I$	$-6.51599 + 10.49728I$	$-15.4762 - 6.5662I$

Solution to I_6^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.058312 - 0.321731I$ $a = -0.512357 - 0.691342I$ $b = -1.236433 + 0.287428I$	$-0.48113 - 1.41291I$	$-11.50731 + 0.65666I$
$u = -1.058312 + 0.321731I$ $a = -0.512357 + 0.691342I$ $b = -1.236433 - 0.287428I$	$-0.48113 + 1.41291I$	$-11.50731 - 0.65666I$
$u = -0.952526 - 0.271233I$ $a = 0.855614 + 0.735538I$ $b = 0.748695 + 0.391789I$	$1.57409 - 1.75671I$	$-11.26354 + 2.48942I$
$u = -0.952526 + 0.271233I$ $a = 0.855614 - 0.735538I$ $b = 0.748695 - 0.391789I$	$1.57409 + 1.75671I$	$-11.26354 - 2.48942I$
$u = -0.884656 - 0.446724I$ $a = 0.452605 - 0.287924I$ $b = 1.33546 - 0.52354I$	$-2.06368 - 5.36613I$	$-15.7641 + 4.3359I$
$u = -0.884656 + 0.446724I$ $a = 0.452605 + 0.287924I$ $b = 1.33546 + 0.52354I$	$-2.06368 + 5.36613I$	$-15.7641 - 4.3359I$
$u = -0.868439 - 0.693479I$ $a = -0.432874 - 0.997544I$ $b = -1.085149 + 0.303522I$	$1.57409 - 1.75671I$	$-11.26354 + 2.48942I$
$u = -0.868439 + 0.693479I$ $a = -0.432874 + 0.997544I$ $b = -1.085149 - 0.303522I$	$1.57409 + 1.75671I$	$-11.26354 - 2.48942I$
$u = -0.723442 - 0.483773I$ $a = 1.26637 + 0.65103I$ $b = 1.54780 - 0.60966I$	$1.99201 - 3.02567I$	$-9.17011 + 1.57690I$
$u = -0.723442 + 0.483773I$ $a = 1.26637 - 0.65103I$ $b = 1.54780 + 0.60966I$	$1.99201 + 3.02567I$	$-9.17011 - 1.57690I$

Solution to I_6^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.673649 - 0.289156I$ $a = -0.009006 - 0.367834I$ $b = 1.89179 - 0.62354I$	$-2.10401 - 5.43294I$	$-16.4599 + 1.4390I$
$u = -0.673649 + 0.289156I$ $a = -0.009006 + 0.367834I$ $b = 1.89179 + 0.62354I$	$-2.10401 + 5.43294I$	$-16.4599 - 1.4390I$
$u = -0.335964 - 0.575378I$ $a = 0.425849 - 1.053158I$ $b = -0.067861 - 0.169301I$	$-0.48113 + 1.41291I$	$-11.50731 - 0.65666I$
$u = -0.335964 + 0.575378I$ $a = 0.425849 + 1.053158I$ $b = -0.067861 + 0.169301I$	$-0.48113 - 1.41291I$	$-11.50731 + 0.65666I$
$u = -0.205467 - 0.686465I$ $a = -1.55584 - 0.94030I$ $b = -1.130941 + 0.576276I$	$3.74729 + 5.28000I$	$-5.18091 - 3.40493I$
$u = -0.205467 + 0.686465I$ $a = -1.55584 + 0.94030I$ $b = -1.130941 - 0.576276I$	$3.74729 - 5.28000I$	$-5.18091 + 3.40493I$
$u = -0.173863 - 0.983906I$ $a = 0.981842 + 0.751380I$ $b = 1.311420 + 0.372273I$	$-3.15719 + 4.84917I$	$-13.58414 - 3.73183I$
$u = -0.173863 + 0.983906I$ $a = 0.981842 - 0.751380I$ $b = 1.311420 - 0.372273I$	$-3.15719 - 4.84917I$	$-13.58414 + 3.73183I$
$u = -0.172475 - 0.855408I$ $a = 0.225124 + 0.766556I$ $b = 1.330860 + 0.026355I$	$-2.27554 - 5.83321I$	$-13.60048 + 3.60394I$
$u = -0.172475 + 0.855408I$ $a = 0.225124 - 0.766556I$ $b = 1.330860 - 0.026355I$	$-2.27554 + 5.83321I$	$-13.60048 - 3.60394I$

Solution to I_6^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.099098 - 0.640186I$ $a = 1.74206 - 0.06299I$ $b = 1.155946 - 0.237960I$	$2.17471 - 2.01374I$	$-7.73585 + 3.91188I$
$u = -0.099098 + 0.640186I$ $a = 1.74206 + 0.06299I$ $b = 1.155946 + 0.237960I$	$2.17471 + 2.01374I$	$-7.73585 - 3.91188I$
$u = 0.135724$ $a = 5.00269$ $b = -1.38185$	-5.55198	-15.3382
$u = 0.185453 - 1.290280I$ $a = -0.770163 + 0.538543I$ $b = -1.72480 + 0.18152I$	$-0.13405 - 10.50230I$	$-10.61660 + 7.72054I$
$u = 0.185453 + 1.290280I$ $a = -0.770163 - 0.538543I$ $b = -1.72480 - 0.18152I$	$-0.13405 + 10.50230I$	$-10.61660 - 7.72054I$
$u = 0.639831 - 0.484680I$ $a = 0.122902 + 0.545450I$ $b = 0.542628 - 0.147669I$	$2.17471 + 2.01374I$	$-7.73585 - 3.91188I$
$u = 0.639831 + 0.484680I$ $a = 0.122902 - 0.545450I$ $b = 0.542628 + 0.147669I$	$2.17471 - 2.01374I$	$-7.73585 + 3.91188I$
$u = 0.681546 - 0.443831I$ $a = 0.93897 - 1.06221I$ $b = 1.066642 - 0.320787I$	$1.99201 - 3.02567I$	$-9.17011 + 1.57690I$
$u = 0.681546 + 0.443831I$ $a = 0.93897 + 1.06221I$ $b = 1.066642 + 0.320787I$	$1.99201 + 3.02567I$	$-9.17011 - 1.57690I$
$u = 0.903459 - 0.213520I$ $a = -0.46861 + 1.67890I$ $b = -0.395277 - 1.092846I$	$1.72325 + 5.82388I$	$-14.0227 - 8.3964I$

Solution to I_6^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.903459 + 0.213520I$ $a = -0.46861 - 1.67890I$ $b = -0.395277 + 1.092846I$	$1.72325 - 5.82388I$	$-14.0227 + 8.3964I$
$u = 0.913487 - 0.729355I$ $a = 1.044556 - 0.156978I$ $b = 1.63654 + 0.47332I$	$1.72325 + 5.82388I$	$-14.0227 - 8.3964I$
$u = 0.913487 + 0.729355I$ $a = 1.044556 + 0.156978I$ $b = 1.63654 - 0.47332I$	$1.72325 - 5.82388I$	$-14.0227 + 8.3964I$
$u = 0.918123 - 0.113673I$ $a = 0.601424 - 1.067971I$ $b = 1.44898 + 1.93632I$	$-5.82415 + 2.23290I$	$-14.1085 + 2.1221I$
$u = 0.918123 + 0.113673I$ $a = 0.601424 + 1.067971I$ $b = 1.44898 - 1.93632I$	$-5.82415 - 2.23290I$	$-14.1085 - 2.1221I$
$u = 1.036457 - 0.711450I$ $a = 0.803296 - 0.436745I$ $b = 1.57495 + 1.58012I$	$-6.56195 + 4.20028I$	$-14.6505 - 7.5466I$
$u = 1.036457 + 0.711450I$ $a = 0.803296 + 0.436745I$ $b = 1.57495 - 1.58012I$	$-6.56195 - 4.20028I$	$-14.6505 + 7.5466I$
$u = 1.157510 - 0.625695I$ $a = 0.624950 - 0.510871I$ $b = 1.71232 + 0.31893I$	$3.74729 + 5.28000I$	$-5.18091 - 3.40493I$
$u = 1.157510 + 0.625695I$ $a = 0.624950 + 0.510871I$ $b = 1.71232 - 0.31893I$	$3.74729 - 5.28000I$	$-5.18091 + 3.40493I$
$u = 1.26027$ $a = -0.859670$ $b = -0.171940$	-5.55198	-15.3382

Solution to I_6^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.260713 - 0.276157I$ $a = -0.646516 + 0.779710I$ $b = -1.241936 - 0.621190I$	$-2.06368 + 5.36613I$	$-15.7641 - 4.3359I$
$u = 1.260713 + 0.276157I$ $a = -0.646516 - 0.779710I$ $b = -1.241936 + 0.621190I$	$-2.06368 - 5.36613I$	$-15.7641 + 4.3359I$
$u = 1.291757 - 0.455145I$ $a = 0.709922 + 0.595279I$ $b = -0.0254576 + 0.0551669I$	$-6.51599 + 10.49728I$	$-15.4762 - 6.5662I$
$u = 1.291757 + 0.455145I$ $a = 0.709922 - 0.595279I$ $b = -0.0254576 - 0.0551669I$	$-6.51599 - 10.49728I$	$-15.4762 + 6.5662I$
$u = 1.292282 - 0.285538I$ $a = -0.627804 + 0.797229I$ $b = -1.37034 - 0.93634I$	$-2.10401 + 5.43294I$	$-16.4599 - 1.4390I$
$u = 1.292282 + 0.285538I$ $a = -0.627804 - 0.797229I$ $b = -1.37034 + 0.93634I$	$-2.10401 - 5.43294I$	$-16.4599 + 1.4390I$
$u = 1.306826 - 0.465197I$ $a = -0.715297 + 0.676328I$ $b = -1.35807 - 1.20554I$	$-2.27554 + 5.83321I$	$-13.60048 - 3.60394I$
$u = 1.306826 + 0.465197I$ $a = -0.715297 - 0.676328I$ $b = -1.35807 + 1.20554I$	$-2.27554 - 5.83321I$	$-13.60048 + 3.60394I$
$u = 1.40424 - 0.40913I$ $a = 0.205658 + 0.470345I$ $b = -0.613673 - 0.115221I$	-7.98335	-19.3802
$u = 1.40424 + 0.40913I$ $a = 0.205658 - 0.470345I$ $b = -0.613673 + 0.115221I$	-7.98335	-19.3802

VII. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u+1)(u^4+u-1)$ $(u^{12}-2u^{10}-u^9+5u^7+6u^6-u^5-9u^4-5u^3+6u^2+2u-1)$ $(u^{18}-u^{17}+\dots+u^2-1)(u^{20}-8u^{18}+\dots+u-1)$ $(u^{60}+u^{59}+\dots+109u+17)$
c_2	$u(u-1)^{12}(u^4-2u^2+u+1)$ $(u^{10}-5u^8+8u^6+4u^5-6u^4-3u^3+3u^2-1)^2$ $(u^{18}+u^{17}+\dots+50u+4)$ $(36+170u+395u^2+600u^3+716u^4+825u^5+924u^6+673u^7-199u^8-1261u^9-1595u^{10})$
c_3, c_{10}	$(u-1)(u^4+u^3-1)(u^{12}+2u^{10}+\dots+4u+1)$ $(u^{18}+2u^{17}+\dots-3u+1)(u^{20}+3u^{19}+\dots-8u^2-1)$ $(u^{60}+2u^{59}+\dots-2u-1)$
c_4	$(u+1)(u^4+u-1)$ $(u^{12}-2u^{10}-u^9+5u^7+6u^6-u^5-9u^4-5u^3+6u^2+2u-1)$ $(u^{18}-u^{17}+\dots+u^2-1)(u^{20}-8u^{18}+\dots+u-1)$ $(u^{60}+u^{59}+\dots+109u+17)$
c_5	$u^4(u-1)(1-5u^2+2u^3+u^6)^2(u^{18}+6u^{17}+\dots-416u-64)$ $(u^{20}+8u^{14}-52u^{12}-138u^{10}+104u^8+527u^6+296u^4-356u^2-319)$ $(u^{60}-4u^{59}+\dots-4u+1)$
c_6	$(u+1)(u^4-u-1)$ $(u^{12}-2u^{10}-u^9+5u^7+6u^6-u^5-9u^4-5u^3+6u^2+2u-1)$ $(u^{18}-u^{17}+\dots+u^2-1)(u^{20}-8u^{18}+\dots-u-1)$ $(u^{60}+u^{59}+\dots+109u+17)$
c_7, c_{11}	$(u-1)(u^4-u^3-1)(u^{12}+2u^{10}+\dots+4u+1)$ $(u^{18}+2u^{17}+\dots-3u+1)(u^{20}-3u^{19}+\dots-8u^2-1)$ $(u^{60}+2u^{59}+\dots-2u-1)$
c_8	$u(u-1)^{12}(u^4-2u^2-u+1)$ $(u^{10}-5u^8+8u^6-4u^5-6u^4+3u^3+3u^2-1)^2$ $(u^{18}+u^{17}+\dots+50u+4)(u^{60}+12u^{59}+\dots+12240u+1296)$
c_9	$(u+1)(u^4-u-1)$ $(u^{12}-2u^{10}-u^9+5u^7+6u^6-u^5-9u^4-5u^3+6u^2+2u-1)$ $(u^{18}-u^{17}+\dots+u^2-1)(u^{20}-8u^{18}+\dots-u-1)$ $(u^{60}+u^{59}+\dots+109u+17)$

VIII. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_6	$(y-1)(y^4-2y^2-y+1)(y^{12}-4y^{11}+\dots-16y+1)$ $(y^{18}-11y^{17}+\dots-2y+1)(y^{20}-16y^{19}+\dots-13y+1)$ $(y^{60}-41y^{59}+\dots-18409y+289)$
c_2	$y(y-1)^{12}(y^4-4y^3+6y^2-5y+1)$ $(1-6y+21y^2-61y^3+118y^4-144y^5+130y^6-92y^7+41y^8-10y^9+y^{10})^2$ $(y^{18}-13y^{17}+\dots-1100y+16)$ $(1296-460y+3577y^2-8332y^3+9468y^4-8367y^5+1.87 \times 10^4 y^6-3.19 \times 10^4 y^7+3.58 \times 10^4 y^8-1.87 \times 10^4 y^9+1.29 \times 10^4 y^{10})$
c_3, c_7, c_{10}	$(y-1)(y^4-y^3-2y^2+1)(y^{12}+4y^{11}+\dots-16y+1)$ $(y^{18}+8y^{17}+\dots-9y+1)(y^{20}+13y^{19}+\dots+16y+1)$ $(y^{60}+32y^{59}+\dots+20y+1)$
c_4	$(y-1)(y^4-2y^2-y+1)(y^{12}-4y^{11}+\dots-16y+1)$ $(y^{18}-11y^{17}+\dots-2y+1)(y^{20}-16y^{19}+\dots-13y+1)$ $(y^{60}-41y^{59}+\dots-18409y+289)$
c_5	$y^4(y-1)(y^6-10y^4-2y^3+25y^2-10y+1)^2$ $(-319-356y+296y^2+527y^3+104y^4-138y^5-52y^6+8y^7+y^{10})^2$ $(y^{18}+56y^{16}+\dots-37888y+4096)(y^{60}-4y^{59}+\dots-168y+1)$
c_8	$y(y-1)^{12}(y^4-4y^3+6y^2-5y+1)$ $(1-6y+21y^2-61y^3+118y^4-144y^5+130y^6-92y^7+41y^8-10y^9+y^{10})^2$ $(y^{18}-13y^{17}+\dots-1100y+16)$ $(y^{60}-44y^{59}+\dots-1192320y+1679616)$
c_9	$(y-1)(y^4-2y^2-y+1)(y^{12}-4y^{11}+\dots-16y+1)$ $(y^{18}-11y^{17}+\dots-2y+1)(y^{20}-16y^{19}+\dots-13y+1)$ $(y^{60}-41y^{59}+\dots-18409y+289)$
c_{11}	$(y-1)(y^4-y^3-2y^2+1)(y^{12}+4y^{11}+\dots-16y+1)$ $(y^{18}+8y^{17}+\dots-9y+1)(y^{20}+13y^{19}+\dots+16y+1)$ $(y^{60}+32y^{59}+\dots+20y+1)$