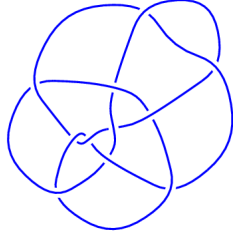
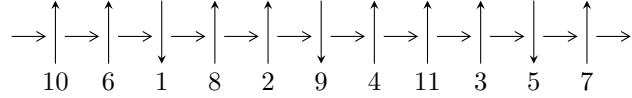


11a₃₀₂ (K11a₃₀₂)

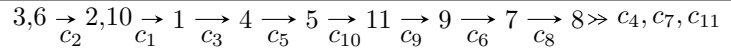


1

Arc Sequences



Solving Sequence



Representation Ideals

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

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

$$I_2^u = \langle u^{21} - 7u^{19} + \dots + 5u - 1, -86810u^{20} - 51179u^{19} + \dots + 203617b + 498356, \\ 548161u^{20} + 27309u^{19} + \dots + 203617a + 1419959 \rangle$$

$$I_3^u = \langle u^{22} - 6u^{20} + \dots + u + 1, 330474083u^{21} - 170598791u^{20} + \dots + 332950103b + 35950927, \\ 211438488u^{21} + 97373739u^{20} + \dots + 332950103a + 43876857 \rangle$$

$$I_4^u = \langle u^{84} - u^{83} + \dots - 13u + 1, 8.01634 \times 10^{204}u^{83} - 1.47295 \times 10^{204}u^{82} + \dots + 2.85391 \times 10^{204}a - 2.38032 \times 10^{204}b \\ 1.93742 \times 10^{205}u^{83} + 1.36676 \times 10^{204}u^{82} + \dots + 2.85391 \times 10^{204}b - 1.87510 \times 10^{205} \rangle$$

There are 4 irreducible components with 130 representations.

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

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

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

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

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

(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
$u = -0.662359 - 0.562280I$ $a = -0.122561 - 0.744862I$ $b = 0.662359 + 0.562280I$	$1.83893 + 3.77083I$	$5.54852 - 8.03996I$
$u = -0.662359 + 0.562280I$ $a = -0.122561 + 0.744862I$ $b = 0.662359 - 0.562280I$	$1.83893 - 3.77083I$	$5.54852 + 8.03996I$
$u = 1.32472$ $a = -1.75488$ $b = -1.32472$	9.48162	16.9030

II.

$$I_2^u = \langle u^{21} - 7u^{19} + \dots + 5u - 1, -8.68 \times 10^4 u^{20} - 5.12 \times 10^4 u^{19} + \dots + 2.04 \times 10^5 b + 4.98 \times 10^5, 5.48 \times 10^5 u^{20} + 2.73 \times 10^4 u^{19} + \dots + 2.04 \times 10^5 a + 1.42 \times 10^6 \rangle$$

(i) Arc colorings

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

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

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

$$a_{10} = \begin{pmatrix} -2.69212u^{20} - 0.134119u^{19} + \dots + 28.2075u - 6.97368 \\ 0.426340u^{20} + 0.251349u^{19} + \dots + 7.71376u - 2.44752 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -1.85734u^{20} - 0.844581u^{19} + \dots + 20.6981u - 4.31433 \\ -0.385469u^{20} + 0.103538u^{19} + \dots + 11.0661u - 3.11846 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0.979437u^{20} - 0.0931160u^{19} + \dots + 4.09981u - 0.575374 \\ -0.0237357u^{20} + 0.194404u^{19} + \dots - 1.65479u + 0.482258 \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} -3.91939u^{20} - 0.521779u^{19} + \dots + 30.2187u - 6.71970 \\ 1.01138u^{20} + 0.674192u^{19} + \dots + 6.41358u - 3.08915 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -3.11846u^{20} - 0.385469u^{19} + \dots + 20.4938u - 4.52616 \\ 0.426340u^{20} + 0.251349u^{19} + \dots + 7.71376u - 2.44752 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -0.482258u^{20} + 0.0237357u^{19} + \dots + 5.29877u - 0.756499 \\ 0.287854u^{20} + 0.284623u^{19} + \dots - 5.89970u + 1.78023 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.575374u^{20} + 0.979437u^{19} + \dots - 0.173792u + 0.222938 \\ 0.482258u^{20} - 0.0237357u^{19} + \dots - 5.29877u + 1.75650 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.575374u^{20} + 0.979437u^{19} + \dots - 0.173792u + 0.222938 \\ 0.482258u^{20} - 0.0237357u^{19} + \dots - 5.29877u + 1.75650 \end{pmatrix}$$

(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
$u = -1.36146 - 0.57065I$		
$a = 0.843025 - 0.608835I$	$10.21620 + 5.64989I$	$15.0241 - 3.8611I$
$b = 1.304894 - 0.034538I$		
$u = -1.36146 + 0.57065I$		
$a = 0.843025 + 0.608835I$	$10.21620 - 5.64989I$	$15.0241 + 3.8611I$
$b = 1.304894 + 0.034538I$		
$u = -1.188641 - 0.329356I$		
$a = -1.011511 - 0.120494I$	$5.15265 + 4.73162I$	$8.09798 - 4.44428I$
$b = -0.284184 + 0.245258I$		
$u = -1.188641 + 0.329356I$		
$a = -1.011511 + 0.120494I$	$5.15265 - 4.73162I$	$8.09798 + 4.44428I$
$b = -0.284184 - 0.245258I$		
$u = -1.111706 - 0.428960I$		
$a = -1.95911 + 0.31173I$	$4.95885 + 9.25397I$	$8.29327 - 10.96531I$
$b = -1.78476 - 0.65605I$		
$u = -1.111706 + 0.428960I$		
$a = -1.95911 - 0.31173I$	$4.95885 - 9.25397I$	$8.29327 + 10.96531I$
$b = -1.78476 + 0.65605I$		
$u = -0.928185 - 0.189936I$		
$a = 0.674396 - 0.216214I$	$3.43423 + 3.77228I$	$11.55133 - 4.69984I$
$b = 0.735536 + 1.073719I$		
$u = -0.928185 + 0.189936I$		
$a = 0.674396 + 0.216214I$	$3.43423 - 3.77228I$	$11.55133 + 4.69984I$
$b = 0.735536 - 1.073719I$		
$u = 0.067511 - 1.157489I$		
$a = 0.0502069 - 0.0817577I$	$1.79260 - 6.58426I$	$8.00865 + 7.58329I$
$b = -0.997381 + 0.629444I$		
$u = 0.067511 + 1.157489I$		
$a = 0.0502069 + 0.0817577I$	$1.79260 + 6.58426I$	$8.00865 - 7.58329I$
$b = -0.997381 - 0.629444I$		

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.305278 - 0.294373I$ $a = 0.94021 - 1.42121I$ $b = 0.223914 - 0.503703I$	$0.730644 - 1.059893I$	$8.01231 + 6.34216I$
$u = 0.305278 + 0.294373I$ $a = 0.94021 + 1.42121I$ $b = 0.223914 + 0.503703I$	$0.730644 + 1.059893I$	$8.01231 - 6.34216I$
$u = 0.372563 - 0.410285I$ $a = -0.39105 + 1.43567I$ $b = 0.909633 + 0.829475I$	$0.48724 + 1.81194I$	$3.30153 - 2.05952I$
$u = 0.372563 + 0.410285I$ $a = -0.39105 - 1.43567I$ $b = 0.909633 - 0.829475I$	$0.48724 - 1.81194I$	$3.30153 + 2.05952I$
$u = 0.789234$ $a = 1.20750$ $b = 0.556308$	1.38786	6.70343
$u = 0.827440 - 0.723293I$ $a = 0.126743 - 0.809716I$ $b = -0.567919 + 0.288839I$	$2.18487 - 3.00976I$	$10.87376 - 0.69402I$
$u = 0.827440 + 0.723293I$ $a = 0.126743 + 0.809716I$ $b = -0.567919 - 0.288839I$	$2.18487 + 3.00976I$	$10.87376 + 0.69402I$
$u = 1.205892 - 0.106741I$ $a = -1.92936 + 0.40120I$ $b = -1.207310 - 0.326297I$	$8.49324 - 2.76851I$	$15.4777 + 0.9885I$
$u = 1.205892 + 0.106741I$ $a = -1.92936 - 0.40120I$ $b = -1.207310 + 0.326297I$	$8.49324 + 2.76851I$	$15.4777 - 0.9885I$
$u = 1.41669 - 0.52365I$ $a = 1.55271 + 0.10596I$ $b = 1.38942 - 1.03688I$	$11.2036 - 18.3943I$	$11.0076 + 9.0976I$
Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.41669 + 0.52365I$ $a = 1.55271 - 0.10596I$ $b = 1.38942 + 1.03688I$	$11.2036 + 18.3943I$	$11.0076 - 9.0976I$

III.

$$I_3^u = \langle u^{22} - 6u^{20} + \dots + u + 1, 3.30 \times 10^8 u^{21} - 1.71 \times 10^8 u^{20} + \dots + 3.33 \times 10^8 b + 3.60 \times 10^7, 2.11 \times 10^8 u^{21} + 9.74 \times 10^7 u^{20} + \dots + 3.33 \times 10^8 a + 4.39 \times 10^7 \rangle$$

(i) Arc colorings

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

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

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

$$a_{10} = \begin{pmatrix} -0.635046u^{21} - 0.292457u^{20} + \dots - 1.34171u - 0.131782 \\ -0.992563u^{21} + 0.512385u^{20} + \dots - 1.17373u - 0.107977 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0.889535u^{21} + 0.0966271u^{20} + \dots - 0.989738u - 0.475909 \\ -0.0212194u^{21} + 0.0240420u^{20} + \dots - 2.18136u - 0.983265 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -0.386153u^{21} - 0.405453u^{20} + \dots + 1.41651u + 1.50722 \\ 0.493967u^{21} - 0.175818u^{20} + \dots + 2.18607u - 0.167488 \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} 0.336298u^{21} - 0.780801u^{20} + \dots - 2.34934u - 0.00706984 \\ -0.863842u^{21} + 0.316590u^{20} + \dots - 0.649099u + 0.255654 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0.357518u^{21} - 0.804843u^{20} + \dots - 0.167975u - 0.0238052 \\ -0.992563u^{21} + 0.512385u^{20} + \dots - 1.17373u - 0.107977 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -0.0573463u^{21} + 0.336094u^{20} + \dots - 3.47754u - 0.657519 \\ 0.0219546u^{21} + 0.762143u^{20} + \dots + 1.34055u - 0.187482 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.652627u^{21} - 0.172652u^{20} + \dots - 2.19868u - 1.11453 \\ -0.670297u^{21} + 0.330174u^{20} + \dots - 0.834144u - 0.0125608 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -0.652627u^{21} - 0.172652u^{20} + \dots - 2.19868u - 1.11453 \\ -0.670297u^{21} + 0.330174u^{20} + \dots - 0.834144u - 0.0125608 \end{pmatrix}$$

(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
$u = -1.36566 - 0.38329I$ $a = -1.60654 - 0.00056I$ $b = -1.19451 - 0.76861I$	$8.58189 + 6.24482I$	$12.19966 - 3.97801I$
$u = -1.36566 + 0.38329I$ $a = -1.60654 + 0.00056I$ $b = -1.19451 + 0.76861I$	$8.58189 - 6.24482I$	$12.19966 + 3.97801I$
$u = -1.220703 - 0.018399I$ $a = -1.075786 + 0.004794I$ $b = -1.047590 + 0.787761I$	$4.05165 + 2.03043I$	$8.21995 - 2.84126I$
$u = -1.220703 + 0.018399I$ $a = -1.075786 - 0.004794I$ $b = -1.047590 - 0.787761I$	$4.05165 - 2.03043I$	$8.21995 + 2.84126I$
$u = -0.996853 - 0.278091I$ $a = 1.329729 - 0.474336I$ $b = 1.116111 + 0.772027I$	$2.14439 + 3.53044I$	$4.95647 - 3.30554I$
$u = -0.996853 + 0.278091I$ $a = 1.329729 + 0.474336I$ $b = 1.116111 - 0.772027I$	$2.14439 - 3.53044I$	$4.95647 + 3.30554I$
$u = -0.456280 - 0.389882I$ $a = 1.22510 + 1.37492I$ $b = -0.063660 + 0.989377I$	0.122720	1.50261
$u = -0.456280 + 0.389882I$ $a = 1.22510 - 1.37492I$ $b = -0.063660 - 0.989377I$	0.122720	1.50261
$u = -0.40576 - 1.50605I$ $a = 0.181803 + 0.126321I$ $b = -0.277976 + 0.054179I$	$-0.50092 + 2.11174I$	$-5.15528 + 11.05035I$
$u = -0.40576 + 1.50605I$ $a = 0.181803 - 0.126321I$ $b = -0.277976 - 0.054179I$	$-0.50092 - 2.11174I$	$-5.15528 - 11.05035I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.041486 - 0.760088I$ $a = 0.332109 - 0.176049I$ $b = 0.856724 - 0.482949I$	$4.05165 - 2.03043I$	$8.21995 + 2.84126I$
$u = -0.041486 + 0.760088I$ $a = 0.332109 + 0.176049I$ $b = 0.856724 + 0.482949I$	$4.05165 + 2.03043I$	$8.21995 - 2.84126I$
$u = 0.024657 - 0.437672I$ $a = -1.02449 + 1.22474I$ $b = 0.770375 + 0.789792I$	$2.14439 + 3.53044I$	$4.95647 - 3.30554I$
$u = 0.024657 + 0.437672I$ $a = -1.02449 - 1.22474I$ $b = 0.770375 - 0.789792I$	$2.14439 - 3.53044I$	$4.95647 + 3.30554I$
$u = 0.831103 - 0.513463I$ $a = -1.27286 - 1.19665I$ $b = -0.024234 + 1.029537I$	$-0.50092 - 2.11174I$	$-5.15528 - 11.05035I$
$u = 0.831103 + 0.513463I$ $a = -1.27286 + 1.19665I$ $b = -0.024234 - 1.029537I$	$-0.50092 + 2.11174I$	$-5.15528 + 11.05035I$
$u = 0.934195 - 0.222884I$ $a = 1.98665 + 1.58078I$ $b = 0.879814 + 0.359757I$	$7.04578 - 7.81545I$	$13.0279 + 5.9552I$
$u = 0.934195 + 0.222884I$ $a = 1.98665 - 1.58078I$ $b = 0.879814 - 0.359757I$	$7.04578 + 7.81545I$	$13.0279 - 5.9552I$
$u = 1.274882 - 0.054997I$ $a = 0.257710 - 0.116488I$ $b = -0.216019 + 0.842080I$	$8.58189 + 6.24482I$	$12.19966 - 3.97801I$
$u = 1.274882 + 0.054997I$ $a = 0.257710 + 0.116488I$ $b = -0.216019 - 0.842080I$	$8.58189 - 6.24482I$	$12.19966 + 3.97801I$
Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.42191 - 0.45186I$ $a = -1.333419 + 0.069874I$ $b = -1.29904 + 0.80185I$	$7.04578 - 7.81545I$	$13.0279 + 5.9552I$
$u = 1.42191 + 0.45186I$ $a = -1.333419 - 0.069874I$ $b = -1.29904 - 0.80185I$	$7.04578 + 7.81545I$	$13.0279 - 5.9552I$

$$\text{IV. } I_4^u = \langle u^{84} - u^{83} + \dots - 13u + 1, 8.02 \times 10^{204} u^{83} - 1.47 \times 10^{204} u^{82} + \dots + 2.85 \times 10^{204} u - 2.38 \times 10^{205}, 1.94 \times 10^{205} u^{83} + 1.37 \times 10^{204} u^{82} + \dots + 2.85 \times 10^{204} u - 1.88 \times 10^{205} \rangle$$

(i) Arc colorings

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

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

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

$$a_{10} = \begin{pmatrix} -2.80890u^{83} + 0.516116u^{82} + \dots - 106.773u + 8.34055 \\ -6.78864u^{83} - 0.478907u^{82} + \dots - 76.5519u + 6.57029 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 3.38419u^{83} - 0.362972u^{82} + \dots + 77.5673u + 7.17563 \\ -2.53005u^{83} - 0.224618u^{82} + \dots - 43.3946u + 3.81230 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -2.24631u^{83} + 0.604610u^{82} + \dots - 192.633u + 22.6033 \\ 2.43802u^{83} + 0.303260u^{82} + \dots + 7.34022u - 1.81171 \end{pmatrix}$$

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

$$a_{11} = \begin{pmatrix} 4.55591u^{83} + 1.15513u^{82} + \dots - 27.0524u + 1.66528 \\ -5.34136u^{83} - 0.404432u^{82} + \dots - 59.5879u + 5.24176 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 3.97974u^{83} + 0.995023u^{82} + \dots - 30.2214u + 1.77026 \\ -6.78864u^{83} - 0.478907u^{82} + \dots - 76.5519u + 6.57029 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 5.43747u^{83} + 0.177775u^{82} + \dots + 43.6461u + 4.25595 \\ -1.66531u^{83} - 0.0104175u^{82} + \dots - 30.8069u + 1.97472 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 2.47215u^{83} - 0.763880u^{82} + \dots + 175.607u - 18.2174 \\ -2.61767u^{83} - 0.377913u^{82} + \dots - 16.3564u + 2.21693 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 2.47215u^{83} - 0.763880u^{82} + \dots + 175.607u - 18.2174 \\ -2.61767u^{83} - 0.377913u^{82} + \dots - 16.3564u + 2.21693 \end{pmatrix}$$

(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
$u = -1.55256 - 0.46316I$		
$a = -0.960208 - 0.267593I$	$6.34003 + 8.91423I$	$8.8427 - 12.4313I$
$b = -0.878289 - 0.947608I$		
$u = -1.55256 + 0.46316I$		
$a = -0.960208 + 0.267593I$	$6.34003 - 8.91423I$	$8.8427 + 12.4313I$
$b = -0.878289 + 0.947608I$		
$u = -1.52347 - 0.60928I$		
$a = 0.567285 - 0.456782I$	$10.74165 - 5.71330I$	$15.2364 + 3.4446I$
$b = 0.938984 + 0.052647I$		
$u = -1.52347 + 0.60928I$		
$a = 0.567285 + 0.456782I$	$10.75840 + 5.70483I$	$15.2364 - 3.4446I$
$b = 0.938984 - 0.052647I$		
$u = -1.39980 - 0.47856I$		
$a = -1.021700 + 0.576699I$	$9.93256 + 3.56952I$	$15.9668 - 2.5214I$
$b = -0.927889 - 0.295498I$		
$u = -1.39980 + 0.47856I$		
$a = -1.021700 - 0.576699I$	$9.93256 - 3.56952I$	$15.9668 + 2.5214I$
$b = -0.927889 + 0.295498I$		
$u = -1.39804 - 0.51884I$		
$a = 1.50066 - 0.14841I$	$6.42748 + 12.43877I$	$9.13234 - 8.26213I$
$b = 1.36732 + 1.06245I$		
$u = -1.39804 + 0.51884I$		
$a = 1.50066 + 0.14841I$	$6.42748 - 12.43877I$	$9.13234 + 8.26213I$
$b = 1.36732 - 1.06245I$		
$u = -1.38593 - 0.43780I$		
$a = -1.47248 - 0.00386I$	$5.90536 + 7.10956I$	$7.76610 - 3.18386I$
$b = -1.32846 - 0.78944I$		
$u = -1.38593 + 0.43780I$		
$a = -1.47248 + 0.00386I$	$5.90536 - 7.10956I$	$7.76610 + 3.18386I$
$b = -1.32846 + 0.78944I$		

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.331965 - 0.037459I$ $a = 1.18314 - 0.83290I$ $b = 1.35866 - 1.43338I$	$9.93256 - 3.56952I$	$15.9668 + 2.5214I$
$u = -1.331965 + 0.037459I$ $a = 1.18314 + 0.83290I$ $b = 1.35866 + 1.43338I$	$9.93256 + 3.56952I$	$15.9668 - 2.5214I$
$u = -1.248014 - 0.079685I$ $a = -1.85795 - 0.34215I$ $b = -1.41535 - 1.16871I$	$9.16439 + 2.30003I$	$15.8707 - 2.5208I$
$u = -1.248014 + 0.079685I$ $a = -1.85795 + 0.34215I$ $b = -1.41535 + 1.16871I$	$9.16439 - 2.30003I$	$15.8707 + 2.5208I$
$u = -1.209413 - 0.050801I$ $a = -1.57865 - 0.62605I$ $b = -0.856376 + 0.171706I$	$5.14325 + 1.81373I$	$18.0633 - 2.4655I$
$u = -1.209413 + 0.050801I$ $a = -1.57865 + 0.62605I$ $b = -0.856376 - 0.171706I$	$5.14325 - 1.81373I$	$18.0633 + 2.4655I$
$u = -1.208860 - 0.113613I$ $a = 1.24948 - 1.29597I$ $b = 1.42986 - 2.01391I$	$9.41934 + 8.23155I$	$15.5082 - 8.1042I$
$u = -1.208860 + 0.113613I$ $a = 1.24948 + 1.29597I$ $b = 1.42986 + 2.01391I$	$9.41934 - 8.23155I$	$15.5082 + 8.1042I$
$u = -1.095188 - 0.136546I$ $a = 0.596121 - 0.839742I$ $b = 0.528751 + 0.778109I$	$3.31027 + 4.01412I$	$10.91907 - 8.56399I$
$u = -1.095188 + 0.136546I$ $a = 0.596121 + 0.839742I$ $b = 0.528751 - 0.778109I$	$3.31027 - 4.01412I$	$10.91907 + 8.56399I$

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.092544 - 0.366898I$		
$a = 1.60708 - 0.10147I$	$-0.53461 + 4.05993I$	$2.13658 - 6.95533I$
$b = 0.711297 + 0.697297I$		
$u = -1.092544 + 0.366898I$		
$a = 1.60708 + 0.10147I$	$-0.53461 - 4.05993I$	$2.13658 + 6.95533I$
$b = 0.711297 - 0.697297I$		
$u = -0.985326 - 0.021789I$		
$a = -1.93810 - 1.17823I$	$4.13302 + 3.67085I$	$10.13650 - 4.07600I$
$b = -0.947964 - 0.368637I$		
$u = -0.985326 + 0.021789I$		
$a = -1.93810 + 1.17823I$	$4.13302 - 3.67085I$	$10.13650 + 4.07600I$
$b = -0.947964 + 0.368637I$		
$u = -0.787842 - 0.559097I$		
$a = 1.18409 - 1.21681I$	$-0.36053 + 2.27504I$	$19.2642 - 16.4838I$
$b = -0.073486 + 1.071998I$		
$u = -0.787842 + 0.559097I$		
$a = 1.18409 + 1.21681I$	$-0.36053 - 2.27504I$	$19.2642 + 16.4838I$
$b = -0.073486 - 1.071998I$		
$u = -0.529370 - 0.527660I$		
$a = 0.217817 - 0.094410I$	$3.31027 + 4.01412I$	$10.91907 - 8.56399I$
$b = 0.713712 + 0.939195I$		
$u = -0.529370 + 0.527660I$		
$a = 0.217817 + 0.094410I$	$3.31027 - 4.01412I$	$10.91907 + 8.56399I$
$b = 0.713712 - 0.939195I$		
$u = -0.478559 - 0.748201I$		
$a = 0.876962 + 0.549123I$	$2.41193 + 0.49575I$	$6.97126 + 0.76893I$
$b = 0.017116 + 0.689696I$		
$u = -0.478559 + 0.748201I$		
$a = 0.876962 - 0.549123I$	$2.41193 - 0.49575I$	$6.97126 - 0.76893I$
$b = 0.017116 - 0.689696I$		

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.396919 - 0.818374I$ $a = 0.150512 - 0.842112I$ $b = 1.076566 - 0.628616I$	$2.66616 - 4.59027I$	$9.89989 + 8.77883I$
$u = -0.396919 + 0.818374I$ $a = 0.150512 + 0.842112I$ $b = 1.076566 + 0.628616I$	$2.66616 + 4.59027I$	$9.89989 - 8.77883I$
$u = -0.334826 - 0.714497I$ $a = 0.113127 - 0.180207I$ $b = -0.313370 + 0.821251I$	-2.88354	-3.04446
$u = -0.334826 + 0.714497I$ $a = 0.113127 + 0.180207I$ $b = -0.313370 - 0.821251I$	-2.88354	-3.04446
$u = -0.210295 - 0.240685I$ $a = 3.56655 + 0.84064I$ $b = -0.665854 - 0.321804I$	$0.89781 - 2.28879I$	$4.75450 + 2.28484I$
$u = -0.210295 + 0.240685I$ $a = 3.56655 - 0.84064I$ $b = -0.665854 + 0.321804I$	$0.89781 + 2.28879I$	$4.75450 - 2.28484I$
$u = -0.096511 - 1.182555I$ $a = -0.0394892 - 0.0002488I$ $b = -0.993395 - 0.687665I$	$6.42748 + 12.43877I$	$9.13234 - 8.26213I$
$u = -0.096511 + 1.182555I$ $a = -0.0394892 + 0.0002488I$ $b = -0.993395 + 0.687665I$	$6.42748 - 12.43877I$	$9.13234 + 8.26213I$
$u = -0.069362 - 1.055507I$ $a = 0.006053 + 0.302515I$ $b = -1.042160 - 0.610320I$	$6.25983 + 0.22821I$	$12.78452 - 0.32403I$
$u = -0.069362 + 1.055507I$ $a = 0.006053 - 0.302515I$ $b = -1.042160 + 0.610320I$	$6.25983 - 0.22821I$	$12.78452 + 0.32403I$

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.0011085 - 0.1043922I$ $a = -11.28362 + 8.01560I$ $b = -0.866225 - 0.595290I$	$5.90536 - 7.10956I$	$7.76610 + 3.18386I$
$u = -0.0011085 + 0.1043922I$ $a = -11.28362 - 8.01560I$ $b = -0.866225 + 0.595290I$	$5.90536 + 7.10956I$	$7.76610 - 3.18386I$
$u = 0.058275 - 1.155738I$ $a = 0.235480 + 0.247651I$ $b = 0.956335 + 0.271666I$	$5.14021 + 2.16348I$	$17.8659 - 3.3107I$
$u = 0.058275 + 1.155738I$ $a = 0.235480 - 0.247651I$ $b = 0.956335 - 0.271666I$	$5.14021 - 2.16348I$	$17.8659 + 3.3107I$
$u = 0.0781250 - 0.0575559I$ $a = 6.07183 - 5.26345I$ $b = 1.018547 + 0.454621I$	$5.14325 + 1.81373I$	$18.0633 - 2.4655I$
$u = 0.0781250 + 0.0575559I$ $a = 6.07183 + 5.26345I$ $b = 1.018547 - 0.454621I$	$5.14325 - 1.81373I$	$18.0633 + 2.4655I$
$u = 0.152546 - 0.783755I$ $a = 0.804335 - 0.372548I$ $b = -0.249934 - 0.532891I$	$1.30396 - 0.89340I$	$6.53370 + 0.64889I$
$u = 0.152546 + 0.783755I$ $a = 0.804335 + 0.372548I$ $b = -0.249934 + 0.532891I$	$1.30396 + 0.89340I$	$6.53370 - 0.64889I$
$u = 0.254789 - 0.872661I$ $a = -0.065466 - 0.179749I$ $b = 0.655792 - 0.532899I$	$0.89781 - 2.28879I$	$4.75450 + 2.28484I$
$u = 0.254789 + 0.872661I$ $a = -0.065466 + 0.179749I$ $b = 0.655792 + 0.532899I$	$0.89781 + 2.28879I$	$4.75450 - 2.28484I$

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.30112 - 1.60051I$ $a = -0.0041748 - 0.0290256I$ $b = 0.460657 - 0.107893I$	$-0.36053 - 2.27504I$	$19.2642 + 16.4838I$
$u = 0.30112 + 1.60051I$ $a = -0.0041748 + 0.0290256I$ $b = 0.460657 + 0.107893I$	$-0.36053 + 2.27504I$	$19.2642 - 16.4838I$
$u = 0.358302 - 0.602891I$ $a = -0.280820 + 1.307901I$ $b = -0.512934 - 0.986421I$	$4.28784 + 5.30125I$	$7.89549 - 5.60852I$
$u = 0.358302 + 0.602891I$ $a = -0.280820 - 1.307901I$ $b = -0.512934 + 0.986421I$	$4.28784 - 5.30125I$	$7.89549 + 5.60852I$
$u = 0.415622 - 0.740224I$ $a = -0.0020036 - 0.1082309I$ $b = -0.069817 - 0.926327I$	$-0.53461 - 4.05993I$	$2.13658 + 6.95533I$
$u = 0.415622 + 0.740224I$ $a = -0.0020036 + 0.1082309I$ $b = -0.069817 + 0.926327I$	$-0.53461 + 4.05993I$	$2.13658 - 6.95533I$
$u = 0.906187 - 0.158270I$ $a = -1.40959 - 1.04548I$ $b = -0.422407 - 0.578901I$	$1.30396 - 0.89340I$	$6.53370 + 0.64889I$
$u = 0.906187 + 0.158270I$ $a = -1.40959 + 1.04548I$ $b = -0.422407 + 0.578901I$	$1.30396 + 0.89340I$	$6.53370 - 0.64889I$
$u = 0.962597 - 0.318394I$ $a = 1.377298 - 0.139751I$ $b = 0.664367 - 0.492109I$	1.17898	5.35443
$u = 0.962597 + 0.318394I$ $a = 1.377298 + 0.139751I$ $b = 0.664367 + 0.492109I$	1.17898	5.35443

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.069758 - 0.315438I$ $a = 2.47968 + 0.26967I$ $b = 0.463529 - 0.567527I$	$6.34003 - 8.91423I$	$8.8427 + 12.4313I$
$u = 1.069758 + 0.315438I$ $a = 2.47968 - 0.26967I$ $b = 0.463529 + 0.567527I$	$6.34003 + 8.91423I$	$8.8427 - 12.4313I$
$u = 1.092249 - 0.002765I$ $a = -0.733789 + 0.407597I$ $b = -0.29106 + 1.51046I$	$2.41193 - 0.49575I$	$6.97126 - 0.76893I$
$u = 1.092249 + 0.002765I$ $a = -0.733789 - 0.407597I$ $b = -0.29106 - 1.51046I$	$2.41193 + 0.49575I$	$6.97126 + 0.76893I$
$u = 1.107921 - 0.242581I$ $a = -2.35624 + 0.11814I$ $b = -2.03515 + 1.07118I$	$2.66616 - 4.59027I$	$9.89989 + 8.77883I$
$u = 1.107921 + 0.242581I$ $a = -2.35624 - 0.11814I$ $b = -2.03515 - 1.07118I$	$2.66616 + 4.59027I$	$9.89989 - 8.77883I$
$u = 1.124538 - 0.428916I$ $a = 1.038226 + 0.027685I$ $b = 1.012965 - 0.956168I$	$4.13302 - 3.67085I$	$10.13650 + 4.07600I$
$u = 1.124538 + 0.428916I$ $a = 1.038226 - 0.027685I$ $b = 1.012965 + 0.956168I$	$4.13302 + 3.67085I$	$10.13650 - 4.07600I$
$u = 1.208235 - 0.063695I$ $a = 1.52740 + 1.46381I$ $b = 0.649430 - 0.363725I$	$9.40902 - 7.37920I$	$17.2969 + 8.3182I$
$u = 1.208235 + 0.063695I$ $a = 1.52740 - 1.46381I$ $b = 0.649430 + 0.363725I$	$9.40902 + 7.37920I$	$17.2969 - 8.3182I$

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.230686 - 0.043766I$ $a = 1.50014 + 1.11883I$ $b = 1.73790 + 1.78298I$	$5.14021 - 2.16348I$	$17.8659 + 3.3107I$
$u = 1.230686 + 0.043766I$ $a = 1.50014 - 1.11883I$ $b = 1.73790 - 1.78298I$	$5.14021 + 2.16348I$	$17.8659 - 3.3107I$
$u = 1.357028 - 0.020794I$ $a = -1.26007 - 0.76022I$ $b = -0.725277 + 0.025979I$	$9.16439 + 2.30003I$	$15.8707 - 2.5208I$
$u = 1.357028 + 0.020794I$ $a = -1.26007 + 0.76022I$ $b = -0.725277 - 0.025979I$	$9.16439 - 2.30003I$	$15.8707 + 2.5208I$
$u = 1.36930 - 0.49505I$ $a = 1.51004 + 0.26261I$ $b = 1.25954 - 1.06934I$	$10.75840 - 5.70483I$	$15.2364 + 3.4446I$
$u = 1.36930 + 0.49505I$ $a = 1.51004 - 0.26261I$ $b = 1.25954 + 1.06934I$	$10.75840 + 5.70483I$	$15.2364 - 3.4446I$
$u = 1.38900 - 0.54948I$ $a = -1.44142 - 0.29334I$ $b = -1.34989 + 0.51349I$	$9.41934 - 8.23155I$	$15.5082 + 8.1042I$
$u = 1.38900 + 0.54948I$ $a = -1.44142 + 0.29334I$ $b = -1.34989 - 0.51349I$	$9.41934 + 8.23155I$	$15.5082 - 8.1042I$
$u = 1.44638 - 0.30530I$ $a = -1.57740 + 0.38063I$ $b = -1.35856 + 1.09530I$	$9.40902 - 7.37920I$	$17.2969 + 8.3182I$
$u = 1.44638 + 0.30530I$ $a = -1.57740 - 0.38063I$ $b = -1.35856 - 1.09530I$	$9.40902 + 7.37920I$	$17.2969 - 8.3182I$

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.46634 - 0.53685I$	$6.25983 + 0.22821I$	$12.78452 - 0.32403I$
$a = 0.736389 + 0.411433I$		
$b = 1.112130 - 0.159293I$		
$u = 1.46634 + 0.53685I$	$6.25983 - 0.22821I$	$12.78452 + 0.32403I$
$a = 0.736389 - 0.411433I$		
$b = 1.112130 + 0.159293I$		
$u = 1.48689 - 0.57208I$	$4.28784 - 5.30125I$	$7.89549 + 5.60852I$
$a = -0.816525 - 0.119314I$		
$b = -0.809610 + 0.627801I$		
$u = 1.48689 + 0.57208I$	$4.28784 + 5.30125I$	$7.89549 - 5.60852I$
$a = -0.816525 + 0.119314I$		
$b = -0.809610 - 0.627801I$		

V. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u^3 - 2u^2 + u - 1)(u^{21} + 2u^{20} + \dots + u - 1)(u^{22} - 9u^{21} + \dots - 11u + 1)$ $(u^{84} + 2u^{83} + \dots - 184899u + 14113)$
c_2	$(u^3 - u - 1)(u^{21} - 7u^{19} + \dots + 5u + 1)(u^{22} - 6u^{20} + \dots + u + 1)$ $(u^{84} + u^{83} + \dots + 13u + 1)$
c_3	$(u^3 + u^2 + 2u + 1)(u^{21} + u^{20} + \dots + 8u + 4)(u^{22} + u^{21} + \dots - 8u + 4)$ $(u^{84} + 8u^{83} + \dots + 1444332u + 360028)$
c_4	$(u^3 - u - 1)(u^{21} - 7u^{19} + \dots + 5u + 1)(u^{22} - 6u^{20} + \dots + u + 1)$ $(u^{84} + u^{83} + \dots + 13u + 1)$
c_5	$(u^3 - u + 1)(u^{21} - 7u^{19} + \dots + 5u + 1)(u^{22} - 6u^{20} + \dots - u + 1)$ $(u^{84} + u^{83} + \dots + 13u + 1)$
c_6	$(u^3 - u^2 + 2u - 1)(u^{21} + u^{20} + \dots + 8u + 4)(u^{22} - u^{21} + \dots + 8u + 4)$ $(u^{84} + 8u^{83} + \dots + 1444332u + 360028)$
c_7	$(u^3 - u + 1)(u^{21} - 7u^{19} + \dots + 5u + 1)(u^{22} - 6u^{20} + \dots - u + 1)$ $(u^{84} + u^{83} + \dots + 13u + 1)$
c_8	$(u^3 + 2u^2 + u + 1)(u^{21} + 2u^{20} + \dots + u - 1)(u^{22} + 9u^{21} + \dots + 11u + 1)$ $(u^{84} + 2u^{83} + \dots - 184899u + 14113)$
c_9	$(u^3 - u - 1)(u^{21} - 7u^{19} + \dots - 3u - 1)(u^{22} - u^{21} + \dots - 5u + 1)$ $(u^{84} - 9u^{82} + \dots - 7203u + 9091)$
c_{10}	$u^3(u^{21} + 7u^{20} + \dots + 256u + 64)(u^{22} + 7u^{20} + \dots + 84u^2 + 23)$ $(u^{84} - 6u^{83} + \dots + 1389190u + 748225)$
c_{11}	$(u^3 - u + 1)(u^{21} - 7u^{19} + \dots - 3u - 1)(u^{22} + u^{21} + \dots + 5u + 1)$ $(u^{84} - 9u^{82} + \dots - 7203u + 9091)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1	$(y^3 - 2y^2 - 3y - 1)(y^{21} + 32y^{19} + \dots + 25y - 1)$ $(y^{22} - 9y^{21} + \dots - 17y + 1)$ $(y^{84} - 42y^{83} + \dots - 25475290137y + 199176769)$
c_2, c_5	$(y^3 - 2y^2 + y - 1)(y^{21} - 14y^{20} + \dots + 7y - 1)$ $(y^{22} - 12y^{21} + \dots + 5y + 1)(y^{84} - 59y^{83} + \dots + 111y + 1)$
c_3	$(y^3 + 3y^2 + 2y - 1)(y^{21} + 17y^{20} + \dots - 192y - 16)$ $(y^{22} + 3y^{21} + \dots + 256y + 16)$ $(y^{84} + 30y^{83} + \dots + 3877148205504y + 129620160784)$
c_4	$(y^3 - 2y^2 + y - 1)(y^{21} - 14y^{20} + \dots + 7y - 1)$ $(y^{22} - 12y^{21} + \dots + 5y + 1)(y^{84} - 59y^{83} + \dots + 111y + 1)$
c_6	$(y^3 + 3y^2 + 2y - 1)(y^{21} + 17y^{20} + \dots - 192y - 16)$ $(y^{22} + 3y^{21} + \dots + 256y + 16)$ $(y^{84} + 30y^{83} + \dots + 3877148205504y + 129620160784)$
c_7	$(y^3 - 2y^2 + y - 1)(y^{21} - 14y^{20} + \dots + 7y - 1)$ $(y^{22} - 12y^{21} + \dots + 5y + 1)(y^{84} - 59y^{83} + \dots + 111y + 1)$
c_8	$(y^3 - 2y^2 - 3y - 1)(y^{21} + 32y^{19} + \dots + 25y - 1)$ $(y^{22} - 9y^{21} + \dots - 17y + 1)$ $(y^{84} - 42y^{83} + \dots - 25475290137y + 199176769)$
c_9	$(y^3 - 2y^2 + y - 1)(y^{21} - 14y^{20} + \dots + 7y - 1)$ $(y^{22} - 3y^{21} + \dots - 21y + 1)$ $(y^{84} - 18y^{83} + \dots - 1277331827y + 82646281)$
c_{10}	y^3 $(23 + 84y + 104y^2 + 24y^3 - 26y^4 + 3y^5 + 68y^6 + 88y^7 + 61y^8 + 26y^9 + 7y^{10} + y^{11})^2$ $(y^{21} + 9y^{20} + \dots - 32768y - 4096)$ $(y^{84} + 54y^{83} + \dots + 11697182495450y + 559840650625)$
c_{11}	$(y^3 - 2y^2 + y - 1)(y^{21} - 14y^{20} + \dots + 7y - 1)$ $(y^{22} - 3y^{21} + \dots - 21y + 1)$ $(y^{84} - 18y^{83} + \dots - 1277331827y + 82646281)$