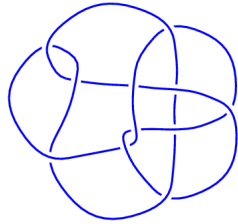
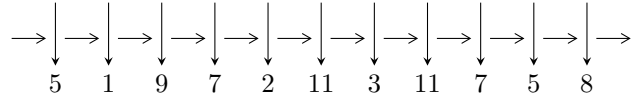


11n₉₃ (K11n₉₃)

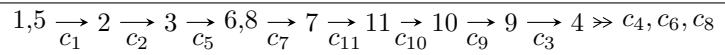


1

Arc Sequences



Solving Sequence



Representation Ideals

$$I = \bigcap_{i=1}^2 I_i^u$$

$$I_1^u = \langle u^{11} + u^{10} - 3u^9 - 3u^8 + 5u^7 + 6u^6 - 4u^5 - 5u^4 + 2u^3 + 3u^2 - u - 1, \\ u^{10} - 3u^8 + u^7 + 5u^6 - u^5 - 5u^4 + 2u^3 + 3u^2 + b - 1, \\ 3u^{10} + 2u^9 - 9u^8 - 6u^7 + 15u^6 + 13u^5 - 13u^4 - 9u^3 + 6u^2 + a + 5u - 4 \rangle$$

$$I_2^u = \langle u^{34} + 2u^{33} + \dots - 3u - 1, -1.36953 \times 10^{20}u^{33} - 1.71275 \times 10^{20}u^{32} + \dots + 2.52092 \times 10^{19}b + 1.79272 \times 10^{19} \\ 2.14966 \times 10^{20}a^{33} + 2.97471 \times 10^{20}a^{32} + \dots + 2.52092 \times 10^{19}a - 2.61593 \times 10^{20} \rangle$$

There are 2 irreducible components with 45 representations.

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

$$I_1^u = \langle u^{11} + u^{10} + \dots - u - 1, u^{10} - 3u^8 + \dots + b - 1, 3u^{10} + 2u^9 + \dots + a - 4 \rangle \quad \mathbf{I.}$$

(i) Arc colorings

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

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

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

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

$$a_6 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -3u^{10} - 2u^9 + 9u^8 + 6u^7 - 15u^6 - 13u^5 + 13u^4 + 9u^3 - 6u^2 - 5u + 4 \\ -u^{10} + 3u^8 - u^7 - 5u^6 + u^5 + 5u^4 - 2u^3 - 3u^2 + 1 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -2u^{10} - u^9 + 6u^8 + 3u^7 - 10u^6 - 7u^5 + 9u^4 + 5u^3 - 4u^2 - 4u + 3 \\ -u^{10} + 3u^8 - u^7 - 5u^6 + u^5 + 5u^4 - 3u^3 - 3u^2 + u + 1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 2u^{10} + u^9 - 6u^8 - 2u^7 + 10u^6 + 4u^5 - 9u^4 - u^3 + 5u^2 + u - 3 \\ -u^8 - u^7 + 3u^6 + 2u^5 - 5u^4 - 3u^3 + 3u^2 + u - 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 2u^{10} + u^9 - 6u^8 - 2u^7 + 10u^6 + 4u^5 - 9u^4 - u^3 + 5u^2 + u - 3 \\ -u^{10} - u^9 + 2u^8 + 2u^7 - 2u^6 - 3u^5 - u^4 + u^2 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -4u^{10} - 2u^9 + \dots - 6u + 7 \\ -u^{10} - u^9 + 2u^8 + 2u^7 - 2u^6 - 4u^5 - u^4 + 2u^3 + u^2 - 2u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 6u^{10} + 2u^9 - 19u^8 - 5u^7 + 32u^6 + 14u^5 - 31u^4 - 8u^3 + 15u^2 + 7u - 9 \\ 2u^{10} + u^9 - 7u^8 - 2u^7 + 13u^6 + 4u^5 - 13u^4 - 2u^3 + 9u^2 + u - 3 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 6u^{10} + 2u^9 - 19u^8 - 5u^7 + 32u^6 + 14u^5 - 31u^4 - 8u^3 + 15u^2 + 7u - 9 \\ 2u^{10} + u^9 - 7u^8 - 2u^7 + 13u^6 + 4u^5 - 13u^4 - 2u^3 + 9u^2 + u - 3 \end{pmatrix}$$

(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
$u = -1.46259$ $a = -0.590722$ $b = 0.425554$	-11.8310	-12.0275
$u = -1.006852 - 0.637757I$ $a = -0.820799 + 1.074542I$ $b = -0.831904 - 0.975863I$	$2.01933 - 5.51593I$	$-10.60882 + 6.86396I$
$u = -1.006852 + 0.637757I$ $a = -0.820799 - 1.074542I$ $b = -0.831904 + 0.975863I$	$2.01933 + 5.51593I$	$-10.60882 - 6.86396I$
$u = -0.699469 - 0.611146I$ $a = 0.428957 - 0.652621I$ $b = -0.620153 + 1.221951I$	$3.01958 + 0.56743I$	$-9.71824 + 0.39336I$
$u = -0.699469 + 0.611146I$ $a = 0.428957 + 0.652621I$ $b = -0.620153 - 1.221951I$	$3.01958 - 0.56743I$	$-9.71824 - 0.39336I$
$u = -0.580365$ $a = 4.86388$ $b = 0.747290$	-8.15261	-27.3414
$u = 0.626035 - 0.508829I$ $a = 0.12930 - 1.93949I$ $b = -0.138001 + 1.197500I$	$2.51249 + 2.42581I$	$-7.49749 - 5.02500I$
$u = 0.626035 + 0.508829I$ $a = 0.12930 + 1.93949I$ $b = -0.138001 - 1.197500I$	$2.51249 - 2.42581I$	$-7.49749 + 5.02500I$
$u = 0.875804$ $a = -0.670673$ $b = -1.06635$	-3.03217	-10.2530
$u = 1.163864 - 0.576096I$ $a = 0.961303 + 0.429407I$ $b = 0.036813 - 0.809877I$	$0.66663 + 2.01787I$	$-8.86455 - 3.07109I$
Solution to I_1^v	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.163864 + 0.576096I$ $a = 0.961303 - 0.429407I$ $b = 0.036813 + 0.809877I$	$0.66663 - 2.01787I$	$-8.86455 + 3.07109I$

$$\text{II. } I_2^u = \langle u^{34} + 2u^{33} + \dots - 3u - 1, -1.37 \times 10^{20} u^{33} - 1.71 \times 10^{20} u^{32} + \dots + 2.52 \times 10^{19} b + 1.79 \times 10^{20}, 2.15 \times 10^{20} u^{33} + 2.97 \times 10^{20} u^{32} + \dots + 2.52 \times 10^{19} a - 2.62 \times 10^{20} \rangle$$

(i) Arc colorings

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

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

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

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

$$a_6 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -8.52729u^{33} - 11.8001u^{32} + \dots + 4.46895u + 10.3769 \\ 5.43266u^{33} + 6.79414u^{32} + \dots - 10.8889u - 7.11138 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -5.44195u^{33} - 7.75886u^{32} + \dots - 0.159734u + 6.36806 \\ 8.48937u^{33} + 10.7511u^{32} + \dots - 17.6044u - 11.3972 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0.678159u^{33} + 0.639889u^{32} + \dots + 4.60728u + 2.39805 \\ 4.96030u^{33} + 6.55238u^{32} + \dots - 11.3046u - 7.35481 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.678159u^{33} + 0.639889u^{32} + \dots + 4.60728u + 2.39805 \\ 3.98582u^{33} + 5.46449u^{32} + \dots - 9.83347u - 6.63838 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0.605729u^{33} - 0.505670u^{32} + \dots - 20.5146u - 2.20921 \\ -0.341296u^{33} + 0.0744426u^{32} + \dots + 1.81668u - 0.281935 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 4.14625u^{33} + 3.90637u^{32} + \dots - 34.9982u - 9.83659 \\ -4.60795u^{33} - 5.18060u^{32} + \dots + 10.8857u + 5.66173 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 4.14625u^{33} + 3.90637u^{32} + \dots - 34.9982u - 9.83659 \\ -4.60795u^{33} - 5.18060u^{32} + \dots + 10.8857u + 5.66173 \end{pmatrix}$$

(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
$u = -1.27133 - 0.67164I$ $a = 0.65445 - 1.29088I$ $b = 0.91249 + 1.24105I$	$-8.8655 - 12.5839I$	$-13.0129 + 6.3971I$
$u = -1.27133 + 0.67164I$ $a = 0.65445 + 1.29088I$ $b = 0.91249 - 1.24105I$	$-8.8655 + 12.5839I$	$-13.0129 - 6.3971I$
$u = -1.192909 - 0.280924I$ $a = -0.484338 - 0.191067I$ $b = -0.644248 - 0.614710I$	$-0.99260 - 2.94608I$	$-14.2242 + 4.1884I$
$u = -1.192909 + 0.280924I$ $a = -0.484338 + 0.191067I$ $b = -0.644248 + 0.614710I$	$-0.99260 + 2.94608I$	$-14.2242 - 4.1884I$
$u = -1.162066 - 0.498975I$ $a = -0.258485 + 0.047341I$ $b = 1.31485 - 0.79996I$	$-10.50346 - 4.65202I$	$-13.9876 + 3.4886I$
$u = -1.162066 + 0.498975I$ $a = -0.258485 - 0.047341I$ $b = 1.31485 + 0.79996I$	$-10.50346 + 4.65202I$	$-13.9876 - 3.4886I$
$u = -1.000089 - 0.396450I$ $a = 0.995356 - 0.586804I$ $b = 0.091298 + 0.895598I$	$-0.300266 - 0.779117I$	$-12.61952 + 0.14976I$
$u = -1.000089 + 0.396450I$ $a = 0.995356 + 0.586804I$ $b = 0.091298 - 0.895598I$	$-0.300266 + 0.779117I$	$-12.61952 - 0.14976I$
$u = -0.953057 - 0.668360I$ $a = -0.53608 + 1.54146I$ $b = -0.645636 - 0.835280I$	$-0.43138 - 4.55558I$	$-13.3660 + 5.8441I$
$u = -0.953057 + 0.668360I$ $a = -0.53608 - 1.54146I$ $b = -0.645636 + 0.835280I$	$-0.43138 + 4.55558I$	$-13.3660 - 5.8441I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.878110 - 0.672399I$ $a = 0.639488 - 0.722914I$ $b = -0.282345 + 0.793763I$	$-0.041134 - 0.639337I$	$-11.81438 - 0.98279I$
$u = -0.878110 + 0.672399I$ $a = 0.639488 + 0.722914I$ $b = -0.282345 - 0.793763I$	$-0.041134 + 0.639337I$	$-11.81438 + 0.98279I$
$u = -0.739045 - 0.052216I$ $a = -0.93579 + 1.67559I$ $b = -0.394062 - 1.339378I$	$1.56826 - 1.68408I$	$-13.99827 + 0.91587I$
$u = -0.739045 + 0.052216I$ $a = -0.93579 - 1.67559I$ $b = -0.394062 + 1.339378I$	$1.56826 + 1.68408I$	$-13.99827 - 0.91587I$
$u = -0.331451$ $a = 1.15110$ $b = -0.282626$	-0.627282	-15.7508
$u = -0.300493 - 1.118764I$ $a = -0.628604 + 1.104012I$ $b = 0.708856 - 1.113102I$	$-5.84181 + 6.21635I$	$-10.71032 - 3.59890I$
$u = -0.300493 + 1.118764I$ $a = -0.628604 - 1.104012I$ $b = 0.708856 + 1.113102I$	$-5.84181 - 6.21635I$	$-10.71032 + 3.59890I$
$u = -0.158687 - 0.575572I$ $a = 0.27697 - 2.86042I$ $b = 0.950893 + 0.442875I$	$-7.71465 + 0.24390I$	$-10.88322 + 1.02866I$
$u = -0.158687 + 0.575572I$ $a = 0.27697 + 2.86042I$ $b = 0.950893 - 0.442875I$	$-7.71465 - 0.24390I$	$-10.88322 - 1.02866I$
$u = 0.182031 - 0.670224I$ $a = 0.59393 + 1.62022I$ $b = -0.306134 - 1.218493I$	$2.61338 - 2.54071I$	$-8.06134 + 4.21753I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.182031 + 0.670224I$ $a = 0.59393 - 1.62022I$ $b = -0.306134 + 1.218493I$	$2.61338 + 2.54071I$	$-8.06134 - 4.21753I$
$u = 0.304363$ $a = -8.51870$ $b = 0.493445$	-7.76994	-5.58747
$u = 0.573841 - 0.727686I$ $a = 0.107760 - 0.779562I$ $b = 0.238183 + 0.951299I$	$3.89256 + 0.89641I$	$-5.46445 - 2.96652I$
$u = 0.573841 + 0.727686I$ $a = 0.107760 + 0.779562I$ $b = 0.238183 - 0.951299I$	$3.89256 - 0.89641I$	$-5.46445 + 2.96652I$
$u = 0.977418 - 0.219996I$ $a = -0.444506 - 0.228131I$ $b = -1.177060 - 0.358042I$	$-3.42083 + 0.72607I$	$-14.2661 - 6.0469I$
$u = 0.977418 + 0.219996I$ $a = -0.444506 + 0.228131I$ $b = -1.177060 + 0.358042I$	$-3.42083 - 0.72607I$	$-14.2661 + 6.0469I$
$u = 1.031699 - 0.655009I$ $a = 0.830682 + 0.780653I$ $b = 0.594629 - 0.693125I$	$2.55533 + 4.41329I$	$-7.45627 - 1.89093I$
$u = 1.031699 + 0.655009I$ $a = 0.830682 - 0.780653I$ $b = 0.594629 + 0.693125I$	$2.55533 - 4.41329I$	$-7.45627 + 1.89093I$
$u = 1.163230 - 0.443799I$ $a = 0.54848 + 1.89291I$ $b = 0.592978 - 1.071569I$	$-10.91161 + 3.58899I$	$-13.7786 - 3.7180I$
$u = 1.163230 + 0.443799I$ $a = 0.54848 - 1.89291I$ $b = 0.592978 + 1.071569I$	$-10.91161 - 3.58899I$	$-13.7786 + 3.7180I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.183223 - 0.495063I$ $a = -0.910271 - 1.014236I$ $b = -0.63178 + 1.27610I$	$-0.32497 + 7.07104I$	$-12.7900 - 6.5034I$
$u = 1.183223 + 0.495063I$ $a = -0.910271 + 1.014236I$ $b = -0.63178 - 1.27610I$	$-0.32497 - 7.07104I$	$-12.7900 + 6.5034I$
$u = 1.55789 - 0.27506I$ $a = -0.265249 + 0.006903I$ $b = 0.571671 + 0.692974I$	$-12.18802 - 1.09324I$	$-13.3978 + 4.9478I$
$u = 1.55789 + 0.27506I$ $a = -0.265249 - 0.006903I$ $b = 0.571671 - 0.692974I$	$-12.18802 + 1.09324I$	$-13.3978 - 4.9478I$

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_5	$(u^{11} + u^{10} - 3u^9 - 3u^8 + 5u^7 + 6u^6 - 4u^5 - 5u^4 + 2u^3 + 3u^2 - u - 1)$ $(u^{34} + 2u^{33} + \dots - 3u - 1)$
c_2	$(u^{11} + 7u^{10} + \dots + 7u + 1)(u^{34} + 20u^{33} + \dots + 23u + 1)$
c_3	$(u^{11} - 6u^9 + u^8 + 14u^7 - 3u^6 - 18u^5 + 4u^4 + 12u^3 - 3u^2 - 4u + 1)$ $(u^{34} + u^{33} + \dots - 10u - 1)$
c_4	$(u^{11} + 4u^{10} + \dots - 10u - 1)(u^{34} + 3u^{33} + \dots - 16u + 1)$
c_6	$(u^{11} - u^{10} - u^9 - 4u^8 - 4u^7 - u^6 + 4u^5 + 9u^4 + 9u^3 + 7u^2 + 3u + 1)$ $(u^{34} + 2u^{33} + \dots - 2561u - 1007)$
c_7	$(u^{11} + 4u^9 + u^8 + 5u^7 + 3u^6 + 3u^4 - 5u^3 + 2u^2 - 4u + 1)$ $(u^{34} + u^{33} + \dots - 36u - 9)$
c_8, c_{11}	$(u^{11} - 3u^{10} + 7u^9 - 9u^8 + 9u^7 - 4u^6 - u^5 + 4u^4 - 4u^3 + u^2 - u - 1)$ $(u^{34} + 4u^{33} + \dots - 5u - 7)$
c_9	$(u^{11} + 3u^{10} + u^9 + 3u^7 + u^5 - u^4 - u^3 + 2u^2 - u + 1)$ $(u^{34} - 2u^{33} + \dots - 415u + 31)$
c_{10}	$(u^{11} - 6u^9 - u^8 + 14u^7 + 3u^6 - 18u^5 - 4u^4 + 12u^3 + 3u^2 - 4u - 1)$ $(u^{34} + u^{33} + \dots - 10u - 1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_5	$(y^{11} - 7y^{10} + \dots + 7y - 1)(y^{34} - 20y^{33} + \dots - 23y + 1)$
c_2	$(y^{11} + y^{10} + \dots + 3y - 1)(y^{34} - 4y^{33} + \dots - 215y + 1)$
c_3, c_{10}	$(y^{11} - 12y^{10} + \dots + 22y - 1)(y^{34} - 45y^{33} + \dots + 54y + 1)$
c_4	$(y^{11} - 4y^{10} + \dots + 16y - 1)(y^{34} - 61y^{33} + \dots + 4y + 1)$
c_6	$(y^{11} - 3y^{10} + \dots - 5y - 1)$ $(y^{34} - 48y^{33} + \dots - 16050703y + 1014049)$
c_7	$(y^{11} + 8y^{10} + \dots + 12y - 1)(y^{34} + 11y^{33} + \dots - 576y + 81)$
c_8, c_{11}	$(y^{11} + 5y^{10} + \dots + 3y - 1)(y^{34} + 12y^{33} + \dots - 375y + 49)$
c_9	$(y^{11} - 7y^{10} + 7y^9 + 8y^8 + 15y^7 - 10y^6 - 13y^5 - 9y^4 + 3y^3 - 3y - 1)$ $(y^{34} - 48y^{33} + \dots - 50333y + 961)$