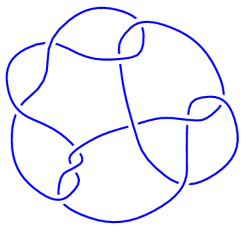
$11a_{12}$ ($K11a_{12}$)



1

Arc Sequences

$\rightarrow \uparrow_{5} \rightarrow \downarrow_{1} \rightarrow \uparrow_{9} \rightarrow \uparrow_{2} \rightarrow \downarrow_{3} \rightarrow \downarrow_{11} \rightarrow \downarrow_{10} \rightarrow \uparrow_{4} \rightarrow \downarrow_{8} \rightarrow \downarrow_{6} \rightarrow \downarrow_{7} \rightarrow$

5 1 9 2 3 11 10 4 8 6 7

Solving Sequence

$$1{,}5 \xrightarrow[c_1]{} 2 \xrightarrow[c_2]{} 3 \xrightarrow[c_4]{} 4{,}7 \xrightarrow[c_{11}]{} 11 \xrightarrow[c_6]{} 6 \xrightarrow[c_{10}]{} 10 \xrightarrow[c_7]{} 8 \xrightarrow[c_9]{} 9 \gg c_3, c_5, c_8$$

Representation Ideals

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

$$I_1^u = \langle u^2 + u + 1,\ b + 1,\ a - u - 1\rangle$$
$$I_2^u = \langle u^{53} + 2u^{52} + \cdots - 3u - 1,\ -u^{51} - u^{50} + \cdots + b + 1,\ u^{52} + 3u^{51} + \cdots + a - 1\rangle$$

There are 2 irreducible components with 55 representations.

[1]The knot diagram image is adapter from "C. Livingston and A. H. Moore, KnotInfo: Table of Knot Invariants, http://www.indiana.edu/ knotinfo"

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

(i) Arc colorings

$$a_1 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ u+1 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u \\ u+1 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u \\ u+1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} u+1 \\ -1 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} u+2 \\ -1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} u+1 \\ -1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u+1 \\ -1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u+1 \\ -1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u+1 \\ -1 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4u - 1$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 - 0.866025I$ $a = \quad 0.500000 - 0.866025I$ $b = -1.00000$	$-1.64493 + 2.02988I$	$-3.00000 - 3.46410I$
$u = -0.500000 + 0.866025I$ $a = \quad 0.500000 + 0.866025I$ $b = -1.00000$	$-1.64493 - 2.02988I$	$-3.00000 + 3.46410I$

II.

$$\boldsymbol{I_2^u = \langle u^{53}+2u^{52}+\cdots-3u-1,\ -u^{51}-u^{50}+\cdots+b+1,\ u^{52}+3u^{51}+\cdots+a-1\rangle}$$

(i) Arc colorings

$$a_1 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_5 = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_2 = \begin{pmatrix}1\\-u^2\end{pmatrix}$$
$$a_3 = \begin{pmatrix}u^2+1\\-u^2\end{pmatrix}$$
$$a_4 = \begin{pmatrix}-u\\u^3+u\end{pmatrix}$$
$$a_7 = \begin{pmatrix}-u^{52}-3u^{51}+\cdots+3u+1\\u^{51}+u^{50}+\cdots-2u-1\end{pmatrix}$$
$$a_{11} = \begin{pmatrix}-u^{52}-2u^{51}+\cdots+2u+1\\u^{51}+u^{50}+\cdots-3u-1\end{pmatrix}$$
$$a_6 = \begin{pmatrix}-u^5-2u^3-u\\u^5+u^3+u\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}-u^{52}-u^{51}+\cdots-5u^3+2u^2\\u^{51}+u^{50}+\cdots-3u-1\end{pmatrix}$$
$$a_8 = \begin{pmatrix}-u^{52}-3u^{51}+\cdots+3u+1\\u^{51}+u^{50}+\cdots-2u-1\end{pmatrix}$$
$$a_9 = \begin{pmatrix}-u^{52}-2u^{51}+\cdots+4u^2+u\\2u^{51}+u^{50}+\cdots-3u-1\end{pmatrix}$$
$$a_9 = \begin{pmatrix}-u^{52}-2u^{51}+\cdots+4u^2+u\\2u^{51}+u^{50}+\cdots-3u-1\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= u^{52}-3u^{51}+\cdots-7u-6$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.808210 - 0.423523I$ $a = -1.05829 - 1.42916I$ $b = 1.329343 + 0.384853I$	$1.26818 - 8.94141I$	$-2.53984 + 5.45139I$
$u = -0.808210 + 0.423523I$ $a = -1.05829 + 1.42916I$ $b = 1.329343 - 0.384853I$	$1.26818 + 8.94141I$	$-2.53984 - 5.45139I$
$u = -0.779449 - 0.450933I$ $a = 0.05385 + 1.77458I$ $b = -0.082170 - 0.858832I$	$5.69104 - 4.47611I$	$1.74448 + 3.16326I$
$u = -0.779449 + 0.450933I$ $a = 0.05385 - 1.77458I$ $b = -0.082170 + 0.858832I$	$5.69104 + 4.47611I$	$1.74448 - 3.16326I$
$u = -0.735188 - 0.481734I$ $a = 1.17639 - 1.50281I$ $b = -1.191388 + 0.413451I$	$2.28411 + 0.08613I$	$-1.183312 - 0.169828I$
$u = -0.735188 + 0.481734I$ $a = 1.17639 + 1.50281I$ $b = -1.191388 - 0.413451I$	$2.28411 - 0.08613I$	$-1.183312 + 0.169828I$
$u = -0.703476 - 0.173079I$ $a = -0.321386 - 0.743221I$ $b = 1.355442 + 0.136049I$	$-5.74714 - 3.41063I$	$-7.67550 + 3.71131I$
$u = -0.703476 + 0.173079I$ $a = -0.321386 + 0.743221I$ $b = 1.355442 - 0.136049I$	$-5.74714 + 3.41063I$	$-7.67550 - 3.71131I$
$u = -0.612898 - 1.110160I$ $a = 0.28728 + 2.57600I$ $b = 1.347191 - 0.390740I$	$-0.7808 + 14.2618I$	$-5.37238 - 9.48715I$
$u = -0.612898 + 1.110160I$ $a = 0.28728 - 2.57600I$ $b = 1.347191 + 0.390740I$	$-0.7808 - 14.2618I$	$-5.37238 + 9.48715I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.610266 - 1.090290I$ $a = -0.98621 - 1.30128I$ $b = -0.108156 + 0.876063I$	$3.78899 + 9.71652I$	$-1.28115 - 7.65601I$
$u = -0.610266 + 1.090290I$ $a = -0.98621 + 1.30128I$ $b = -0.108156 - 0.876063I$	$3.78899 - 9.71652I$	$-1.28115 + 7.65601I$
$u = -0.598130 - 1.065379I$ $a = 0.900724 - 0.233711I$ $b = -1.163704 - 0.443994I$	$0.55249 + 5.00025I$	$-4.21634 - 4.73509I$
$u = -0.598130 + 1.065379I$ $a = 0.900724 + 0.233711I$ $b = -1.163704 + 0.443994I$	$0.55249 - 5.00025I$	$-4.21634 + 4.73509I$
$u = -0.491563 - 1.126401I$ $a = 1.13520 + 1.91058I$ $b = 1.397484 - 0.165043I$	$-8.47430 + 7.85966I$	$-10.86670 - 7.27765I$
$u = -0.491563 + 1.126401I$ $a = 1.13520 - 1.91058I$ $b = 1.397484 + 0.165043I$	$-8.47430 - 7.85966I$	$-10.86670 + 7.27765I$
$u = -0.483844 - 0.213394I$ $a = 0.526258 + 1.051301I$ $b = -0.340173 - 0.453801I$	$-0.42373 - 1.39478I$	$-2.79014 + 5.25225I$
$u = -0.483844 + 0.213394I$ $a = 0.526258 - 1.051301I$ $b = -0.340173 + 0.453801I$	$-0.42373 + 1.39478I$	$-2.79014 - 5.25225I$
$u = -0.472572 - 1.061221I$ $a = -0.667446 - 1.039929I$ $b = -0.430093 + 0.598904I$	$-2.63045 + 5.30697I$	$-7.17193 - 8.38740I$
$u = -0.472572 + 1.061221I$ $a = -0.667446 + 1.039929I$ $b = -0.430093 - 0.598904I$	$-2.63045 - 5.30697I$	$-7.17193 + 8.38740I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.388754 - 1.027129I$ $a = \quad 0.248402 + 0.014464I$ $b = -0.616308 - 0.457732I$	$-3.24252 + 1.36437I$	$-10.10455 - 0.49514I$
$u = -0.388754 + 1.027129I$ $a = \quad 0.248402 - 0.014464I$ $b = -0.616308 + 0.457732I$	$-3.24252 - 1.36437I$	$-10.10455 + 0.49514I$
$u = -0.327705 - 1.125732I$ $a = \quad 1.47765 + 0.42384I$ $b = \quad 1.398165 + 0.082873I$	$-9.55416 - 0.10492I$	$-13.08079 - 0.09673I$
$u = -0.327705 + 1.125732I$ $a = \quad 1.47765 - 0.42384I$ $b = \quad 1.398165 - 0.082873I$	$-9.55416 + 0.10492I$	$-13.08079 + 0.09673I$
$u = -0.242746 - 0.870296I$ $a = -0.185705 - 1.369147I$ $b = -0.968116 + 0.283551I$	$-2.32930 + 1.08642I$	$-8.77370 + 0.57725I$
$u = -0.242746 + 0.870296I$ $a = -0.185705 + 1.369147I$ $b = -0.968116 - 0.283551I$	$-2.32930 - 1.08642I$	$-8.77370 - 0.57725I$
$u = -0.107146 - 1.137427I$ $a = \quad 0.853208 - 0.669683I$ $b = \quad 1.333881 + 0.341289I$	$-4.03348 - 6.68828I$	$-8.87296 + 4.89618I$
$u = -0.107146 + 1.137427I$ $a = \quad 0.853208 + 0.669683I$ $b = \quad 1.333881 - 0.341289I$	$-4.03348 + 6.68828I$	$-8.87296 - 4.89618I$
$u = -0.073654 - 1.073023I$ $a = \quad 0.047762 + 0.488109I$ $b = -0.108842 - 0.774169I$	$0.49494 - 2.64295I$	$-4.27164 + 3.21466I$
$u = -0.073654 + 1.073023I$ $a = \quad 0.047762 - 0.488109I$ $b = -0.108842 + 0.774169I$	$0.49494 + 2.64295I$	$-4.27164 - 3.21466I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.114288 - 0.998949I$ $a = -1.20024 - 1.12645I$ $b = -1.218454 + 0.268078I$	$-2.73834 + 1.08871I$	$-7.57153 - 0.45228I$
$u = 0.114288 + 0.998949I$ $a = -1.20024 + 1.12645I$ $b = -1.218454 - 0.268078I$	$-2.73834 - 1.08871I$	$-7.57153 + 0.45228I$
$u = 0.411073$ $a = -1.51545$ $b = -1.18911$	-2.34833	-2.97220
$u = 0.422351 - 0.696988I$ $a = 0.445354 + 0.699170I$ $b = 0.020226 - 0.357518I$	$0.51548 - 1.38171I$	$2.20295 + 4.47540I$
$u = 0.422351 + 0.696988I$ $a = 0.445354 - 0.699170I$ $b = 0.020226 + 0.357518I$	$0.51548 + 1.38171I$	$2.20295 - 4.47540I$
$u = 0.432705 - 1.054622I$ $a = -2.30953 + 1.64012I$ $b = -1.294167 - 0.057870I$	$-4.79813 - 3.38896I$	$-8.56565 + 4.20601I$
$u = 0.432705 + 1.054622I$ $a = -2.30953 - 1.64012I$ $b = -1.294167 + 0.057870I$	$-4.79813 + 3.38896I$	$-8.56565 - 4.20601I$
$u = 0.482076 - 0.940480I$ $a = 0.761131 - 0.492556I$ $b = 0.219966 + 0.200182I$	$-0.24387 - 2.48522I$	$1.64376 + 3.61634I$
$u = 0.482076 + 0.940480I$ $a = 0.761131 + 0.492556I$ $b = 0.219966 - 0.200182I$	$-0.24387 + 2.48522I$	$1.64376 - 3.61634I$
$u = 0.598927 - 1.081494I$ $a = -0.42512 + 2.79867I$ $b = -1.291970 - 0.356069I$	$0.26166 - 7.85803I$	$-4.27524 + 5.69230I$

Solution to I_2^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.598927 + 1.081494I$ $a = -0.42512 - 2.79867I$ $b = -1.291970 + 0.356069I$	$0.26166 + 7.85803I$	$-4.27524 - 5.69230I$
$u = 0.617590 - 1.056217I$ $a = 1.07508 - 1.24210I$ $b = 0.031004 + 0.805221I$	$4.38710 - 3.67589I$	$0.16278 + 2.56525I$
$u = 0.617590 + 1.056217I$ $a = 1.07508 + 1.24210I$ $b = 0.031004 - 0.805221I$	$4.38710 + 3.67589I$	$0.16278 - 2.56525I$
$u = 0.640661 - 1.028061I$ $a = -0.988481 - 0.371567I$ $b = 1.244293 - 0.351593I$	$0.641453 + 0.489898I$	$-3.92823 - 1.19375I$
$u = 0.640661 + 1.028061I$ $a = -0.988481 + 0.371567I$ $b = 1.244293 + 0.351593I$	$0.641453 - 0.489898I$	$-3.92823 + 1.19375I$
$u = 0.644462 - 0.810856I$ $a = -0.942392 - 0.961581I$ $b = 1.226730 + 0.035206I$	$-2.80413 - 2.50478I$	$-9.09308 + 4.30288I$
$u = 0.644462 + 0.810856I$ $a = -0.942392 + 0.961581I$ $b = 1.226730 - 0.035206I$	$-2.80413 + 2.50478I$	$-9.09308 - 4.30288I$
$u = 0.750238 - 0.453200I$ $a = 0.96810 - 1.62658I$ $b = -1.262355 + 0.367119I$	$2.12308 + 2.73219I$	$-1.27274 - 1.03337I$
$u = 0.750238 + 0.453200I$ $a = 0.96810 + 1.62658I$ $b = -1.262355 - 0.367119I$	$2.12308 - 2.73219I$	$-1.27274 + 1.03337I$
$u = 0.758578 - 0.509405I$ $a = 0.09687 + 1.75830I$ $b = -0.007145 - 0.820800I$	$6.01459 - 1.53976I$	$2.52644 + 2.51375I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.758578 + 0.509405I$ $a = 0.09687 - 1.75830I$ $b = -0.007145 + 0.820800I$	$6.01459 + 1.53976I$	$2.52644 - 2.51375I$
$u = 0.768188 - 0.560407I$ $a = -1.21074 - 1.40785I$ $b = 1.273870 + 0.366638I$	$2.03469 - 5.80979I$	$-1.88693 + 5.87696I$
$u = 0.768188 + 0.560407I$ $a = -1.21074 + 1.40785I$ $b = 1.273870 - 0.366638I$	$2.03469 + 5.80979I$	$-1.88693 - 5.87696I$

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u^2+u+1)(u^{53}+2u^{52}+\cdots-3u-1)$
c_2	$(u^2+u+1)(u^{53}+24u^{52}+\cdots+u-1)$
c_3, c_8	$u^2(u^{53}+u^{52}+\cdots+12u+4)$
c_4	$(u^2-u+1)(u^{53}+2u^{52}+\cdots-3u-1)$
c_5	$(u^2+u+1)(u^{53}+2u^{52}+\cdots+5u+1)$
c_6	$(u-1)^2(u^{53}+3u^{52}+\cdots-6u^2-1)$
c_7, c_9	$u^2(u^{53}+15u^{52}+\cdots-120u-16)$
c_{10}, c_{11}	$(u+1)^2(u^{53}+3u^{52}+\cdots-6u^2-1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_4	$(y^2+y+1)(y^{53}+24y^{52}+\cdots+y-1)$
c_2	$(y^2+y+1)(y^{53}+12y^{52}+\cdots+25y-1)$
c_3, c_8	$y^2(y^{53}+15y^{52}+\cdots-120y-16)$
c_5	$(y^2+y+1)(y^{53}+50y^{51}+\cdots+49y-1)$
c_6, c_{10}, c_{11}	$(y-1)^2(y^{53}-43y^{52}+\cdots-12y-1)$
c_7, c_9	$y^2(y^{53}+43y^{52}+\cdots-1248y-256)$