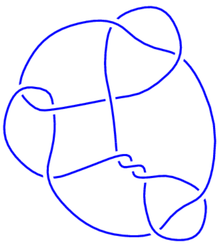
$11a_{23}$ $(K11a_{23})$



1

Arc Sequences

$$\rightarrow \underset{4}{\downarrow} \rightarrow \underset{1}{\downarrow} \rightarrow \underset{7}{\uparrow} \rightarrow \underset{2}{\downarrow} \rightarrow \underset{10}{\downarrow} \rightarrow \underset{3}{\uparrow} \rightarrow \underset{6}{\uparrow} \rightarrow \underset{11}{\downarrow} \rightarrow \underset{5}{\downarrow} \rightarrow \underset{9}{\downarrow} \rightarrow \underset{8}{\downarrow} \rightarrow$$

Solving Sequence

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

Representation Ideals

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

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

$I_2^u = \langle u^{54} - 4u^{53} + \cdots + 5u - 1,\ 9u^{53} - 28u^{52} + \cdots + 2a + 12,\ 17u^{53} - 53u^{52} + \cdots + 4b + 19 \rangle$

There are 2 irreducible components with 57 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. $I_1^u = \langle a^3 - a^2 + 1,\ u - 1,\ a^2 + b - 2a \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -2a^2 + 7a - 10$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -0.754878$ $b = -2.07960$	-2.75839	-16.4238
$u = 1.00000$ $a = 0.877439 - 0.744862I$ $b = 1.53980 - 0.18258I$	$1.37919 + 2.82812I$	$-4.28809 - 2.59975I$
$u = 1.00000$ $a = 0.877439 + 0.744862I$ $b = 1.53980 + 0.18258I$	$1.37919 - 2.82812I$	$-4.28809 + 2.59975I$

II. $I_2^u = \langle u^{54} - 4u^{53} + \cdots + 5u - 1,\ 9u^{53} - 28u^{52} + \cdots + 2a + 12,\ 17u^{53} - 53u^{52} + \cdots + 4b + 19 \rangle$

(i) Arc colorings

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

$$a_{10} = \begin{pmatrix} -\frac{9}{2}u^{53} + 14u^{52} + \cdots + \frac{39}{2}u - 6 \\ -4.25000u^{53} + 13.2500u^{52} + \cdots + 16.5000u - 4.75000 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} \frac{7}{4}u^{53} - \frac{11}{4}u^{52} + \cdots + \frac{5}{2}u - \frac{11}{4} \\ \frac{29}{4}u^{53} - \frac{77}{4}u^{52} + \cdots - \frac{35}{2}u + \frac{11}{4} \end{pmatrix}$$

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

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

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

$$a_9 = \begin{pmatrix} -\frac{9}{2}u^{53} + 14u^{52} + \cdots + \frac{39}{2}u - 6 \\ -\frac{3}{4}u^{53} + \frac{9}{4}u^{52} + \cdots + u - \frac{3}{4} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -\frac{1}{4}u^{53} + \frac{3}{4}u^{52} + \cdots + u - \frac{1}{4} \\ -\frac{1}{4}u^{53} + \frac{3}{4}u^{52} + \cdots - \frac{3}{2}u^2 - \frac{1}{4} \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -\frac{3}{4}u^{53} + \frac{23}{4}u^{52} + \cdots + \frac{29}{2}u - \frac{21}{4} \\ \frac{3}{4}u^{53} - \frac{7}{4}u^{52} + \cdots - \frac{5}{2}u + \frac{1}{4} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -2.75000u^{53} + 13.7500u^{52} + \cdots + 27.5000u - 9.25000 \\ \frac{7}{4}u^{53} - \frac{3}{4}u^{52} + \cdots + \frac{11}{2}u - \frac{11}{4} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -2.75000u^{53} + 13.7500u^{52} + \cdots + 27.5000u - 9.25000 \\ \frac{7}{4}u^{53} - \frac{3}{4}u^{52} + \cdots + \frac{11}{2}u - \frac{11}{4} \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -10u^{53} + \frac{81}{2}u^{52} + \cdots + \frac{159}{2}u - \frac{51}{2}$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.275402 - 0.242664I$ $a = 0.605105 - 0.735068I$ $b = 1.93142 - 0.00744I$	$1.49449 + 5.32145I$	$-4.28927 - 5.43624I$
$u = -1.275402 + 0.242664I$ $a = 0.605105 + 0.735068I$ $b = 1.93142 + 0.00744I$	$1.49449 - 5.32145I$	$-4.28927 + 5.43624I$
$u = -1.267441 - 0.214831I$ $a = 0.744835 + 0.524932I$ $b = 1.65088 + 0.49628I$	$1.86207 - 0.72710I$	$-3.27217 - 0.41485I$
$u = -1.267441 + 0.214831I$ $a = 0.744835 - 0.524932I$ $b = 1.65088 - 0.49628I$	$1.86207 + 0.72710I$	$-3.27217 + 0.41485I$
$u = -1.187539 - 0.321092I$ $a = -0.680113 + 0.402634I$ $b = -2.88373 - 0.10885I$	$-4.90867 + 1.39018I$	$-11.17255 - 4.35263I$
$u = -1.187539 + 0.321092I$ $a = -0.680113 - 0.402634I$ $b = -2.88373 + 0.10885I$	$-4.90867 - 1.39018I$	$-11.17255 + 4.35263I$
$u = -1.122893 - 0.421924I$ $a = 0.827371 - 0.045182I$ $b = 3.41506 - 0.63375I$	$-4.67558 - 3.96496I$	$-10.65253 + 5.36076I$
$u = -1.122893 + 0.421924I$ $a = 0.827371 + 0.045182I$ $b = 3.41506 + 0.63375I$	$-4.67558 + 3.96496I$	$-10.65253 - 5.36076I$
$u = -1.10409$ $a = -0.514074$ $b = -1.86437$	-2.29901	2.64124
$u = -1.080473 - 0.517138I$ $a = -1.012644 - 0.254306I$ $b = -3.16498 + 0.98160I$	$2.13549 - 8.01692I$	$-4.67676 + 6.21219I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.080473 + 0.517138I$ $a = -1.012644 + 0.254306I$ $b = -3.16498 - 0.98160I$	$2.13549 + 8.01692I$	$-4.67676 - 6.21219I$
$u = -1.061799 - 0.331495I$ $a = -0.068638 - 0.446686I$ $b = -0.593559 - 0.514032I$	$-2.17031 - 1.07616I$	$-4.84925 + 0.51569I$
$u = -1.061799 + 0.331495I$ $a = -0.068638 + 0.446686I$ $b = -0.593559 + 0.514032I$	$-2.17031 + 1.07616I$	$-4.84925 - 0.51569I$
$u = -1.055276 - 0.513076I$ $a = -0.316103 + 0.954169I$ $b = 0.436400 + 1.271623I$	$2.56847 - 1.88759I$	$-3.79369 + 1.29382I$
$u = -1.055276 + 0.513076I$ $a = -0.316103 - 0.954169I$ $b = 0.436400 - 1.271623I$	$2.56847 + 1.88759I$	$-3.79369 - 1.29382I$
$u = -0.747670 - 0.233472I$ $a = 0.805895 + 0.133478I$ $b = 0.299048 - 1.108327I$	$-1.12376 - 1.18488I$	$-5.58028 + 5.43531I$
$u = -0.747670 + 0.233472I$ $a = 0.805895 - 0.133478I$ $b = 0.299048 + 1.108327I$	$-1.12376 + 1.18488I$	$-5.58028 - 5.43531I$
$u = -0.429280 - 0.555788I$ $a = -1.67358 + 0.25900I$ $b = -0.413017 + 0.926570I$	$4.38756 - 2.45269I$	$-1.44902 + 3.79989I$
$u = -0.429280 + 0.555788I$ $a = -1.67358 - 0.25900I$ $b = -0.413017 - 0.926570I$	$4.38756 + 2.45269I$	$-1.44902 - 3.79989I$
$u = -0.367008 - 0.582543I$ $a = 0.26323 + 1.75557I$ $b = 1.021949 - 0.663693I$	$4.18784 + 3.59964I$	$-1.85021 - 1.62687I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.367008 + 0.582543I$ $a = 0.26323 - 1.75557I$ $b = 1.021949 + 0.663693I$	$4.18784 - 3.59964I$	$-1.85021 + 1.62687I$
$u = 0.052028 - 0.524289I$ $a = -0.51438 - 1.65125I$ $b = -0.729687 + 0.815757I$	$-1.67290 + 0.31402I$	$-7.28536 - 0.85083I$
$u = 0.052028 + 0.524289I$ $a = -0.51438 + 1.65125I$ $b = -0.729687 - 0.815757I$	$-1.67290 - 0.31402I$	$-7.28536 + 0.85083I$
$u = 0.215170 - 0.767637I$ $a = -0.099649 + 1.270357I$ $b = -0.084856 - 1.155482I$	$-0.69346 - 4.89748I$	$-4.90328 + 6.49260I$
$u = 0.215170 + 0.767637I$ $a = -0.099649 - 1.270357I$ $b = -0.084856 + 1.155482I$	$-0.69346 + 4.89748I$	$-4.90328 - 6.49260I$
$u = 0.285770 - 0.885285I$ $a = 0.510264 - 1.262703I$ $b = 0.741796 + 0.904662I$	$6.64241 - 8.94495I$	$-0.13717 + 5.93673I$
$u = 0.285770 + 0.885285I$ $a = 0.510264 + 1.262703I$ $b = 0.741796 - 0.904662I$	$6.64241 + 8.94495I$	$-0.13717 - 5.93673I$
$u = 0.310277 - 0.873922I$ $a = -1.180296 - 0.526374I$ $b = -0.408101 - 0.204331I$	$7.09944 - 2.70045I$	$0.819456 + 0.972143I$
$u = 0.310277 + 0.873922I$ $a = -1.180296 + 0.526374I$ $b = -0.408101 + 0.204331I$	$7.09944 + 2.70045I$	$0.819456 - 0.972143I$
$u = 0.323402 - 0.678177I$ $a = 0.820664 - 0.079014I$ $b = 0.204751 - 0.040819I$	$1.59069 - 1.49648I$	$1.55257 + 1.21320I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.323402 + 0.678177I$ $a = 0.820664 + 0.079014I$ $b = 0.204751 + 0.040819I$	$1.59069 + 1.49648I$	$1.55257 - 1.21320I$
$u = 0.471952$ $a = -1.86619$ $b = -1.47947$	-1.51820	-5.33261
$u = 0.602229 - 0.576782I$ $a = -0.031939 + 0.928671I$ $b = -0.0135404 + 0.0650924I$	$2.66225 - 0.01615I$	$2.03217 + 0.16196I$
$u = 0.602229 + 0.576782I$ $a = -0.031939 - 0.928671I$ $b = -0.0135404 - 0.0650924I$	$2.66225 + 0.01615I$	$2.03217 - 0.16196I$
$u = 0.787165 - 0.746913I$ $a = -0.053012 - 1.144617I$ $b = 0.476193 - 0.023641I$	$9.95886 - 0.40591I$	$1.83830 - 0.41630I$
$u = 0.787165 + 0.746913I$ $a = -0.053012 + 1.144617I$ $b = 0.476193 + 0.023641I$	$9.95886 + 0.40591I$	$1.83830 + 0.41630I$
$u = 0.806292 - 0.444099I$ $a = 1.096970 - 0.123544I$ $b = 1.62444 - 0.17094I$	$1.80763 + 4.19776I$	$-1.27767 - 7.87465I$
$u = 0.806292 + 0.444099I$ $a = 1.096970 + 0.123544I$ $b = 1.62444 + 0.17094I$	$1.80763 - 4.19776I$	$-1.27767 + 7.87465I$
$u = 0.815507 - 0.739025I$ $a = -1.140906 + 0.009739I$ $b = -1.70285 - 0.55927I$	$9.87556 + 5.94354I$	$1.55448 - 5.54578I$
$u = 0.815507 + 0.739025I$ $a = -1.140906 - 0.009739I$ $b = -1.70285 + 0.55927I$	$9.87556 - 5.94354I$	$1.55448 + 5.54578I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.958936 - 0.449578I$ $a = 0.898575 - 0.317897I$ $b = 1.263808 - 0.315128I$	$1.72344 + 4.24877I$	$-1.89208 - 7.05777I$
$u = 0.958936 + 0.449578I$ $a = 0.898575 + 0.317897I$ $b = 1.263808 + 0.315128I$	$1.72344 - 4.24877I$	$-1.89208 + 7.05777I$
$u = 1.024880 - 0.383533I$ $a = 0.587446 + 0.923619I$ $b = 1.62823 - 0.26702I$	$1.09373 - 1.25845I$	$-4.39932 - 1.89910I$
$u = 1.024880 + 0.383533I$ $a = 0.587446 - 0.923619I$ $b = 1.62823 + 0.26702I$	$1.09373 + 1.25845I$	$-4.39932 + 1.89910I$
$u = 1.108925 - 0.535658I$ $a = -0.136152 + 0.538684I$ $b = -0.288242 + 0.669337I$	$-0.68378 + 6.18510I$	$-2.38929 - 5.41509I$
$u = 1.108925 + 0.535658I$ $a = -0.136152 - 0.538684I$ $b = -0.288242 - 0.669337I$	$-0.68378 - 6.18510I$	$-2.38929 + 5.41509I$
$u = 1.113457 - 0.470092I$ $a = -0.707139 - 0.466446I$ $b = -2.79749 + 0.57096I$	$-4.34560 + 3.65314I$	$-10.05122 - 3.06776I$
$u = 1.113457 + 0.470092I$ $a = -0.707139 + 0.466446I$ $b = -2.79749 - 0.57096I$	$-4.34560 - 3.65314I$	$-10.05122 + 3.06776I$
$u = 1.157874 - 0.533870I$ $a = 0.829801 + 0.087484I$ $b = 3.42390 + 0.03215I$	$-3.43639 + 9.75051I$	$-8.30305 - 9.36472I$
$u = 1.157874 + 0.533870I$ $a = 0.829801 - 0.087484I$ $b = 3.42390 - 0.03215I$	$-3.43639 - 9.75051I$	$-8.30305 + 9.36472I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.167794 - 0.595157I$ $a = -0.242776 - 0.875557I$ $b = -0.107255 - 1.165887I$	$4.52521 + 8.09679I$	$-2.31992 - 4.66525I$
$u = 1.167794 + 0.595157I$ $a = -0.242776 + 0.875557I$ $b = -0.107255 + 1.165887I$	$4.52521 - 8.09679I$	$-2.31992 + 4.66525I$
$u = 1.181147 - 0.590023I$ $a = -0.942698 + 0.212068I$ $b = -3.25866 - 0.39920I$	$3.9497 + 14.3488I$	$-3.40719 - 9.42053I$
$u = 1.181147 + 0.590023I$ $a = -0.942698 - 0.212068I$ $b = -3.25866 + 0.39920I$	$3.9497 - 14.3488I$	$-3.40719 + 9.42053I$

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u-1)^3(u^{54}+4u^{53}+\cdots-5u-1)$
c_2	$(u+1)^3(u^{54}+28u^{53}+\cdots+5u+1)$
c_3, c_6	$u^3(u^{54}+u^{53}+\cdots-28u+8)$
c_4	$(u+1)^3(u^{54}+4u^{53}+\cdots-5u-1)$
c_5	$(u^3+u^2-1)(u^{54}+2u^{53}+\cdots+2u^2-1)$
c_7	$u^3(u^{54}+21u^{53}+\cdots+912u+64)$
c_8	$(u^3-u^2+2u-1)(u^{54}+14u^{53}+\cdots+4u+1)$
c_9	$(u^3-u^2+1)(u^{54}+2u^{53}+\cdots+2u^2-1)$
c_{10}, c_{11}	$(u^3+u^2+2u+1)(u^{54}+14u^{53}+\cdots+4u+1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_4	$(y-1)^3(y^{54}-28y^{53}+\cdots-5y+1)$
c_2	$(y-1)^3(y^{54}+44y^{52}+\cdots-29y+1)$
c_3, c_6	$y^3(y^{54}-21y^{53}+\cdots-912y+64)$
c_5, c_9	$(y^3-y^2+2y-1)(y^{54}-14y^{53}+\cdots-4y+1)$
c_7	$y^3(y^{54}+19y^{53}+\cdots-85248y+4096)$
c_8, c_{10}, c_{11}	$(y^3+3y^2+2y-1)(y^{54}+54y^{53}+\cdots-28y+1)$