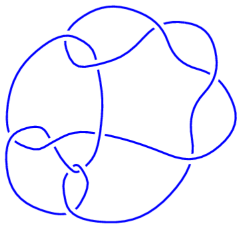
$11a_{16}$ ($K11a_{16}$)



1

Arc Sequences

$\downarrow$	$\downarrow$	$\uparrow$	$\downarrow$	$\downarrow$	$\uparrow$	$\uparrow$	$\uparrow$	$\downarrow$	$\uparrow$	$\uparrow$
4	1	7	2	10	3	5	11	6	9	8

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

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

$$I_1^u = \langle a^4 - a^3 + a^2 + 1,\ u - 1,\ a^3 - a^2 + b \rangle$$
$$I_2^u = \langle u^{56} - 5u^{55} + \cdots - 2u + 1,\ -u^{55} + 4u^{54} + \cdots + 8b + 1,\ -23u^{55} + 94u^{54} + \cdots + 8a + 1 \rangle$$

There are 2 irreducible components with 60 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. $I_1^u = \langle a^4 - a^3 + a^2 + 1,\ u - 1,\ a^3 - a^2 + b \rangle$

(i) Arc colorings

$$a_5 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} a \\ -a^3 + a^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -a^2 \\ -a^2 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} a^3 + a \\ a^2 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} a^3 - a^2 - 1 \\ -1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -a^2 \\ 0 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -a^2 \\ -a^2 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -a^2 \\ -a^2 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 3a^2 - 2a - 1$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -0.351808 - 0.720342I$ $b = -0.899232 + 0.400532I$	$-1.43393 - 1.41510I$	$-1.48175 + 2.96122I$
$u = 1.00000$ $a = -0.351808 + 0.720342I$ $b = -0.899232 - 0.400532I$	$-1.43393 + 1.41510I$	$-1.48175 - 2.96122I$
$u = 1.00000$ $a = 0.851808 - 0.911292I$ $b = 1.39923 - 0.32564I$	$-8.43568 + 3.16396I$	$-3.01825 - 2.83489I$
$u = 1.00000$ $a = 0.851808 + 0.911292I$ $b = 1.39923 + 0.32564I$	$-8.43568 - 3.16396I$	$-3.01825 + 2.83489I$

II. $I_2^u = \langle u^{56} - 5u^{55} + \cdots - 2u + 1,\ -u^{55} + 4u^{54} + \cdots + 8b + 1,\ -23u^{55} + 94u^{54} + \cdots + 8a + 1 \rangle$

(i) Arc colorings

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

$$a_{10} = \begin{pmatrix} \frac{23}{8}u^{55} - \frac{47}{4}u^{54} + \cdots + \frac{55}{8}u - \frac{1}{8} \\ \frac{1}{8}u^{55} - \frac{1}{2}u^{54} + \cdots + \frac{17}{8}u - \frac{1}{8} \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} \frac{39}{4}u^{55} - \frac{163}{4}u^{54} + \cdots + \frac{21}{4}u - 8 \\ 3u^{55} - \frac{53}{4}u^{54} + \cdots + \frac{9}{2}u - \frac{15}{4} \end{pmatrix}$$

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

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

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

$$a_9 = \begin{pmatrix} -\frac{3}{2}u^{55} + 9u^{54} + \cdots - 3u + 7 \\ -u^{55} + \frac{27}{4}u^{54} + \cdots + \frac{1}{2}u + \frac{17}{4} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{1}{8}u^{55} - \frac{1}{2}u^{54} + \cdots + \frac{9}{8}u + \frac{15}{8} \\ u^{11} - 3u^9 + 2u^8 + 4u^7 - 4u^6 - u^5 + 4u^4 - u^3 - 2u^2 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 10u^{55} - \frac{173}{4}u^{54} + \cdots + \frac{15}{2}u - \frac{39}{4} \\ \frac{25}{4}u^{55} - \frac{55}{2}u^{54} + \cdots + \frac{37}{4}u - \frac{27}{4} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 10u^{55} - \frac{173}{4}u^{54} + \cdots + \frac{15}{2}u - \frac{39}{4} \\ \frac{33}{4}u^{55} - \frac{163}{4}u^{54} + \cdots + \frac{51}{4}u - \frac{27}{2} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 10u^{55} - \frac{173}{4}u^{54} + \cdots + \frac{15}{2}u - \frac{39}{4} \\ \frac{33}{4}u^{55} - \frac{163}{4}u^{54} + \cdots + \frac{51}{4}u - \frac{27}{2} \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{45}{4}u^{55} + \frac{235}{4}u^{54} + \cdots - \frac{151}{4}u + \frac{51}{2}$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.288424 - 0.199891I$ $a = 0.507145 - 0.813322I$ $b = 1.58893 + 0.03301I$	$-7.72972 + 5.47011I$	$-2.39713 - 5.44251I$
$u = -1.288424 + 0.199891I$ $a = 0.507145 + 0.813322I$ $b = 1.58893 - 0.03301I$	$-7.72972 - 5.47011I$	$-2.39713 + 5.44251I$
$u = -1.274370 - 0.218063I$ $a = 0.759154 + 0.540315I$ $b = 1.66661 + 0.51759I$	$-8.01940 - 0.73257I$	$-3.26109 - 0.37739I$
$u = -1.274370 + 0.218063I$ $a = 0.759154 - 0.540315I$ $b = 1.66661 - 0.51759I$	$-8.01940 + 0.73257I$	$-3.26109 + 0.37739I$
$u = -1.220684 - 0.092704I$ $a = -0.203834 + 0.726363I$ $b = -0.839404 - 0.816570I$	$-0.79958 + 2.18057I$	$4.75108 - 6.92304I$
$u = -1.220684 + 0.092704I$ $a = -0.203834 - 0.726363I$ $b = -0.839404 + 0.816570I$	$-0.79958 - 2.18057I$	$4.75108 + 6.92304I$
$u = -1.085880 - 0.201187I$ $a = -0.406117 - 0.282675I$ $b = -1.141540 + 0.023565I$	$-2.27622 - 0.63522I$	$-5.14216 - 1.49241I$
$u = -1.085880 + 0.201187I$ $a = -0.406117 + 0.282675I$ $b = -1.141540 - 0.023565I$	$-2.27622 + 0.63522I$	$-5.14216 + 1.49241I$
$u = -1.051604 - 0.519662I$ $a = -0.338412 + 0.965417I$ $b = 0.419331 + 1.289743I$	$-7.29705 - 1.90076I$	$-3.76791 + 1.32160I$
$u = -1.051604 + 0.519662I$ $a = -0.338412 - 0.965417I$ $b = 0.419331 - 1.289743I$	$-7.29705 + 1.90076I$	$-3.76791 - 1.32160I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.039165-0.538839I$ $a=-0.994418-0.407808I$ $b=-3.06060+1.07112I$	$-6.92091-8.11870I$	$-2.86622+6.39095I$
$u=-1.039165+0.538839I$ $a=-0.994418+0.407808I$ $b=-3.06060-1.07112I$	$-6.92091+8.11870I$	$-2.86622-6.39095I$
$u=-0.960952-0.369401I$ $a=\ \ 0.354502-0.368794I$ $b=-0.079633-0.784838I$	$-1.82537-1.28944I$	$-5.03333+1.67156I$
$u=-0.960952+0.369401I$ $a=\ \ 0.354502+0.368794I$ $b=-0.079633+0.784838I$	$-1.82537+1.28944I$	$-5.03333-1.67156I$
$u=-0.931026-0.495036I$ $a=\ \ 0.691983+0.621078I$ $b=\ \ 2.76931-1.52092I$	$0.23022-4.40037I$	$2.37312+7.37153I$
$u=-0.931026+0.495036I$ $a=\ \ 0.691983-0.621078I$ $b=\ \ 2.76931+1.52092I$	$0.23022+4.40037I$	$2.37312-7.37153I$
$u=-0.733872-0.432707I$ $a=-0.292170-1.018254I$ $b=-1.61912+1.59728I$	$0.899368+0.464839I$	$4.81093-1.16758I$
$u=-0.733872+0.432707I$ $a=-0.292170+1.018254I$ $b=-1.61912-1.59728I$	$0.899368-0.464839I$	$4.81093+1.16758I$
$u=-0.459140-0.573659I$ $a=\ \ 0.29974+1.64492I$ $b=\ \ 1.178221-0.748357I$	$-5.25339+3.63777I$	$-0.87283-1.58762I$
$u=-0.459140+0.573659I$ $a=\ \ 0.29974-1.64492I$ $b=\ \ 1.178221+0.748357I$	$-5.25339-3.63777I$	$-0.87283+1.58762I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.397652 - 0.564451I$ $a = -1.71628 + 0.25543I$ $b = -0.426577 + 0.890707I$	$-5.44180 - 2.46519I$	$-1.24832 + 3.76882I$
$u = -0.397652 + 0.564451I$ $a = -1.71628 - 0.25543I$ $b = -0.426577 - 0.890707I$	$-5.44180 + 2.46519I$	$-1.24832 - 3.76882I$
$u = -0.026291 - 0.218757I$ $a = 3.02309 - 0.92295I$ $b = 0.038028 - 0.511957I$	$0.260433 - 1.109868I$	$3.40522 + 6.21684I$
$u = -0.026291 + 0.218757I$ $a = 3.02309 + 0.92295I$ $b = 0.038028 + 0.511957I$	$0.260433 + 1.109868I$	$3.40522 - 6.21684I$
$u = 0.326229 - 0.875406I$ $a = -1.142296 - 0.560278I$ $b = -0.386298 - 0.224720I$	$-2.72661 - 2.68562I$	$0.837839 + 0.919336I$
$u = 0.326229 + 0.875406I$ $a = -1.142296 + 0.560278I$ $b = -0.386298 + 0.224720I$	$-2.72661 + 2.68562I$	$0.837839 - 0.919336I$
$u = 0.342470 - 0.897891I$ $a = 0.648742 - 1.145034I$ $b = 1.026658 + 0.935242I$	$-2.23567 - 8.89297I$	$1.72881 + 5.75005I$
$u = 0.342470 + 0.897891I$ $a = 0.648742 + 1.145034I$ $b = 1.026658 - 0.935242I$	$-2.23567 + 8.89297I$	$1.72881 - 5.75005I$
$u = 0.444739 - 0.847390I$ $a = -0.741805 + 0.781478I$ $b = -1.57412 - 1.17326I$	$4.96310 - 4.62849I$	$7.03327 + 5.15784I$
$u = 0.444739 + 0.847390I$ $a = -0.741805 - 0.781478I$ $b = -1.57412 + 1.17326I$	$4.96310 + 4.62849I$	$7.03327 - 5.15784I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.451727 - 0.746946I$ $a = 0.488351 + 0.515486I$ $b = 0.087582 + 0.153628I$	$2.38315 - 1.29675I$	$1.42442 + 0.64044I$
$u = 0.451727 + 0.746946I$ $a = 0.488351 - 0.515486I$ $b = 0.087582 - 0.153628I$	$2.38315 + 1.29675I$	$1.42442 - 0.64044I$
$u = 0.567553 - 0.794549I$ $a = 0.924976 - 0.411809I$ $b = 2.07645 + 0.85869I$	$5.73525 + 1.07098I$	$8.88776 - 3.00045I$
$u = 0.567553 + 0.794549I$ $a = 0.924976 + 0.411809I$ $b = 2.07645 - 0.85869I$	$5.73525 - 1.07098I$	$8.88776 + 3.00045I$
$u = 0.739353 - 0.750404I$ $a = -1.121631 + 0.119305I$ $b = -1.86438 - 0.54837I$	$0.25420 + 5.44548I$	$2.97914 - 5.79485I$
$u = 0.739353 + 0.750404I$ $a = -1.121631 - 0.119305I$ $b = -1.86438 + 0.54837I$	$0.25420 - 5.44548I$	$2.97914 + 5.79485I$
$u = 0.793930 - 0.547128I$ $a = -0.057448 - 1.026933I$ $b = -0.051973 + 0.286779I$	$-0.0338562 - 0.1100990I$	$1.75833 + 0.05075I$
$u = 0.793930 + 0.547128I$ $a = -0.057448 + 1.026933I$ $b = -0.051973 - 0.286779I$	$-0.0338562 + 0.1100990I$	$1.75833 - 0.05075I$
$u = 0.810762 - 0.654986I$ $a = -0.017529 - 1.045427I$ $b = 0.319898 + 0.255380I$	$-0.0629739 - 0.1237043I$	$2.10228 - 0.09581I$
$u = 0.810762 + 0.654986I$ $a = -0.017529 + 1.045427I$ $b = 0.319898 - 0.255380I$	$-0.0629739 + 0.1237043I$	$2.10228 + 0.09581I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.960919 - 0.329789I$ $a = 0.502468 + 1.147371I$ $b = 1.204326 + 0.061628I$	$-8.44550 - 2.02974I$	$-1.92576 - 3.26082I$
$u = 0.960919 + 0.329789I$ $a = 0.502468 - 1.147371I$ $b = 1.204326 - 0.061628I$	$-8.44550 + 2.02974I$	$-1.92576 + 3.26082I$
$u = 0.980977 - 0.346151I$ $a = 1.083332 - 0.531308I$ $b = 1.45537 - 0.58973I$	$-8.57446 + 4.40882I$	$-2.55879 - 7.92919I$
$u = 0.980977 + 0.346151I$ $a = 1.083332 + 0.531308I$ $b = 1.45537 + 0.58973I$	$-8.57446 - 4.40882I$	$-2.55879 + 7.92919I$
$u = 0.983763 - 0.527675I$ $a = -0.734359 + 0.151887I$ $b = -1.033173 + 0.066055I$	$-0.84678 + 4.37124I$	$-1.57903 - 6.34104I$
$u = 0.983763 + 0.527675I$ $a = -0.734359 - 0.151887I$ $b = -1.033173 - 0.066055I$	$-0.84678 - 4.37124I$	$-1.57903 + 6.34104I$
$u = 1.033916 - 0.649275I$ $a = -0.332226 + 0.736931I$ $b = -1.66143 - 1.37070I$	$4.33416 + 4.34991I$	$6.75272 - 2.91610I$
$u = 1.033916 + 0.649275I$ $a = -0.332226 - 0.736931I$ $b = -1.66143 + 1.37070I$	$4.33416 - 4.34991I$	$6.75272 + 2.91610I$
$u = 1.085464 - 0.600829I$ $a = 0.382401 + 0.407675I$ $b = 0.400553 + 0.623398I$	$0.50522 + 6.42800I$	$-1.79832 - 5.15907I$
$u = 1.085464 + 0.600829I$ $a = 0.382401 - 0.407675I$ $b = 0.400553 - 0.623398I$	$0.50522 - 6.42800I$	$-1.79832 + 5.15907I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.113246 - 0.638818I$ $a = 0.636284 - 0.522786I$ $b = 2.82708 + 1.03247I$	$2.95830 + 10.14667I$	$3.62258 - 9.49522I$
$u = 1.113246 + 0.638818I$ $a = 0.636284 + 0.522786I$ $b = 2.82708 - 1.03247I$	$2.95830 - 10.14667I$	$3.62258 + 9.49522I$
$u = 1.164861 - 0.607522I$ $a = -0.308331 - 0.866295I$ $b = -0.188115 - 1.170389I$	$-5.23615 + 8.13965I$	$-2.22555 - 4.61832I$
$u = 1.164861 + 0.607522I$ $a = -0.308331 + 0.866295I$ $b = -0.188115 + 1.170389I$	$-5.23615 - 8.13965I$	$-2.22555 + 4.61832I$
$u = 1.169152 - 0.619597I$ $a = -0.895315 + 0.366967I$ $b = -3.13200 - 0.53294I$	$-4.7257 + 14.4579I$	$-1.29107 - 9.32776I$
$u = 1.169152 + 0.619597I$ $a = -0.895315 - 0.366967I$ $b = -3.13200 + 0.53294I$	$-4.7257 - 14.4579I$	$-1.29107 + 9.32776I$

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u-1)^4(u^{56}+5u^{55}+\cdots+2u+1)$
c_2	$(u+1)^4(u^{56}+27u^{55}+\cdots-30u+1)$
c_3, c_6	$u^4(u^{56}+u^{55}+\cdots+56u+16)$
c_4	$(u+1)^4(u^{56}+5u^{55}+\cdots+2u+1)$
c_5	$(u^4+u^3+u^2+1)(u^{56}+2u^{55}+\cdots+2u^2+1)$
c_7	$(u^4-u^3+3u^2-2u+1)(u^{56}+2u^{55}+\cdots-140u+200)$
c_8	$(u^4+u^3+3u^2+2u+1)(u^{56}+14u^{55}+\cdots+4u+1)$
c_9	$(u^4-u^3+u^2+1)(u^{56}+2u^{55}+\cdots+2u^2+1)$
c_{10}, c_{11}	$(u^4-u^3+3u^2-2u+1)(u^{56}+14u^{55}+\cdots+4u+1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_4	$(y-1)^4(y^{56}-27y^{55}+\cdots+30y+1)$
c_2	$(y-1)^4(y^{56}+9y^{55}+\cdots-730y+1)$
c_3, c_6	$y^4(y^{56}-27y^{55}+\cdots-2624y+256)$
c_5, c_9	$(y^4+y^3+3y^2+2y+1)(y^{56}+14y^{55}+\cdots+4y+1)$
c_7	$(y^4+5y^3+\cdots+2y+1)(y^{56}-2y^{55}+\cdots+62800y+40000)$
c_8, c_{10}, c_{11}	$(y^4+5y^3+\cdots+2y+1)(y^{56}+58y^{55}+\cdots+28y+1)$