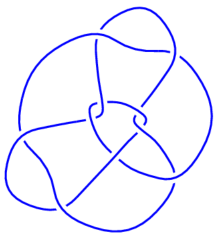
10_{109} $(K10a_{93})$



[1]

Arc Sequences

$$\rightarrow \downarrow \rightarrow \downarrow \rightarrow \downarrow \rightarrow \uparrow \rightarrow \downarrow \rightarrow \uparrow \rightarrow \downarrow \rightarrow \uparrow \rightarrow \uparrow \rightarrow \uparrow \rightarrow$$

$$5 \quad 7 \quad 1 \quad 9 \quad 2 \quad 10 \quad 3 \quad 4 \quad 6 \quad 8$$

Solving Sequence

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

Representation Ideals

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

$$I_1^u = \langle u^6 - u^4 + u^3 - u^2 + 1,\ u^4 + u^3 + b,\ -u^5 - u^2 + a + 2u - 1\rangle$$
$$I_2^u = \langle u^{48} + u^{47} + \cdots + 27u + 9,\ 1.39111 \times 10^{69}u^{47} + 1.58438 \times 10^{69}u^{46} + \cdots + 5.91723 \times 10^{69}b - 2.52766 \times 10^{70}$$
$$6.06582 \times 10^{69}u^{47} - 5.76617 \times 10^{69}u^{46} + \cdots + 1.77517 \times 10^{70}a + 7.29954 \times 10^{70}\rangle$$

There are 2 irreducible components with 54 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. $\boldsymbol{I_1^u = \langle u^6 - u^4 + u^3 - u^2 + 1,\ u^4 + u^3 + b,\ -u^5 - u^2 + a + 2u - 1\rangle}$

(i) Arc colorings

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

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} u^5 + u^2 - 2u + 1 \\ -u^4 - u^3 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 2u^5 - u^4 - u^3 + 3u^2 - 3u + 2 \\ -u^2 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 2u^5 - u^4 - u^3 + 2u^2 - 3u + 2 \\ -u^2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^5 - u^4 + u^2 - 2u + 2 \\ -u^4 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -2u^5 + 2u^4 + u^3 - 3u^2 + 4u - 4 \\ -u^4 - u^3 + 1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -2u^5 + u^4 + u^3 - 3u^2 + 4u - 2 \\ u^5 + u^2 - u \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 8u^5 + 8u^2 - 8u + 4$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.40127$ $a = 0.363443$ $b = -1.10408$	-5.56615	-12.3026
$u = -0.713639$ $a = 2.75146$ $b = 0.104076$	5.56615	12.3026
$u = 0.127051 - 0.991896I$ $a = 0.372949 + 0.927852I$ $b = -0.50000 - 1.41566I$	$-1.00626I$	$-0.512355I$
$u = 0.127051 + 0.991896I$ $a = 0.372949 - 0.927852I$ $b = -0.50000 + 1.41566I$	$1.00626I$	$0.512355I$
$u = 0.930403 - 0.366538I$ $a = -0.430403 - 0.902637I$ $b = -0.50000 + 1.90021I$	$5.76499I$	$-10.1534I$
$u = 0.930403 + 0.366538I$ $a = -0.430403 + 0.902637I$ $b = -0.50000 - 1.90021I$	$-5.76499I$	$10.1534I$

II. $\boldsymbol{I_2^u =}$
$\boldsymbol{\langle u^{48} + u^{47} + \cdots + 27u + 9,\ 1.39 \times 10^{69} u^{47} + 1.58 \times 10^{69} u^{46} + \cdots + 5.92 \times 10^{69} b - 2.53 \times 10^{70},\ 6.07 \times 10^{69} u^{47} - 5.77 \times 10^{69} u^{46} + \cdots + 1.78 \times 10^{70} a + 7.30 \times 10^{70} \rangle}$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -0.341704u^{47} + 0.324824u^{46} + \cdots - 8.82321u - 4.11203 \\ -0.235094u^{47} - 0.267757u^{46} + \cdots + 12.4968u + 4.27169 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 1.02153u^{47} + 0.0740296u^{46} + \cdots + 24.0190u + 11.1470 \\ 0.615085u^{47} + 0.611530u^{46} + \cdots - 1.90830u + 1.46100 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 1.63662u^{47} + 0.685560u^{46} + \cdots + 22.1108u + 12.6080 \\ 0.615085u^{47} + 0.611530u^{46} + \cdots - 1.90830u + 1.46100 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -0.637058u^{47} + 0.136146u^{46} + \cdots - 7.19900u - 4.21139 \\ -0.117365u^{47} - 0.183884u^{46} + \cdots + 10.6505u + 3.41096 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 1.57903u^{47} + 0.309320u^{46} + \cdots + 32.7765u + 17.3641 \\ 0.115037u^{47} - 0.150407u^{46} + \cdots + 14.5689u + 7.01333 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -1.03060u^{47} + 0.0284428u^{46} + \cdots - 23.8582u - 12.6470 \\ 0.214885u^{47} + 0.477878u^{46} + \cdots - 16.4510u - 6.26630 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -2.23307u^{47} - 0.552380u^{46} + \cdots - 44.4701u - 24.9341$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.47083$ $a = \quad 0.521318$ $b = -0.814169$	-5.07611	4.92145
$u = -1.37517 - 0.59899I$ $a = \quad 0.629722 - 0.798200I$ $b = \quad 1.16282 + 1.60497I$	$-\ 14.9002I$	$8.33874I$
$u = -1.37517 + 0.59899I$ $a = \quad 0.629722 + 0.798200I$ $b = \quad 1.16282 - 1.60497I$	$14.9002I$	$-\ 8.33874I$
$u = -1.342850 - 0.281989I$ $a = -0.319882 - 0.671557I$ $b = -0.150574 - 0.021826I$	$-7.33272 - 2.80822I$	$-7.40390 + 2.13041I$
$u = -1.342850 + 0.281989I$ $a = -0.319882 + 0.671557I$ $b = -0.150574 + 0.021826I$	$-7.33272 + 2.80822I$	$-7.40390 - 2.13041I$
$u = -1.108079 - 0.192095I$ $a = -0.851917 + 0.642762I$ $b = -1.23753 - 1.73103I$	$-1.80411 - 5.64123I$	$-3.83961 + 6.95453I$
$u = -1.108079 + 0.192095I$ $a = -0.851917 - 0.642762I$ $b = -1.23753 + 1.73103I$	$-1.80411 + 5.64123I$	$-3.83961 - 6.95453I$
$u = -1.105841 - 0.455768I$ $a = -0.510141 + 0.725262I$ $b = -0.52148 - 1.52173I$	$-0.55675 - 4.59934I$	$-0.60868 + 5.05608I$
$u = -1.105841 + 0.455768I$ $a = -0.510141 - 0.725262I$ $b = -0.52148 + 1.52173I$	$-0.55675 + 4.59934I$	$-0.60868 - 5.05608I$
$u = -1.07865 - 1.36729I$ $a = \quad 0.272463 - 0.554251I$ $b = \quad 1.45254 + 1.74578I$	$0.417476 - 0.732604I$	$0.8254 - 18.1961I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.07865+1.36729I$ $a=\ 0.272463+0.554251I$ $b=\ 1.45254-1.74578I$	$0.417476+0.732604I$	$0.8254+18.1961I$
$u=-1.043561-0.484906I$ $a=-0.223003+0.823905I$ $b=-0.52460-1.37673I$	$-0.39243-4.63681I$	$-1.88077+4.18341I$
$u=-1.043561+0.484906I$ $a=-0.223003-0.823905I$ $b=-0.52460+1.37673I$	$-0.39243+4.63681I$	$-1.88077-4.18341I$
$u=-1.040626-0.301367I$ $a=\ 1.081840-0.739628I$ $b=\ 0.192260+0.774854I$	$3.64950-0.92732I$	$3.47502+0.40612I$
$u=-1.040626+0.301367I$ $a=\ 1.081840+0.739628I$ $b=\ 0.192260-0.774854I$	$3.64950+0.92732I$	$3.47502-0.40612I$
$u=-0.893177$ $a=-2.34568$ $b=-0.792296$	5.07611	-4.92145
$u=-0.752165-0.229742I$ $a=\ 0.395986-0.109240I$ $b=\ 0.32704-1.62505I$	$0.39243-4.63681I$	$1.88077+4.18341I$
$u=-0.752165+0.229742I$ $a=\ 0.395986+0.109240I$ $b=\ 0.32704+1.62505I$	$0.39243+4.63681I$	$1.88077-4.18341I$
$u=-0.415503-0.519321I$ $a=\ 1.094854-0.689278I$ $b=\ 0.296449+0.612534I$	$1.40575+0.47751I$	$6.55789+0.10542I$
$u=-0.415503+0.519321I$ $a=\ 1.094854+0.689278I$ $b=\ 0.296449-0.612534I$	$1.40575-0.47751I$	$6.55789-0.10542I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.323867-0.554108I$ $a=1.255609-0.358556I$ $b=-0.036236+0.338358I$	$1.51083+0.54816I$	$4.17228+0.02806I$
$u=-0.323867+0.554108I$ $a=1.255609+0.358556I$ $b=-0.036236-0.338358I$	$1.51083-0.54816I$	$4.17228-0.02806I$
$u=-0.214571-0.335318I$ $a=-0.98008-1.30525I$ $b=-0.028616-1.106622I$	$0.55675-4.59934I$	$0.60868+5.05608I$
$u=-0.214571+0.335318I$ $a=-0.98008+1.30525I$ $b=-0.028616+1.106622I$	$0.55675+4.59934I$	$0.60868-5.05608I$
$u=-0.028577-1.235938I$ $a=-0.376144+0.962658I$ $b=0.40624-1.67377I$	$4.19769+8.53710I$	$3.40888-6.84759I$
$u=-0.028577+1.235938I$ $a=-0.376144-0.962658I$ $b=0.40624+1.67377I$	$4.19769-8.53710I$	$3.40888+6.84759I$
$u=0.041257-0.871716I$ $a=0.21775+1.51351I$ $b=0.343258-1.370133I$	$7.33272-2.80822I$	$7.40390+2.13041I$
$u=0.041257+0.871716I$ $a=0.21775-1.51351I$ $b=0.343258+1.370133I$	$7.33272+2.80822I$	$7.40390-2.13041I$
$u=0.564624-0.090051I$ $a=0.582825+0.203193I$ $b=-0.596385+0.659961I$	$-1.40575+0.47751I$	$-6.55789+0.10542I$
$u=0.564624+0.090051I$ $a=0.582825-0.203193I$ $b=-0.596385-0.659961I$	$-1.40575-0.47751I$	$-6.55789-0.10542I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.642562 - 0.631264I$ $a = 1.40141 + 0.62780I$ $b = -0.146351 - 0.816816I$	$2.38978 - 1.27522I$	$4.09310 + 0.20483I$
$u = 0.642562 + 0.631264I$ $a = 1.40141 - 0.62780I$ $b = -0.146351 + 0.816816I$	$2.38978 + 1.27522I$	$4.09310 - 0.20483I$
$u = 0.854849 - 0.466219I$ $a = -0.56785 - 1.45238I$ $b = -0.53932 + 1.32606I$	$1.80411 + 5.64123I$	$3.83961 - 6.95453I$
$u = 0.854849 + 0.466219I$ $a = -0.56785 + 1.45238I$ $b = -0.53932 - 1.32606I$	$1.80411 - 5.64123I$	$3.83961 + 6.95453I$
$u = 0.888111 - 0.075986I$ $a = 0.641174 - 0.362087I$ $b = -0.077175 + 0.876614I$	$-1.51083 + 0.54816I$	$-4.17228 + 0.02806I$
$u = 0.888111 + 0.075986I$ $a = 0.641174 + 0.362087I$ $b = -0.077175 - 0.876614I$	$-1.51083 - 0.54816I$	$-4.17228 - 0.02806I$
$u = 1.019308 - 0.096828I$ $a = -1.158464 - 0.460824I$ $b = -1.61489 + 0.94291I$	$-2.38978 + 1.27522I$	$-4.09310 - 0.20483I$
$u = 1.019308 + 0.096828I$ $a = -1.158464 + 0.460824I$ $b = -1.61489 - 0.94291I$	$-2.38978 - 1.27522I$	$-4.09310 + 0.20483I$
$u = 1.227965 - 0.337683I$ $a = -0.516520 + 1.006182I$ $b = 0.0379439 - 0.0548756I$	$-3.40248 + 7.65130I$	$-2.71104 - 6.44427I$
$u = 1.227965 + 0.337683I$ $a = -0.516520 - 1.006182I$ $b = 0.0379439 + 0.0548756I$	$-3.40248 - 7.65130I$	$-2.71104 + 6.44427I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.24933 - 1.35541I$ $a = -0.366147 - 0.283975I$ $b = -0.53476 + 1.78675I$	$-0.417476 - 0.732604I$	$-0.8254 - 18.1961I$
$u = 1.24933 + 1.35541I$ $a = -0.366147 + 0.283975I$ $b = -0.53476 - 1.78675I$	$-0.417476 + 0.732604I$	$-0.8254 + 18.1961I$
$u = 1.302116 - 0.458640I$ $a = -0.695713 - 0.557881I$ $b = -0.27015 + 1.70315I$	$3.40248 + 7.65130I$	$2.71104 - 6.44427I$
$u = 1.302116 + 0.458640I$ $a = -0.695713 + 0.557881I$ $b = -0.27015 - 1.70315I$	$3.40248 - 7.65130I$	$2.71104 + 6.44427I$
$u = 1.336407 - 0.013592I$ $a = 0.322376 + 0.495925I$ $b = -0.490315 - 0.307215I$	$-3.64950 - 0.92732I$	$-3.47502 + 0.40612I$
$u = 1.336407 + 0.013592I$ $a = 0.322376 - 0.495925I$ $b = -0.490315 + 0.307215I$	$-3.64950 + 0.92732I$	$-3.47502 - 0.40612I$
$u = 1.38494 - 0.63464I$ $a = 0.582030 + 0.696909I$ $b = 1.35305 - 1.50450I$	$-4.19769 + 8.53710I$	$-3.40888 - 6.84759I$
$u = 1.38494 + 0.63464I$ $a = 0.582030 - 0.696909I$ $b = 1.35305 + 1.50450I$	$-4.19769 - 8.53710I$	$-3.40888 + 6.84759I$

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_9	$(u^6 + 2u^5 + \cdots + 2u + 1)(u^{48} + u^{47} + \cdots - 3u - 1)$
c_2, c_8	$(u^6 - u^4 + u^3 - u^2 + 1)(u^{48} + u^{47} + \cdots + 27u + 9)$
c_3	$(u^6 + 3u^5 + \cdots - 4u - 1)(u^{48} + 2u^{47} + \cdots + 11u + 1)$
c_4, c_7	$(u^6 - u^4 - u^3 - u^2 + 1)(u^{48} + u^{47} + \cdots + 27u + 9)$
c_5, c_6	$(u^6 - 2u^5 + \cdots - 2u + 1)(u^{48} + u^{47} + \cdots - 3u - 1)$
c_{10}	$(u^6 - 3u^5 + \cdots + 4u - 1)(u^{48} + 2u^{47} + \cdots + 11u + 1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_5, c_6 c_9	$(y^6 - 6y^5 + \cdots - 6y + 1)(y^{48} - 29y^{47} + \cdots - 45y + 1)$
c_2, c_4, c_7 c_8	$(y^6 - 2y^5 + \cdots - 2y + 1)(y^{48} - 29y^{47} + \cdots - 1053y + 81)$
c_3, c_{10}	$(y^6 - 3y^5 + \cdots - 8y + 1)(y^{48} - 6y^{47} + \cdots - 23y + 1)$