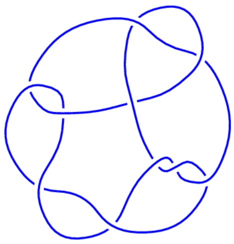
10_{77} $(K10a_{18})$



[1]

Arc Sequences

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

Solving Sequence

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

Representation Ideals

$$I = \bigcap_{i=1}^{3} I_i^u$$

$$\begin{aligned}
I_1^u &= \langle u-1,\ b+1,\ a-1\rangle \\
I_2^u &= \langle u^9-6u^8+15u^7-17u^6+3u^5+12u^4-9u^3-u^2+2u-1,\ u^7-5u^6+10u^5-8u^4-u^3+5u^2+a-u-1, \\
&\quad -u^8+5u^7-10u^6+8u^5+u^4-5u^3+u^2+b+u\rangle \\
I_3^u &= \langle u^{23}-12u^{22}+\cdots+7u-1,\ 9375u^{22}-108217u^{21}+\cdots+5969b+14071, \\
&\quad -12427u^{22}+145111u^{21}+\cdots+11938a-55091\rangle
\end{aligned}$$

There are 3 irreducible components with 33 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. $I_1^u = \langle u-1,\ b+1,\ a-1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \quad 1.00000$		
$a = \quad 1.00000$	0	0
$b = -1.00000$		

II. $I_2^u = \langle u^9 - 6u^8 + \cdots + 2u - 1,\ u^7 - 5u^6 + 10u^5 - 8u^4 - u^3 + 5u^2 + a - u - 1,\ -u^8 + 5u^7 + \cdots + b + u\rangle$

(i) Arc colorings

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -u^7 + 5u^6 - 10u^5 + 8u^4 + u^3 - 5u^2 + u + 1 \\ u^8 - 5u^7 + 10u^6 - 8u^5 - u^4 + 5u^3 - u^2 - u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^8 - 6u^7 + 15u^6 - 18u^5 + 7u^4 + 6u^3 - 6u^2 + 1 \\ u^8 - 5u^7 + 10u^6 - 8u^5 - u^4 + 5u^3 - u^2 - u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -u^7 + 5u^6 - 10u^5 + 8u^4 + u^3 - 5u^2 + u + 1 \\ u^8 - 5u^7 + 10u^6 - 8u^5 - u^4 + 5u^3 - u^2 - u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u + 2 \\ -u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^6 + 4u^5 - 7u^4 + 6u^3 - 2u^2 - 2u + 3 \\ u^8 - 4u^7 + 6u^6 - 2u^5 - 4u^4 + 4u^3 - 2u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -u^4 + 4u^3 - 5u^2 + 3 \\ -u^4 + 2u^3 - 2u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u^6 - 16u^5 + 24u^4 - 8u^3 - 12u^2 + 8u + 6$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.639060 - 0.117940I$ $a = 0.113036 + 1.235328I$ $b = -0.073457 + 0.802780I$	$-3.02413 - 2.82812I$	$2.49024 + 2.97945I$
$u = -0.639060 + 0.117940I$ $a = 0.113036 - 1.235328I$ $b = -0.073457 - 0.802780I$	$-3.02413 + 2.82812I$	$2.49024 - 2.97945I$
$u = 0.265002 - 0.388164I$ $a = 1.28983 + 0.68118I$ $b = -0.606217 + 0.320153I$	1.11345	9.01951
$u = 0.265002 + 0.388164I$ $a = 1.28983 - 0.68118I$ $b = -0.606217 - 0.320153I$	1.11345	9.01951
$u = 1.20097 - 1.03313I$ $a = 0.744906 + 0.276315I$ $b = -1.180077 + 0.437737I$	$-3.02413 + 2.82812I$	$2.49024 - 2.97945I$
$u = 1.20097 + 1.03313I$ $a = 0.744906 - 0.276315I$ $b = -1.180077 - 0.437737I$	$-3.02413 - 2.82812I$	$2.49024 + 2.97945I$
$u = 1.43809 - 0.91519I$ $a = -0.735381 - 0.214151I$ $b = 1.253534 - 0.365043I$	$-3.02413 - 2.82812I$	$2.49024 + 2.97945I$
$u = 1.43809 + 0.91519I$ $a = -0.735381 + 0.214151I$ $b = 1.253534 + 0.365043I$	$-3.02413 + 2.82812I$	$2.49024 - 2.97945I$
$u = 1.47000$ $a = -0.824787$ $b = 1.21243$	1.11345	9.01951

III. $\boldsymbol{I^u_3 = \langle u^{23} - 12u^{22} + \cdots + 7u - 1,\ 9375u^{22} - 108217u^{21} + \cdots + 5969b + 14071,\ -1.24 \times 10^4u^{22} + 1.45 \times 10^5u^{21} + \cdots + 1.19 \times 10^4a - 5.51 \times 10^4\rangle}$

(i) Arc colorings

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

$$a_{10} = \begin{pmatrix} 1.04096u^{22} - 12.1554u^{21} + \cdots - 4.58201u + 4.61476 \\ -1.57061u^{22} + 18.1298u^{21} + \cdots + 12.3408u - 2.35735 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 0.836153u^{22} - 9.37846u^{21} + \cdots + 1.32803u + 2.54096 \\ -1.56215u^{22} + 18.4945u^{21} + \cdots + 14.3248u - 2.23446 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0.590384u^{22} - 7.44614u^{21} + \cdots - 12.1799u + 3.85240 \\ 0.172307u^{22} - 2.25691u^{21} + \cdots - 1.34394u - 0.418077 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0.418077u^{22} - 5.18923u^{21} + \cdots - 10.8360u + 4.27048 \\ 0.172307u^{22} - 2.25691u^{21} + \cdots - 1.34394u - 0.418077 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1.65539u^{22} - 19.4862u^{21} + \cdots - 11.3121u + 5.83615 \\ -0.906768u^{22} + 11.0083u^{21} + \cdots + 12.0127u - 2.39831 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} 1.71595u^{22} - 19.9552u^{21} + \cdots - 15.9211u + 7.69601 \\ -1.17524u^{22} + 13.8038u^{21} + \cdots + 10.5574u - 2.45619 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 2.93600u^{22} - 33.9760u^{21} + \cdots - 23.7410u + 9.51600 \\ -1.19610u^{22} + 14.6375u^{21} + \cdots + 13.6758u - 3.07598 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= \frac{37028}{5969}u^{22} - \frac{413378}{5969}u^{21} + \cdots - \frac{191046}{5969}u + \frac{92216}{5969}$

(iv) Complex Volumes and Cusp Shapes

Solution to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.724852 - 0.256047I$ $a = 1.46390 - 1.00680I$ $b = 0.265783 - 1.134045I$	$1.33811 - 7.00485I$	$7.04339 + 5.13787I$
$u = -0.724852 + 0.256047I$ $a = 1.46390 + 1.00680I$ $b = 0.265783 + 1.134045I$	$1.33811 + 7.00485I$	$7.04339 - 5.13787I$
$u = -0.517401 - 0.075244I$ $a = -2.18707 + 0.96872I$ $b = -0.409400 + 0.905706I$	$0.429871 - 1.292378I$	$5.93678 + 0.45977I$
$u = -0.517401 + 0.075244I$ $a = -2.18707 - 0.96872I$ $b = -0.409400 - 0.905706I$	$0.429871 + 1.292378I$	$5.93678 - 0.45977I$
$u = -0.169134 - 0.760322I$ $a = 0.27717 - 1.73915I$ $b = 0.76382 - 1.77584I$	$6.97398 - 1.20490I$	$11.80214 + 0.58796I$
$u = -0.169134 + 0.760322I$ $a = 0.27717 + 1.73915I$ $b = 0.76382 + 1.77584I$	$6.97398 + 1.20490I$	$11.80214 - 0.58796I$
$u = 0.199940$ $a = 3.49308$ $b = -0.600331$	1.01631	10.3718
$u = 0.431420 - 0.662786I$ $a = 0.79226 + 1.38758I$ $b = -1.52923 + 2.58060I$	$2.49785 + 1.83570I$	$6.37573 - 3.60335I$
$u = 0.431420 + 0.662786I$ $a = 0.79226 - 1.38758I$ $b = -1.52923 - 2.58060I$	$2.49785 - 1.83570I$	$6.37573 + 3.60335I$
$u = 0.529906 - 1.130869I$ $a = -0.346261 - 1.056189I$ $b = 0.68241 - 2.74013I$	$5.85182 + 6.12354I$	$9.22962 - 6.59776I$

Solution to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.529906 + 1.130869I$ $a = -0.346261 + 1.056189I$ $b = 0.68241 + 2.74013I$	$5.85182 - 6.12354I$	$9.22962 + 6.59776I$
$u = 0.595376 - 0.789505I$ $a = -0.236651 + 0.660824I$ $b = -0.284932 + 0.304128I$	$0.26922 + 3.59706I$	$4.75645 - 7.79597I$
$u = 0.595376 + 0.789505I$ $a = -0.236651 - 0.660824I$ $b = -0.284932 - 0.304128I$	$0.26922 - 3.59706I$	$4.75645 + 7.79597I$
$u = 0.864881 - 0.315143I$ $a = -0.051470 - 0.334706I$ $b = 0.714844 - 0.282502I$	$-1.67067 + 0.60932I$	$-3.84266 - 0.84402I$
$u = 0.864881 + 0.315143I$ $a = -0.051470 + 0.334706I$ $b = 0.714844 + 0.282502I$	$-1.67067 - 0.60932I$	$-3.84266 + 0.84402I$
$u = 1.17508 - 1.11119I$ $a = 0.421192 + 0.709925I$ $b = -0.18568 + 3.19242I$	$-2.78844 + 5.69706I$	$2.62032 - 4.06061I$
$u = 1.17508 + 1.11119I$ $a = 0.421192 - 0.709925I$ $b = -0.18568 - 3.19242I$	$-2.78844 - 5.69706I$	$2.62032 + 4.06061I$
$u = 1.19423 - 1.28438I$ $a = -0.356000 - 0.711972I$ $b = 0.16442 - 3.05178I$	$-1.85559 + 12.07471I$	$3.82521 - 8.06520I$
$u = 1.19423 + 1.28438I$ $a = -0.356000 + 0.711972I$ $b = 0.16442 + 3.05178I$	$-1.85559 - 12.07471I$	$3.82521 + 8.06520I$
$u = 1.21632 - 1.17599I$ $a = -0.319423 + 0.411130I$ $b = -0.111007 + 0.809298I$	$-6.35503 + 7.52364I$	$-0.34364 - 6.02284I$

Solution to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.21632 + 1.17599I$ $a = -0.319423 - 0.411130I$ $b = -0.111007 - 0.809298I$	$-6.35503 - 7.52364I$	$-0.34364 + 6.02284I$
$u = 1.30420 - 1.02033I$ $a = 0.295814 - 0.396904I$ $b = 0.229133 - 0.874444I$	$-6.84422 + 1.43226I$	$-1.58922 - 0.72835I$
$u = 1.30420 + 1.02033I$ $a = 0.295814 + 0.396904I$ $b = 0.229133 + 0.874444I$	$-6.84422 - 1.43226I$	$-1.58922 + 0.72835I$

IV. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u-1)(u^9-3u^7-u^6+3u^5+2u^4+u^3-u^2-2u-1)$ $(u^{23}+2u^{22}+\cdots+3u+1)$
c_2, c_8	$(u)(u^3+u^2-1)^3(u^{23}-2u^{22}+\cdots+2u-2)$
c_3	$(u-1)(u^9+6u^8+15u^7+17u^6+3u^5-12u^4-9u^3+u^2+2u+1)$ $(u^{23}+12u^{22}+\cdots+7u+1)$
c_4	$(u+1)(u^9-3u^7-u^6+3u^5+2u^4+u^3-u^2-2u-1)$ $(u^{23}+2u^{22}+\cdots+3u+1)$
c_5, c_6	$(u+1)(u^9-3u^7+u^6+3u^5-2u^4+u^3+u^2-2u+1)$ $(u^{23}+2u^{22}+\cdots-u-1)$
c_7, c_9	$(u)(1+2u+u^2+u^3)^3(u^{23}+6u^{22}+\cdots+8u+4)$
c_{10}	$(u-1)(u^9-3u^7+u^6+3u^5-2u^4+u^3+u^2-2u+1)$ $(u^{23}+2u^{22}+\cdots-u-1)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_4	$(y-1)(y^9-6y^8+15y^7-17y^6+3y^5+12y^4-9y^3-y^2+2y-1)$ $(y^{23}-12y^{22}+\cdots+7y-1)$
c_2	$1y(1y^3-y^2+2.00000y-1.00000)^3$ $(1y^{23}-6.00000y^{22}+\cdots+8.0000y-4.00000)$
c_3	$(y-1)$ $(y^9-6y^8+27y^7-73y^6+139y^5-184y^4+83y^3-13y^2+2y-1)$ $(y^{23}+32y^{21}+\cdots+31y-1)$
c_5	$(y-1)(y^9-6y^8+15y^7-17y^6+3y^5+12y^4-9y^3-y^2+2y-1)$ $(y^{23}-20y^{22}+\cdots-9y-1)$
c_6	$+1.00000(1y-1.00000)$ $(1y^9-6.0000y^8+\cdots+2.00000y-1.00000)$ $(1y^{23}-20.0000y^{22}+\cdots-9.0000y-1.00000)$
c_7, c_9	$(y)(-1+2y+3y^2+y^3)^3(y^{23}+18y^{22}+\cdots-8y-16)$
c_8	$(y)(-1+2y-y^2+y^3)^3(y^{23}-6y^{22}+\cdots+8y-4)$
c_{10}	$+1.00000(1y-1.000000)$ $(1y^9-6.00000y^8+\cdots+2.00000y-1.000000)$ $(1y^{23}-20.0000y^{22}+\cdots-9.00000y-1.000000)$