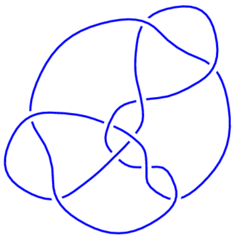
10_{156} $(K10n_{32})$



[1]

Arc Sequences

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

7 5 8 10 8 1 4 5 3 2

Solving Sequence

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

Representation Ideals

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

$$\begin{aligned}
I_1^u = \langle & u^{12} + 3u^{11} + 4u^{10} + 5u^9 - 2u^8 + 7u^7 + 19u^6 - 3u^5 + 12u^4 + 12u^3 + 10u + 11, \\
& 358u^{11} - 1274u^{10} + \cdots + 57905b - 4904, \\
& - 140508u^{11} - 870808u^{10} + \cdots + 10828235a - 10200130\rangle \\
I_2^u = \langle & u^5 - 2u^3 + 3u^2 - 2u + 1,\ u^4 - 3u^2 + a + 2u,\ -u^4 + 3u^2 + b - 2u + 1\rangle \\
I_3^u = \langle & u^{10} + 2u^9 + 6u^8 + 7u^7 + 21u^6 + 22u^5 + 34u^4 + 17u^3 + 13u^2 + u + 1, \\
& - 53u^9 - 119u^8 - 292u^7 - 328u^6 - 926u^5 - 1062u^4 - 1154u^3 - 110u^2 + 225a + 201u + 493, \\
& 53u^9 + 119u^8 + 292u^7 + 328u^6 + 926u^5 + 1062u^4 + 1154u^3 + 110u^2 + 225b - 201u - 268\rangle
\end{aligned}$$

There are 3 irreducible components with 27 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. $\boldsymbol{I_1^u = \langle u^{12} + 3u^{11} + \cdots + 10u + 11,\ 358u^{11} - 1274u^{10} + \cdots + 57905b - 4904,\ -1.41 \times 10^5 u^{11} - 8.71 \times 10^5 u^{10} + \cdots + 1.08 \times 10^7 a - 1.02 \times 10^7 \rangle}$

(i) Arc colorings

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

$$a_7 = \begin{pmatrix} 0.0129761u^{11} + 0.0804201u^{10} + \cdots + 0.219219u + 0.941994 \\ -0.00618254u^{11} + 0.0220016u^{10} + \cdots - 0.370210u + 0.0846904 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} 0.0129761u^{11} + 0.0804201u^{10} + \cdots + 0.219219u + 0.941994 \\ -0.0839692u^{11} - 0.240256u^{10} + \cdots + 0.187446u + 0.541101 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.0243656u^{11} - 0.0950617u^{10} + \cdots + 0.655784u + 0.482490 \\ 0.0672135u^{11} + 0.159693u^{10} + \cdots - 0.558501u + 0.227891 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -0.0100016u^{11} - 0.144111u^{10} + \cdots - 0.373939u - 0.0138264 \\ -0.00320809u^{11} - 0.0416890u^{10} + \cdots - 0.524930u - 0.987142 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 0.00116889u^{11} + 0.00671476u^{10} + \cdots - 0.569594u + 0.536619 \\ 0.0610310u^{11} + 0.181694u^{10} + \cdots - 0.928711u + 1.31258 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.0428480u^{11} + 0.0646309u^{10} + \cdots + 0.0972831u + 0.710381 \\ 0.0672135u^{11} + 0.159693u^{10} + \cdots - 0.558501u + 0.227891 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0.0592845u^{11} + 0.206820u^{10} + \cdots - 0.946361u - 0.290927 \\ -0.00320809u^{11} - 0.0416890u^{10} + \cdots - 0.524930u + 0.0128578 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.0674429u^{11} + 0.00229844u^{10} + \cdots + 0.633027u + 0.0160250 \\ -0.126446u^{11} - 0.278249u^{10} + \cdots + 1.18712u + 0.939466 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{1432}{57905}u^{11} + \frac{5096}{57905}u^{10} + \frac{2256}{57905}u^9 - \frac{34896}{57905}u^8 - \frac{55008}{57905}u^7 - \frac{161656}{57905}u^6 + \frac{68516}{57905}u^5 + \frac{99424}{57905}u^4 - \frac{257532}{57905}u^3 + \frac{90136}{57905}u^2 - \frac{85748}{57905}u + \frac{135426}{57905}$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -2.28602$ $a = 0.109456$ $b = -0.754878$	2.83439	-1.01951
$u = -1.47545$ $a = -0.794497$ $b = -0.754878$	2.83439	-1.01951
$u = -0.729624 - 0.294565I$ $a = 0.533817 - 0.434611I$ $b = 0.877439 + 0.744862I$	$-0.92371 - 2.82812I$	$5.50976 + 2.97945I$
$u = -0.729624 + 0.294565I$ $a = 0.533817 + 0.434611I$ $b = 0.877439 - 0.744862I$	$-0.92371 + 2.82812I$	$5.50976 - 2.97945I$
$u = -0.62468 - 1.86786I$ $a = -0.403492 - 0.628311I$ $b = 0.877439 + 0.744862I$	$6.97197 - 2.82812I$	$5.50976 + 2.97945I$
$u = -0.62468 + 1.86786I$ $a = -0.403492 + 0.628311I$ $b = 0.877439 - 0.744862I$	$6.97197 + 2.82812I$	$5.50976 - 2.97945I$
$u = 0.078364 - 0.958073I$ $a = 1.11218 + 1.23414I$ $b = 0.877439 - 0.744862I$	$6.97197 + 2.82812I$	$5.50976 - 2.97945I$
$u = 0.078364 + 0.958073I$ $a = 1.11218 - 1.23414I$ $b = 0.877439 + 0.744862I$	$6.97197 - 2.82812I$	$5.50976 + 2.97945I$
$u = 0.718377 - 0.787894I$ $a = 0.846985 - 0.995749I$ $b = -0.754878$	-5.06130	-1.01951
$u = 0.718377 + 0.787894I$ $a = 0.846985 + 0.995749I$ $b = -0.754878$	-5.06130	-1.01951

Solution to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.938298 - 0.642073I$ $a = -0.201517 + 0.893456I$ $b = 0.877439 - 0.744862I$	$-0.92371 + 2.82812I$	$5.50976 - 2.97945I$
$u = 0.938298 + 0.642073I$ $a = -0.201517 - 0.893456I$ $b = 0.877439 + 0.744862I$	$-0.92371 - 2.82812I$	$5.50976 + 2.97945I$

II. $I_2^u = \langle u^5 - 2u^3 + 3u^2 - 2u + 1,\ u^4 - 3u^2 + a + 2u,\ -u^4 + 3u^2 + b - 2u + 1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 7u^4 + 4u^3 - 9u^2 + 14u - 6$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -2.02298$ $a = -0.424848$ $b = -0.575152$	3.55538	12.9676
$u = 0.193660 - 0.705367I$ $a = -1.90443 + 0.33976I$ $b = 0.904429 - 0.339760I$	$-4.86920 + 1.42206I$	$0.68335 - 4.57040I$
$u = 0.193660 + 0.705367I$ $a = -1.90443 - 0.33976I$ $b = 0.904429 + 0.339760I$	$-4.86920 - 1.42206I$	$0.68335 + 4.57040I$
$u = 0.817831 - 0.505011I$ $a = 0.116853 - 0.784420I$ $b = -1.116853 + 0.784420I$	$-1.84330 + 3.45949I$	$-2.16713 - 7.95950I$
$u = 0.817831 + 0.505011I$ $a = 0.116853 + 0.784420I$ $b = -1.116853 - 0.784420I$	$-1.84330 - 3.45949I$	$-2.16713 + 7.95950I$

III. $I_3^u = \langle u^{10} + 2u^9 + \cdots + u + 1,\ -53u^9 - 119u^8 + \cdots + 225a + 493,\ 53u^9 + 119u^8 + \cdots + 225b - 268\rangle$

(i) Arc colorings

$$a_4 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 0.235556u^9 + 0.528889u^8 + \cdots - 0.893333u - 2.19111 \\ -0.235556u^9 - 0.528889u^8 + \cdots + 0.893333u + 1.19111 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0.235556u^9 + 0.528889u^8 + \cdots - 0.893333u - 2.19111 \\ -0.00444444u^9 + 0.00888889u^8 + \cdots + 1.18667u + 1.24889 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -0.0977778u^9 + 0.128889u^8 + \cdots + 4.57333u + 4.40889 \\ -0.137778u^9 - 0.657778u^8 + \cdots - 3.68000u - 2.21778 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -0.266667u^9 - 0.733333u^8 + \cdots - 5.93333u - 0.333333 \\ 0.457778u^9 + 0.617778u^8 + \cdots + 4.04000u - 0.102222 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0.368889u^9 + 1.39556u^8 + \cdots + 10.5733u + 3.47556 \\ -0.466667u^9 - 1.26667u^8 + \cdots - 6u - 1.06667 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -0.235556u^9 - 0.528889u^8 + \cdots + 0.893333u + 2.19111 \\ -0.137778u^9 - 0.657778u^8 + \cdots - 3.68000u - 2.21778 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} \frac{4}{15}u^9 + \frac{11}{15}u^8 + \cdots + \frac{89}{15}u + \frac{1}{3} \\ -0.657778u^9 - 1.15111u^8 + \cdots - 3.10667u + 0.368889 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} \frac{6}{5}u^9 + \frac{7}{3}u^8 + \cdots + \frac{82}{15}u - \frac{37}{15} \\ 0.0488889u^9 - 0.0977778u^8 + \cdots - 0.0533333u + 2.26222 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= \frac{122}{75}u^9 + \frac{136}{75}u^8 + \frac{553}{75}u^7 + \frac{287}{75}u^6 + \frac{1994}{75}u^5 + \frac{668}{75}u^4 + \frac{807}{25}u^3 - \frac{38}{5}u^2 + \frac{541}{75}u - \frac{152}{75}$

(iv) Complex Volumes and Cusp Shapes

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.20055 - 1.54735I$ $a = \ \ 0.143866 + 0.796701I$ $b = -1.143866 - 0.796701I$	$6.19490 - 11.16339I$	$4.37125 + 6.32339I$
$u = -1.20055 + 1.54735I$ $a = \ \ 0.143866 - 0.796701I$ $b = -1.143866 + 0.796701I$	$6.19490 + 11.16339I$	$4.37125 - 6.32339I$
$u = -0.443805 - 1.105327I$ $a = -0.359398 - 1.080444I$ $b = -0.640602 + 1.080444I$	$7.82103 - 4.41044I$	$6.40190 + 3.03613I$
$u = -0.443805 + 1.105327I$ $a = -0.359398 + 1.080444I$ $b = -0.640602 - 1.080444I$	$7.82103 + 4.41044I$	$6.40190 - 3.03613I$
$u = -0.282508 - 0.750438I$ $a = -0.624833 + 0.605238I$ $b = -0.375167 - 0.605238I$	$1.185417 + 0.648518I$	$7.38806 - 2.73057I$
$u = -0.282508 + 0.750438I$ $a = -0.624833 - 0.605238I$ $b = -0.375167 + 0.605238I$	$1.185417 - 0.648518I$	$7.38806 + 2.73057I$
$u = \ \ 0.025281 - 0.303928I$ $a = -2.25258 + 0.40809I$ $b = \ \ 1.252581 - 0.408094I$	$-1.96302 + 2.37863I$	$-1.27520 - 1.22709I$
$u = \ \ 0.025281 + 0.303928I$ $a = -2.25258 - 0.40809I$ $b = \ \ 1.252581 + 0.408094I$	$-1.96302 - 2.37863I$	$-1.27520 + 1.22709I$
$u = \ \ 0.90158 - 1.50334I$ $a = \ \ 0.092946 - 0.536743I$ $b = -1.092946 + 0.536743I$	$-0.90131 + 5.21099I$	$4.11400 - 8.12783I$
$u = \ \ 0.90158 + 1.50334I$ $a = \ \ 0.092946 + 0.536743I$ $b = -1.092946 - 0.536743I$	$-0.90131 - 5.21099I$	$4.11400 + 8.12783I$

IV. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u^3-u^2+1)^4(u^5+u^4-u^3-2u^2+u+1)$ $(u^{10}+4u^9+6u^8-12u^6-15u^5+u^4+21u^3+25u^2+14u+4)$
c_2	$(u^2+u-1)^6(u^5+u^4-2u^3-u^2+u+1)$ $(u^{10}-6u^9+14u^8-18u^7+22u^6-31u^5+26u^4-7u^3+4u^2-12u+8)$
c_3	$(u^5+2u^3+u^2+1)(u^{10}-u^7+5u^6+u^3+u^2+u+1)$ $(u^{12}+u^{11}+2u^{10}+3u^9+6u^8+3u^7+9u^6+5u^5-2u^4-8u^2+6u-1)$
c_4, c_7	$(u^5+2u^3-u^2-1)(u^{10}-u^7+5u^6+u^3+u^2+u+1)$ $(u^{12}+u^{11}+2u^{10}+3u^9+6u^8+3u^7+9u^6+5u^5-2u^4-8u^2+6u-1)$
c_5, c_9	$(u^5+u^3+2u^2+1)$ $(u^{10}+2u^9-7u^8-18u^7+9u^6+46u^5+25u^4-13u^3-10u^2+u+1)$ $(u^{12}+u^{11}+\cdots-46u-19)$
c_6	$(u^3-u^2+1)^4(u^5-u^4-u^3+2u^2+u-1)$ $(u^{10}+4u^9+6u^8-12u^6-15u^5+u^4+21u^3+25u^2+14u+4)$
c_8	$(u^5+u^3-2u^2-1)$ $(u^{10}+2u^9-7u^8-18u^7+9u^6+46u^5+25u^4-13u^3-10u^2+u+1)$ $(u^{12}+u^{11}+\cdots-46u-19)$
c_{10}	$(u^3+u^2+2u+1)^4(u^5-3u^4+7u^3-8u^2+5u-1)$ $(u^{10}+4u^9+\cdots-4u+16)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_6	$(y^3 - y^2 + 2y - 1)^4(y^5 - 3y^4 + 7y^3 - 8y^2 + 5y - 1)$ $(y^{10} - 4y^9 + \cdots + 4y + 16)$
c_2	$(y^2 - 3y + 1)^6(y^5 - 5y^4 + 8y^3 - 7y^2 + 3y - 1)$ $(y^{10} - 8y^9 + \cdots - 80y + 64)$
c_3, c_4, c_7	$(y^5 + 4y^4 + 4y^3 - y^2 - 2y - 1)$ $(y^{10} + 10y^8 - y^7 + 27y^6 + 4y^5 + 12y^4 + 9y^3 - y^2 + y + 1)$ $(y^{12} + 3y^{11} + \cdots - 20y + 1)$
c_5, c_8, c_9	$(y^5 + 2y^4 + \cdots - 4y - 1)(y^{10} - 18y^9 + \cdots - 21y + 1)$ $(y^{12} - 9y^{11} + \cdots + 240y + 361)$
c_{10}	$(y^3 + 3y^2 + 2y - 1)^4(y^5 + 5y^4 + 11y^3 + 9y - 1)$ $(y^{10} + 8y^9 + \cdots + 1424y + 256)$