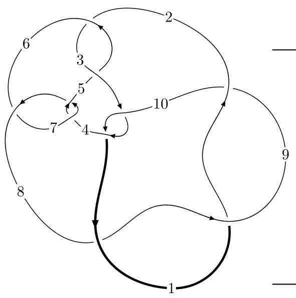
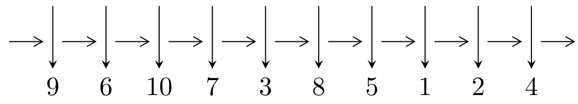
10_{80} $(K10a_8)$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

Ideals for irreducible components[2] of $X_{\mathbf{par}}$

$$\begin{aligned}
I_1^u = \langle & 1794841722415u^{39} + 5490595544415u^{38} + \cdots + 1305995790962b + 2649665691745, \\
& -1190941729941u^{39} - 4615935344485u^{38} + \cdots + 1305995790962a - 3386435539405, \\
& u^{40} + 4u^{39} + \cdots - 2u + 1\rangle \\
I_2^u = \langle & b,\ u^2 + a + 2u + 1,\ u^3 + u^2 - 1\rangle \\
I_3^u = \langle & b - a - 1,\ a^2 + a - 1,\ u - 1\rangle
\end{aligned}$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 45 representations.

[1] The image of knot diagram is generated by the software "**Draw programme**" developed by Andrew Bartholomew(`http://www.layer8.co.uk/maths/draw/index.htm#Running-draw`), where we modified some parts for our purpose(`https://github.com/CATsTAILs/LinksPainter`).

[2] All coefficients of polynomials are rational numbers. But the coefficients are sometimes approximated in decimal forms when there is not enough margin.

I.

$\boldsymbol{I_1^u = \langle 1.79\times10^{12}u^{39}+5.49\times10^{12}u^{38}+\cdots+1.31\times10^{12}b+2.65\times10^{12},\ -1.19\times10^{12}u^{39}-4.62\times10^{12}u^{38}+\cdots+1.31\times10^{12}a-3.39\times10^{12},\ u^{40}+4u^{39}+\cdots-2u+1\rangle}$

(i) Arc colorings

$$a_4 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_7 = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_5 = \begin{pmatrix}1\\u^2\end{pmatrix}$$
$$a_1 = \begin{pmatrix}0.911903u^{39}+3.53442u^{38}+\cdots+4.75622u+2.59299\\-1.37431u^{39}-4.20414u^{38}+\cdots+3.79441u-2.02885\end{pmatrix}$$
$$a_8 = \begin{pmatrix}-u\\-u^3+u\end{pmatrix}$$
$$a_9 = \begin{pmatrix}-2.36296u^{39}-8.30641u^{38}+\cdots+1.11511u-2.81278\\0.625691u^{39}+1.79586u^{38}+\cdots-1.20559u+0.971153\end{pmatrix}$$
$$a_6 = \begin{pmatrix}u^3\\u^5-u^3+u\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}-0.462406u^{39}-0.669727u^{38}+\cdots+8.55064u+0.564144\\-1.37431u^{39}-4.20414u^{38}+\cdots+3.79441u-2.02885\end{pmatrix}$$
$$a_3 = \begin{pmatrix}-0.481242u^{39}-1.19932u^{38}+\cdots+3.81151u+1.61679\\-1.34743u^{39}-3.78400u^{38}+\cdots+3.42400u-1.70725\end{pmatrix}$$
$$a_2 = \begin{pmatrix}-2.58732u^{39}-8.51193u^{38}+\cdots+10.6671u-0.875683\\-0.625691u^{39}-1.79586u^{38}+\cdots+1.20559u-0.971153\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= -\frac{1683630050026}{652997895481}u^{39}-\frac{6742803896956}{652997895481}u^{38}+\cdots-\frac{5009068136946}{652997895481}u-\frac{5965220685850}{652997895481}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_8, c_9	$u^{40} - 5u^{39} + \cdots + 6u + 1$
c_2, c_5	$u^{40} - 2u^{39} + \cdots + 4u - 4$
c_3, c_{10}	$u^{40} + 2u^{39} + \cdots - 28u - 8$
c_4, c_7	$u^{40} - 4u^{39} + \cdots + 2u + 1$
c_6	$u^{40} + 20u^{39} + \cdots + 38u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_8, c_9	$y^{40} - 39y^{39} + \cdots + 24y + 1$
c_2, c_5	$y^{40} + 18y^{39} + \cdots - 104y + 16$
c_3, c_{10}	$y^{40} - 24y^{39} + \cdots - 1360y + 64$
c_4, c_7	$y^{40} - 20y^{39} + \cdots - 38y + 1$
c_6	$y^{40} + 4y^{39} + \cdots - 918y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.272416 + 0.968858I$ $a = 0.945891 + 0.854682I$ $b = -1.224160 - 0.640097I$	$-3.73330 - 7.68923I$	$-11.60024 + 4.76581I$
$u = -0.272416 - 0.968858I$ $a = 0.945891 - 0.854682I$ $b = -1.224160 + 0.640097I$	$-3.73330 + 7.68923I$	$-11.60024 - 4.76581I$
$u = -0.645648 + 0.698758I$ $a = 0.141845 + 1.079620I$ $b = 0.488954 - 0.746861I$	$3.38024 + 1.21441I$	$-4.33120 - 2.38202I$
$u = -0.645648 - 0.698758I$ $a = 0.141845 - 1.079620I$ $b = 0.488954 + 0.746861I$	$3.38024 - 1.21441I$	$-4.33120 + 2.38202I$
$u = -1.038880 + 0.250251I$ $a = 0.485795 + 0.350283I$ $b = 1.66075 + 0.19671I$	$-10.88700 + 0.63545I$	$-16.1019 - 7.3224I$
$u = -1.038880 - 0.250251I$ $a = 0.485795 - 0.350283I$ $b = 1.66075 - 0.19671I$	$-10.88700 - 0.63545I$	$-16.1019 + 7.3224I$
$u = 0.917670$ $a = 4.22167$ $b = 0.349359$	-2.98695	-59.3920
$u = 1.033250 + 0.435364I$ $a = -0.60097 + 1.79230I$ $b = -0.986819 - 0.340805I$	$-2.52882 - 3.14028I$	$-13.2871 + 4.9220I$
$u = 1.033250 - 0.435364I$ $a = -0.60097 - 1.79230I$ $b = -0.986819 + 0.340805I$	$-2.52882 + 3.14028I$	$-13.2871 - 4.9220I$
$u = 0.424088 + 0.764374I$ $a = -1.58059 + 0.54433I$ $b = 1.213240 - 0.287237I$	$-6.42531 + 1.37910I$	$-14.4871 - 0.1126I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.424088 - 0.764374I$ $a = -1.58059 - 0.54433I$ $b = 1.213240 + 0.287237I$	$-6.42531 - 1.37910I$	$-14.4871 + 0.1126I$
$u = -0.334699 + 0.793502I$ $a = -0.423088 - 0.639117I$ $b = 1.031810 + 0.544946I$	$1.73108 - 3.69196I$	$-7.37427 + 4.06105I$
$u = -0.334699 - 0.793502I$ $a = -0.423088 + 0.639117I$ $b = 1.031810 - 0.544946I$	$1.73108 + 3.69196I$	$-7.37427 - 4.06105I$
$u = 1.096340 + 0.338707I$ $a = -1.05201 + 1.21469I$ $b = 0.110133 - 0.969437I$	$-4.81110 - 1.15004I$	$-14.8249 + 0.1630I$
$u = 1.096340 - 0.338707I$ $a = -1.05201 - 1.21469I$ $b = 0.110133 + 0.969437I$	$-4.81110 + 1.15004I$	$-14.8249 - 0.1630I$
$u = -0.955160 + 0.637303I$ $a = -0.565833 - 0.448992I$ $b = 0.220904 + 0.771822I$	$2.47440 + 3.90124I$	$-5.43445 - 4.68146I$
$u = -0.955160 - 0.637303I$ $a = -0.565833 + 0.448992I$ $b = 0.220904 - 0.771822I$	$2.47440 - 3.90124I$	$-5.43445 + 4.68146I$
$u = -1.048110 + 0.492760I$ $a = -0.904373 - 0.926403I$ $b = -1.239580 + 0.203806I$	$-2.11016 + 3.32020I$	$-13.06049 - 3.76837I$
$u = -1.048110 - 0.492760I$ $a = -0.904373 + 0.926403I$ $b = -1.239580 - 0.203806I$	$-2.11016 - 3.32020I$	$-13.06049 + 3.76837I$
$u = 1.160490 + 0.215401I$ $a = 1.009060 - 0.552611I$ $b = 0.895187 - 0.176420I$	$-3.04518 + 0.83928I$	$-13.6876 - 5.4055I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.160490 - 0.215401I$ $a = 1.009060 + 0.552611I$ $b = 0.895187 + 0.176420I$	$-3.04518 - 0.83928I$	$-13.6876 + 5.4055I$
$u = -1.109770 + 0.525691I$ $a = 0.749622 + 0.680872I$ $b = -0.374879 - 1.281230I$	$-3.50534 + 6.28261I$	$-13.0953 - 5.4809I$
$u = -1.109770 - 0.525691I$ $a = 0.749622 - 0.680872I$ $b = -0.374879 + 1.281230I$	$-3.50534 - 6.28261I$	$-13.0953 + 5.4809I$
$u = -0.873586 + 0.885492I$ $a = 0.722061 - 0.543762I$ $b = -0.840743 + 0.122050I$	$0.49614 + 3.22180I$	$-15.2960 - 4.0561I$
$u = -0.873586 - 0.885492I$ $a = 0.722061 + 0.543762I$ $b = -0.840743 - 0.122050I$	$0.49614 - 3.22180I$	$-15.2960 + 4.0561I$
$u = 1.109100 + 0.586635I$ $a = -0.04572 - 1.84175I$ $b = 1.281130 + 0.518288I$	$-8.48566 - 6.50843I$	$-15.7623 + 4.5910I$
$u = 1.109100 - 0.586635I$ $a = -0.04572 + 1.84175I$ $b = 1.281130 - 0.518288I$	$-8.48566 + 6.50843I$	$-15.7623 - 4.5910I$
$u = -1.135680 + 0.577352I$ $a = 0.73159 + 1.41035I$ $b = 1.232290 - 0.518147I$	$-0.64027 + 8.82354I$	$-11.18744 - 7.65851I$
$u = -1.135680 - 0.577352I$ $a = 0.73159 - 1.41035I$ $b = 1.232290 + 0.518147I$	$-0.64027 - 8.82354I$	$-11.18744 + 7.65851I$
$u = 0.684183 + 0.185929I$ $a = 1.011580 - 0.590171I$ $b = -0.399719 + 0.274052I$	$-0.945608 - 0.085520I$	$-9.49008 - 0.83288I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = \quad 0.684183 - 0.185929I$ $a = \quad 1.011580 + 0.590171I$ $b = -0.399719 - 0.274052I$	$-0.945608 + 0.085520I$	$-9.49008 + 0.83288I$
$u = -0.289056 + 0.640853I$ $a = -0.58487 - 1.93617I$ $b = -0.435741 + 0.971160I$	$-1.17381 - 1.71654I$	$-9.22754 + 1.14237I$
$u = -0.289056 - 0.640853I$ $a = -0.58487 + 1.93617I$ $b = -0.435741 - 0.971160I$	$-1.17381 + 1.71654I$	$-9.22754 - 1.14237I$
$u = -0.491493 + 0.483729I$ $a = -0.533644 + 0.146067I$ $b = -0.888256 - 0.454789I$	$-0.414732 + 0.767581I$	$-9.73697 - 1.10255I$
$u = -0.491493 - 0.483729I$ $a = -0.533644 - 0.146067I$ $b = -0.888256 + 0.454789I$	$-0.414732 - 0.767581I$	$-9.73697 + 1.10255I$
$u = -1.217970 + 0.609804I$ $a = -0.43882 - 1.60438I$ $b = -1.33819 + 0.73038I$	$-6.6238 + 13.3940I$	$-14.1442 - 7.8976I$
$u = -1.217970 - 0.609804I$ $a = -0.43882 + 1.60438I$ $b = -1.33819 - 0.73038I$	$-6.6238 - 13.3940I$	$-14.1442 + 7.8976I$
$u = \quad 1.355550 + 0.252070I$ $a = -0.147210 + 0.232788I$ $b = -1.289140 + 0.415642I$	$-9.24274 + 3.54815I$	$-15.7354 - 3.2017I$
$u = \quad 1.355550 - 0.252070I$ $a = -0.147210 - 0.232788I$ $b = -1.289140 - 0.415642I$	$-9.24274 - 3.54815I$	$-15.7354 + 3.2017I$
$u = \quad 0.181281$ $a = \quad 2.93770$ $b = -0.583695$	-0.821503	-11.8790

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

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

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$(u+1)^3$
c_2, c_6	$u^3 - u^2 + 2u - 1$
c_3, c_{10}	u^3
c_4	$u^3 + u^2 - 1$
c_5	$u^3 + u^2 + 2u + 1$
c_7	$u^3 - u^2 + 1$
c_8, c_9	$(u-1)^3$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_8, c_9	$(y-1)^3$
c_2, c_5, c_6	y^3+3y^2+2y-1
c_3, c_{10}	y^3
c_4, c_7	y^3-y^2+2y-1

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.877439 + 0.744862I$ $a = 0.539798 - 0.182582I$ $b = 0$	$1.37919 + 2.82812I$	$-7.78492 - 1.30714I$
$u = -0.877439 - 0.744862I$ $a = 0.539798 + 0.182582I$ $b = 0$	$1.37919 - 2.82812I$	$-7.78492 + 1.30714I$
$u = 0.754878$ $a = -3.07960$ $b = 0$	-2.75839	-7.43020

III. $I^u_3 = \langle b - a - 1,\ a^2 + a - 1,\ u - 1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -11$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3	$u^2 - u - 1$
c_2, c_5	u^2
c_4, c_6	$(u-1)^2$
c_7	$(u+1)^2$
c_8, c_9, c_{10}	$u^2 + u - 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_8 c_9, c_{10}	$y^2 - 3y + 1$
c_2, c_5	y^2
c_4, c_6, c_7	$(y-1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = 0.618034$ $b = 1.61803$	-10.5276	-11.0000
$u = 1.00000$ $a = -1.61803$ $b = -0.618034$	-2.63189	-11.0000

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u+1)^3)(u^2-u-1)(u^{40}-5u^{39}+\cdots+6u+1)$
c_2	$u^2(u^3-u^2+2u-1)(u^{40}-2u^{39}+\cdots+4u-4)$
c_3	$u^3(u^2-u-1)(u^{40}+2u^{39}+\cdots-28u-8)$
c_4	$((u-1)^2)(u^3+u^2-1)(u^{40}-4u^{39}+\cdots+2u+1)$
c_5	$u^2(u^3+u^2+2u+1)(u^{40}-2u^{39}+\cdots+4u-4)$
c_6	$((u-1)^2)(u^3-u^2+2u-1)(u^{40}+20u^{39}+\cdots+38u+1)$
c_7	$((u+1)^2)(u^3-u^2+1)(u^{40}-4u^{39}+\cdots+2u+1)$
c_8, c_9	$((u-1)^3)(u^2+u-1)(u^{40}-5u^{39}+\cdots+6u+1)$
c_{10}	$u^3(u^2+u-1)(u^{40}+2u^{39}+\cdots-28u-8)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_8, c_9	$((y-1)^3)(y^2-3y+1)(y^{40}-39y^{39}+\cdots+24y+1)$
c_2, c_5	$y^2(y^3+3y^2+2y-1)(y^{40}+18y^{39}+\cdots-104y+16)$
c_3, c_{10}	$y^3(y^2-3y+1)(y^{40}-24y^{39}+\cdots-1360y+64)$
c_4, c_7	$((y-1)^2)(y^3-y^2+2y-1)(y^{40}-20y^{39}+\cdots-38y+1)$
c_6	$((y-1)^2)(y^3+3y^2+2y-1)(y^{40}+4y^{39}+\cdots-918y+1)$