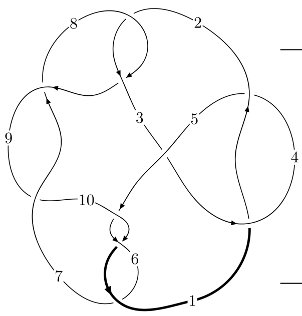
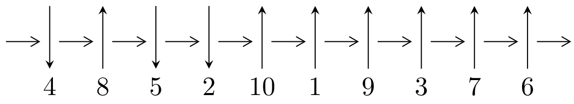
10_{77} $(K10a_{18})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I_1^u = \langle u^{22} - u^{21} + \cdots + b - 1,\ u^{22} - 9u^{20} + \cdots + a - 1,\ u^{23} - 2u^{22} + \cdots - u + 1\rangle$$
$$I_2^u = \langle u^6 - 2u^4 + u^2 + b,\ u^4 - u^2 + a + 1,\ u^9 - 3u^7 - u^6 + 3u^5 + 2u^4 + u^3 - u^2 - 2u - 1\rangle$$
$$I_3^u = \langle b,\ a - 1,\ u + 1\rangle$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 33 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.

$$\boldsymbol{I_1^u = \langle u^{22} - u^{21} + \cdots + b - 1,\ u^{22} - 9u^{20} + \cdots + a - 1,\ u^{23} - 2u^{22} + \cdots - u + 1 \rangle}$$

(i) Arc colorings

$$a_1 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^{22} + 9u^{20} + \cdots + 5u + 1 \\ -u^{22} + u^{21} + \cdots - u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u^2 + 1 \\ -u^4 + 2u^2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^{22} - u^{21} + \cdots + 6u - 1 \\ -u^{19} + 7u^{17} + \cdots - 6u^2 - u \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} u^6 - 3u^4 + 2u^2 + 1 \\ -u^6 + 2u^4 - u^2 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -u^{21} + 9u^{19} + \cdots + 15u^2 + 6u \\ -u^{22} + u^{21} + \cdots - u + 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes

$= -2u^{21} + 4u^{20} + 18u^{19} - 32u^{18} - 70u^{17} + 100u^{16} + 148u^{15} - 132u^{14} - 164u^{13} - 4u^{12} + 38u^{11} + 200u^{10} + 130u^9 - 148u^8 - 136u^7 - 68u^6 + 2u^5 + 80u^4 + 50u^3 + 20u^2 - 6u$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$y^{23} - 12y^{22} + \cdots + 7y - 1$
c_2, c_8	$y^{23} - 6y^{22} + \cdots + 8y - 4$
c_3	$y^{23} + 32y^{21} + \cdots + 31y - 1$
c_5, c_6, c_{10}	$y^{23} - 20y^{22} + \cdots - 9y - 1$
c_7, c_9	$y^{23} + 18y^{22} + \cdots - 8y - 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.094963+0.875706I$ $a=\ \ 2.34528+0.84882I$ $b=-1.86529-0.93050I$	$-6.35503-7.52364I$	$-0.34364+6.02284I$
$u=-0.094963-0.875706I$ $a=\ \ 2.34528-0.84882I$ $b=-1.86529+0.93050I$	$-6.35503+7.52364I$	$-0.34364-6.02284I$
$u=\ \ 0.019170+0.819470I$ $a=\ \ 2.62421-0.25037I$ $b=-2.01346-0.21505I$	$-6.84422+1.43226I$	$-1.58922-0.72835I$
$u=\ \ 0.019170-0.819470I$ $a=\ \ 2.62421+0.25037I$ $b=-2.01346+0.21505I$	$-6.84422-1.43226I$	$-1.58922+0.72835I$
$u=-1.204480+0.336653I$ $a=\ \ 0.431013-0.938359I$ $b=-1.64316-0.13209I$	$0.429871-1.292380I$	$5.93678+0.45977I$
$u=-1.204480-0.336653I$ $a=\ \ 0.431013+0.938359I$ $b=-1.64316+0.13209I$	$0.429871+1.292380I$	$5.93678-0.45977I$
$u=-1.261470+0.073530I$ $a=\ \ 0.222367+0.062621I$ $b=-0.51599-1.45099I$	$2.49785-1.83570I$	$6.37573+3.60335I$
$u=-1.261470-0.073530I$ $a=\ \ 0.222367-0.062621I$ $b=-0.51599+1.45099I$	$2.49785+1.83570I$	$6.37573-3.60335I$
$u=-0.698406$ $a=-0.537824$ $b=-0.384144$	1.01631	10.3720
$u=-0.380828+0.580276I$ $a=\ \ 0.191263-0.218661I$ $b=\ \ 0.411893+0.381927I$	$0.26922-3.59706I$	$4.75645+7.79597I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.380828 - 0.580276I$ $a = 0.191263 + 0.218661I$ $b = 0.411893 - 0.381927I$	$0.26922 + 3.59706I$	$4.75645 - 7.79597I$
$u = -1.283800 + 0.366192I$ $a = -0.89429 + 1.11514I$ $b = 2.28606 + 0.18751I$	$-2.78844 - 5.69706I$	$2.62032 + 4.06061I$
$u = -1.283800 - 0.366192I$ $a = -0.89429 - 1.11514I$ $b = 2.28606 - 0.18751I$	$-2.78844 + 5.69706I$	$2.62032 - 4.06061I$
$u = 1.318900 + 0.354954I$ $a = 0.95360 + 1.10438I$ $b = -1.57753 + 1.07523I$	$1.33811 + 7.00485I$	$7.04339 - 5.13787I$
$u = 1.318900 - 0.354954I$ $a = 0.95360 - 1.10438I$ $b = -1.57753 - 1.07523I$	$1.33811 - 7.00485I$	$7.04339 + 5.13787I$
$u = 1.369190 + 0.083411I$ $a = 0.752735 - 0.144610I$ $b = -0.117460 - 0.451573I$	$6.97398 + 1.20490I$	$11.80214 - 0.58796I$
$u = 1.369190 - 0.083411I$ $a = 0.752735 + 0.144610I$ $b = -0.117460 + 0.451573I$	$6.97398 - 1.20490I$	$11.80214 + 0.58796I$
$u = 1.377900 + 0.168105I$ $a = -0.363007 + 0.227729I$ $b = -0.140468 + 0.918165I$	$5.85182 + 6.12354I$	$9.22962 - 6.59776I$
$u = 1.377900 - 0.168105I$ $a = -0.363007 - 0.227729I$ $b = -0.140468 - 0.918165I$	$5.85182 - 6.12354I$	$9.22962 + 6.59776I$
$u = 1.339590 + 0.393018I$ $a = -1.38895 - 1.04382I$ $b = 1.90675 - 1.28425I$	$-1.85559 + 12.07470I$	$3.82521 - 8.06520I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.339590 - 0.393018I$ $a = -1.38895 + 1.04382I$ $b = 1.90675 + 1.28425I$	$-1.85559 - 12.07470I$	$3.82521 + 8.06520I$
$u = 0.149995 + 0.273260I$ $a = -0.10530 + 2.51199I$ $b = 0.460745 - 0.520456I$	$-1.67067 + 0.60932I$	$-3.84266 - 0.84402I$
$u = 0.149995 - 0.273260I$ $a = -0.10530 - 2.51199I$ $b = 0.460745 + 0.520456I$	$-1.67067 - 0.60932I$	$-3.84266 + 0.84402I$

II.

$\boldsymbol{I^u_2 = \langle u^6 - 2u^4 + u^2 + b,\ u^4 - u^2 + a + 1,\ u^9 - 3u^7 - u^6 + 3u^5 + 2u^4 + u^3 - u^2 - 2u - 1\rangle}$

(i) Arc colorings

$$a_1 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^4 + u^2 - 1 \\ -u^6 + 2u^4 - u^2 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u^2 + 1 \\ -u^4 + 2u^2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -1 \\ -u^2 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} u^6 - 3u^4 + 2u^2 + 1 \\ -u^6 + 2u^4 - u^2 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u^6 - 8u^4 - 4u^3 + 4u^2 + 4u + 10$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_5 c_6, c_{10}	$y^9 - 6y^8 + 15y^7 - 17y^6 + 3y^5 + 12y^4 - 9y^3 - y^2 + 2y - 1$
c_2, c_8	$(y^3 - y^2 + 2y - 1)^3$
c_3	$y^9 - 6y^8 + 27y^7 - 73y^6 + 139y^5 - 184y^4 + 83y^3 - 13y^2 + 2y - 1$
c_7, c_9	$(y^3 + 3y^2 + 2y - 1)^3$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.073457 + 0.802780I$ $a = -2.03355 - 0.26868I$ $b = 1.66236 + 0.56228I$	$-3.02413 - 2.82812I$	$2.49024 + 2.97945I$
$u = -0.073457 - 0.802780I$ $a = -2.03355 + 0.26868I$ $b = 1.66236 - 0.56228I$	$-3.02413 + 2.82812I$	$2.49024 - 2.97945I$
$u = 1.21243$ $a = -1.69089$ $b = -0.324718$	1.11345	9.01950
$u = -1.180080 + 0.437737I$ $a = -0.17400 + 1.44838I$ $b = 1.66236 - 0.56228I$	$-3.02413 + 2.82812I$	$2.49024 - 2.97945I$
$u = -1.180080 - 0.437737I$ $a = -0.17400 - 1.44838I$ $b = 1.66236 + 0.56228I$	$-3.02413 - 2.82812I$	$2.49024 + 2.97945I$
$u = 1.253530 + 0.365043I$ $a = -0.79245 - 1.71706I$ $b = 1.66236 - 0.56228I$	$-3.02413 + 2.82812I$	$2.49024 - 2.97945I$
$u = 1.253530 - 0.365043I$ $a = -0.79245 + 1.71706I$ $b = 1.66236 + 0.56228I$	$-3.02413 - 2.82812I$	$2.49024 + 2.97945I$
$u = -0.606217 + 0.320153I$ $a = -0.654553 - 0.182436I$ $b = -0.324718$	1.11345	$9.01951 + 0.I$
$u = -0.606217 - 0.320153I$ $a = -0.654553 + 0.182436I$ $b = -0.324718$	1.11345	$9.01951 + 0.I$

III. $I_3^u = \langle b,\ a-1,\ u+1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.00000$ $a = 1.00000$ $b = 0$	0	0

IV. u-Polynomials

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

V. Riley Polynomials

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