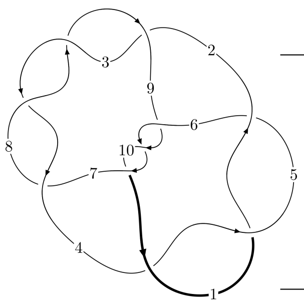
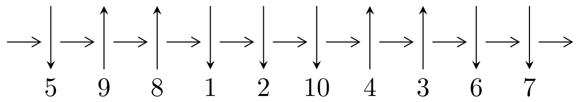
10_{61} $(K10a_{123})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u &= \langle -u^4 - u^3 - 3u^2 + b - 2u - 1,\ u^8 + 3u^7 + 10u^6 + 19u^5 + 31u^4 + 35u^3 + 32u^2 + 2a + 16u + 4, \\
&\quad u^9 + 3u^8 + 10u^7 + 19u^6 + 31u^5 + 37u^4 + 34u^3 + 22u^2 + 8u + 2 \rangle \\
I_2^u &= \langle -u^4 + u^3 + au - 3u^2 + b + 2u - 1,\ -u^4a - 2u^4 - 3u^2a + u^3 + a^2 - 7u^2 - a + 2u - 3, \\
&\quad u^5 - u^4 + 4u^3 - 3u^2 + 3u - 1 \rangle \\
I_3^u &= \langle b + 1,\ 2a - u,\ u^2 + 2 \rangle
\end{aligned}$$

$$I_1^v = \langle a,\ b - 1,\ v + 1 \rangle$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 22 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.

$$I_1^u = \langle -u^4 - u^3 - 3u^2 + b - 2u - 1,\ u^8 + 3u^7 + \cdots + 2a + 4,\ u^9 + 3u^8 + \cdots + 8u + 2\rangle$$

(i) Arc colorings

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

$$a_9 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} -\frac{1}{2}u^8 - \frac{3}{2}u^7 + \cdots - 8u - 2 \\ u^4 + u^3 + 3u^2 + 2u + 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} \frac{1}{2}u^8 + \frac{1}{2}u^7 + \cdots + 3u^2 + u \\ -u^8 - 2u^7 - 7u^6 - 10u^5 - 15u^4 - 14u^3 - 10u^2 - 3u - 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -\frac{1}{2}u^8 - \frac{3}{2}u^7 + \cdots - 6u - 1 \\ u^4 + u^3 + 3u^2 + 2u + 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -\frac{1}{2}u^8 - \frac{3}{2}u^7 + \cdots - 7u^2 - 3u \\ -u^8 - 2u^7 - 7u^6 - 10u^5 - 15u^4 - 14u^3 - 10u^2 - 4u - 1 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} u^2 + 1 \\ -u^4 - 2u^2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u^3 - 2u \\ u^5 + 3u^3 + u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 2u^7 + 6u^6 + 18u^5 + 32u^4 + 46u^3 + 48u^2 + 38u + 8$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4, c_5 c_6, c_9, c_{10}	$u^9 + u^8 - 6u^7 - 5u^6 + 12u^5 + 6u^4 - 8u^3 + u^2 + u + 1$
c_2, c_3, c_7 c_8	$u^9 - 3u^8 + 10u^7 - 19u^6 + 31u^5 - 37u^4 + 34u^3 - 22u^2 + 8u - 2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_5 c_6, c_9, c_{10}	$y^9 - 13y^8 + 70y^7 - 197y^6 + 300y^5 - 232y^4 + 86y^3 - 29y^2 - y - 1$
c_2, c_3, c_7 c_8	$y^9 + 11y^8 + 48y^7 + 105y^6 + 119y^5 + 51y^4 - 52y^3 - 88y^2 - 24y - 4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.903187$ $a = -1.73778$ $b = 1.56954$	-9.61991	-8.30450
$u = -0.638951 + 0.973621I$ $a = 0.628534 + 1.228300I$ $b = -1.59750 - 0.17287I$	$-12.55800 - 5.12744I$	$-10.43762 + 3.71423I$
$u = -0.638951 - 0.973621I$ $a = 0.628534 - 1.228300I$ $b = -1.59750 + 0.17287I$	$-12.55800 + 5.12744I$	$-10.43762 - 3.71423I$
$u = -0.215940 + 0.436674I$ $a = 0.411654 - 0.740818I$ $b = 0.234603 + 0.339731I$	$-0.116751 - 0.880893I$	$-2.67139 + 7.91481I$
$u = -0.215940 - 0.436674I$ $a = 0.411654 + 0.740818I$ $b = 0.234603 - 0.339731I$	$-0.116751 + 0.880893I$	$-2.67139 - 7.91481I$
$u = -0.00790 + 1.51466I$ $a = -0.266916 + 0.385198I$ $b = -0.581336 - 0.407332I$	$-6.71646 - 1.46233I$	$-6.34609 + 4.72292I$
$u = -0.00790 - 1.51466I$ $a = -0.266916 - 0.385198I$ $b = -0.581336 + 0.407332I$	$-6.71646 + 1.46233I$	$-6.34609 - 4.72292I$
$u = -0.18562 + 1.72176I$ $a = 0.095616 - 0.974129I$ $b = 1.65947 + 0.34544I$	$17.6214 - 8.4586I$	$-11.39264 + 3.44703I$
$u = -0.18562 - 1.72176I$ $a = 0.095616 + 0.974129I$ $b = 1.65947 - 0.34544I$	$17.6214 + 8.4586I$	$-11.39264 - 3.44703I$

II. $\boldsymbol{I^u_2 = \langle -u^4 + u^3 + au - 3u^2 + b + 2u - 1,\ -u^4a - 2u^4 + \cdots - a - 3,\ u^5 - u^4 + 4u^3 - 3u^2 + 3u - 1\rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

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

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_5 c_6, c_9, c_{10}	$y^{10} - 9y^9 + \cdots - 52y + 9$
c_2, c_3, c_7 c_8	$(y^5 + 7y^4 + 16y^3 + 13y^2 + 3y - 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.233677 + 0.885557I$ $a = -0.504786 - 0.801043I$ $b = -1.349550 + 0.050168I$	$-5.10967 + 2.21397I$	$-8.88568 - 4.22289I$
$u = 0.233677 + 0.885557I$ $a = -0.32299 + 1.43873I$ $b = 0.591412 - 0.634202I$	$-5.10967 + 2.21397I$	$-8.88568 - 4.22289I$
$u = 0.233677 - 0.885557I$ $a = -0.504786 + 0.801043I$ $b = -1.349550 - 0.050168I$	$-5.10967 - 2.21397I$	$-8.88568 + 4.22289I$
$u = 0.233677 - 0.885557I$ $a = -0.32299 - 1.43873I$ $b = 0.591412 + 0.634202I$	$-5.10967 - 2.21397I$	$-8.88568 + 4.22289I$
$u = 0.416284$ $a = -1.21727$ $b = 1.15193$	-2.40769	-0.391160
$u = 0.416284$ $a = 2.76718$ $b = -0.506729$	-2.40769	-0.391160
$u = 0.05818 + 1.69128I$ $a = -0.032711 - 0.944677I$ $b = -0.660273 + 1.014190I$	$-14.2482 + 3.3317I$	$-9.91874 - 2.36228I$
$u = 0.05818 + 1.69128I$ $a = 0.585538 + 0.410541I$ $b = 1.59581 - 0.11029I$	$-14.2482 + 3.3317I$	$-9.91874 - 2.36228I$
$u = 0.05818 - 1.69128I$ $a = -0.032711 + 0.944677I$ $b = -0.660273 - 1.014190I$	$-14.2482 - 3.3317I$	$-9.91874 + 2.36228I$
$u = 0.05818 - 1.69128I$ $a = 0.585538 - 0.410541I$ $b = 1.59581 + 0.11029I$	$-14.2482 - 3.3317I$	$-9.91874 + 2.36228I$

III. $I_3^u = \langle b+1,\ 2a-u,\ u^2+2 \rangle$

(i) Arc colorings

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

$a_9 = \begin{pmatrix} 0 \\ u \end{pmatrix}$

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

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

$a_{10} = \begin{pmatrix} \frac{1}{2}u \\ u-1 \end{pmatrix}$

$a_5 = \begin{pmatrix} \frac{1}{2}u-1 \\ -1 \end{pmatrix}$

$a_1 = \begin{pmatrix} \frac{1}{2}u \\ -1 \end{pmatrix}$

$a_8 = \begin{pmatrix} -u \\ -u \end{pmatrix}$

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.414210I$ $a = 0.707107I$ $b = -1.00000$	-8.22467	-12.0000
$u = -1.414210I$ $a = -0.707107I$ $b = -1.00000$	-8.22467	-12.0000

IV. $I_1^v = \langle a,\ b-1,\ v+1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v = -1.00000$ $a = 0$ $b = 1.00000$	-3.28987	-12.0000

V. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_6	$(u-1)(u+1)^2(u^9+u^8+\cdots+u+1)$ $\cdot\,(u^{10}+u^9-4u^8-2u^7+6u^6-2u^5-7u^4+3u^3+8u^2+2u-3)$
c_2, c_3, c_7 c_8	$u(u^2+2)(u^5+u^4+4u^3+3u^2+3u+1)^2$ $\cdot\,(u^9-3u^8+10u^7-19u^6+31u^5-37u^4+34u^3-22u^2+8u-2)$
c_4, c_5, c_9 c_{10}	$((u-1)^2)(u+1)(u^9+u^8+\cdots+u+1)$ $\cdot\,(u^{10}+u^9-4u^8-2u^7+6u^6-2u^5-7u^4+3u^3+8u^2+2u-3)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_5 c_6, c_9, c_{10}	$(y-1)^3$ $\cdot\,(y^9 - 13y^8 + 70y^7 - 197y^6 + 300y^5 - 232y^4 + 86y^3 - 29y^2 - y - 1)$ $\cdot\,(y^{10} - 9y^9 + \cdots - 52y + 9)$
c_2, c_3, c_7 c_8	$y(y+2)^2(y^5 + 7y^4 + 16y^3 + 13y^2 + 3y - 1)^2$ $\cdot\,(y^9 + 11y^8 + 48y^7 + 105y^6 + 119y^5 + 51y^4 - 52y^3 - 88y^2 - 24y - 4)$