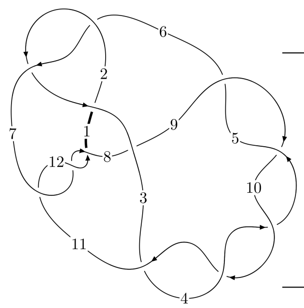
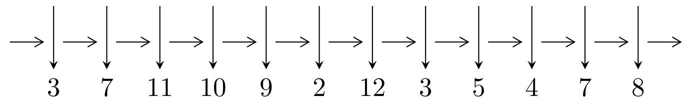
$12n_{0581}$ $(K12n_{0581})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

$$7{,}11 \xrightarrow[c_{11}]{} 12 \xrightarrow[c_7]{} 4{,}8 \xrightarrow[c_3]{} 3 \xrightarrow[c_2]{} 2 \xrightarrow[c_1]{} 1 \xrightarrow[c_6]{} 6 \xrightarrow[c_{10}]{} 10 \xrightarrow[c_4]{} 5 \xrightarrow[c_9]{} 9 \twoheadrightarrow c_5, c_8, c_{12}$$

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

$$\begin{aligned}
I^u_1 = \langle & u^9 - u^8 - 7u^7 + 6u^6 + 14u^5 - 7u^4 - 5u^3 - 10u^2 + 4b + u, \\
& - u^9 + u^8 + 7u^7 - 6u^6 - 14u^5 + 7u^4 + 5u^3 + 10u^2 + 4a - u - 4, \\
& u^{10} - u^9 - 8u^8 + 7u^7 + 21u^6 - 13u^5 - 19u^4 + u^3 + 6u^2 - 2u - 1\rangle \\
I^u_2 = \langle & 2u^7 + u^6 - 6u^5 - 6u^4 + 5u^3 + 11u^2 + 2b - 3u - 10, \\
& - 5u^7 - 3u^6 + 16u^5 + 18u^4 - 15u^3 - 37u^2 + 8a + 9u + 39,\ u^8 - u^7 - 4u^6 + 2u^5 + 7u^4 + u^3 - 9u^2 - 3u + 8\rangle \\
I^u_3 = \langle & b + a + 1,\ a^2 + 2a + 4,\ u + 1\rangle \\
I^u_4 = \langle & b,\ a + 1,\ u + 1\rangle \\
I^u_5 = \langle & b + a + 1,\ a^2 + 2a + 2,\ u - 1\rangle
\end{aligned}$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 23 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.

$$\boldsymbol{I_1^u = \langle u^9 - u^8 + \cdots + 4b + u,\ -u^9 + u^8 + \cdots + 4a - 4,\ u^{10} - u^9 + \cdots - 2u - 1\rangle}$$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} \frac{1}{4}u^9 - \frac{1}{4}u^8 + \cdots + \frac{1}{4}u + 1 \\ -\frac{1}{4}u^9 + \frac{1}{4}u^8 + \cdots + \frac{5}{2}u^2 - \frac{1}{4}u \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} 1 \\ -\frac{1}{4}u^9 + \frac{1}{4}u^8 + \cdots + \frac{5}{2}u^2 - \frac{1}{4}u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 1 \\ -\frac{1}{4}u^9 + \frac{1}{4}u^8 + \cdots + \frac{3}{2}u^2 - \frac{1}{4}u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -u^2 + 1 \\ -u^4 + 2u^2 \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} -\frac{1}{4}u^9 + \frac{1}{2}u^8 + \cdots - \frac{1}{4}u + \frac{5}{4} \\ \frac{1}{2}u^9 - \frac{3}{4}u^8 + \cdots + \frac{1}{2}u - \frac{1}{4} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -\frac{1}{4}u^9 + \frac{1}{2}u^8 + \cdots + \frac{1}{4}u + \frac{3}{4} \\ \frac{1}{2}u^7 - \frac{7}{2}u^5 + \cdots - \frac{1}{2}u + \frac{1}{2} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} \frac{1}{4}u^8 - \frac{1}{4}u^7 + \cdots - \frac{3}{2}u + \frac{1}{4} \\ -\frac{1}{4}u^9 + \frac{1}{4}u^8 + \cdots + \frac{7}{4}u + \frac{1}{2} \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 2u^9 - \frac{7}{2}u^8 - \frac{31}{2}u^7 + \frac{53}{2}u^6 + 38u^5 - 60u^4 - \frac{61}{2}u^3 + \frac{63}{2}u^2 + 14u - \frac{37}{2}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{10}+17u^9+\cdots+16u+1$
c_2, c_6, c_7 c_{11}, c_{12}	$u^{10}-u^9-8u^8+7u^7+21u^6-13u^5-19u^4+u^3+6u^2-2u-1$
c_3, c_4, c_5 c_9, c_{10}	$u^{10}+3u^9+\cdots+12u+2$
c_8	$u^{10}+3u^9+\cdots+108u+58$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{10} - 49y^9 + \cdots - 100y + 1$
c_2, c_6, c_7 c_{11}, c_{12}	$y^{10} - 17y^9 + \cdots - 16y + 1$
c_3, c_4, c_5 c_9, c_{10}	$y^{10} + 13y^9 + \cdots - 36y + 4$
c_8	$y^{10} - 51y^9 + \cdots - 9460y + 3364$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.624283+0.413630I$ $a=\ \ 0.99995+1.69388I$ $b=\ \ 0.00005-1.69388I$	$11.16200+1.46971I$	$-6.43725-4.71631I$
$u=-0.624283-0.413630I$ $a=\ \ 0.99995-1.69388I$ $b=\ \ 0.00005+1.69388I$	$11.16200-1.46971I$	$-6.43725+4.71631I$
$u=\ \ 0.425863+0.318105I$ $a=\ \ 0.919105-0.860258I$ $b=\ \ 0.080895+0.860258I$	$2.03579-1.27062I$	$-6.43196+5.78765I$
$u=\ \ 0.425863-0.318105I$ $a=\ \ 0.919105+0.860258I$ $b=\ \ 0.080895-0.860258I$	$2.03579+1.27062I$	$-6.43196-5.78765I$
$u=-0.299023$ $a=\ \ 0.714196$ $b=\ \ 0.285804$	-0.505065	-19.6030
$u=\ \ 1.74982+0.35246I$ $a=\ \ 0.79690-1.70108I$ $b=\ \ 0.20310+1.70108I$	$-4.80759-8.37238I$	$-11.74586+3.25359I$
$u=\ \ 1.74982-0.35246I$ $a=\ \ 0.79690+1.70108I$ $b=\ \ 0.20310-1.70108I$	$-4.80759+8.37238I$	$-11.74586-3.25359I$
$u=-1.85465+0.19086I$ $a=\ \ 0.362420+0.933540I$ $b=\ \ 0.637580-0.933540I$	$-13.8130+4.9888I$	$-13.52702-3.37301I$
$u=-1.85465-0.19086I$ $a=\ \ 0.362420-0.933540I$ $b=\ \ 0.637580+0.933540I$	$-13.8130-4.9888I$	$-13.52702+3.37301I$
$u=\ \ 1.90554$ $a=\ \ 0.129056$ $b=\ \ 0.870944$	-16.6134	-16.1130

II. $\boldsymbol{I_2^u = \langle 2u^7 + u^6 + \cdots + 2b - 10,\ -5u^7 - 3u^6 + \cdots + 8a + 39,\ u^8 - u^7 - 4u^6 + 2u^5 + 7u^4 + u^3 - 9u^2 - 3u + 8\rangle}$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} \frac{5}{8}u^7 + \frac{3}{8}u^6 + \cdots - \frac{9}{8}u - \frac{39}{8} \\ -u^7 - \frac{1}{2}u^6 + \cdots + \frac{3}{2}u + 5 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} -\frac{3}{8}u^7 - \frac{1}{8}u^6 + \cdots + \frac{3}{8}u + \frac{1}{8} \\ -u^7 - \frac{1}{2}u^6 + \cdots + \frac{3}{2}u + 5 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -\frac{3}{8}u^7 - \frac{1}{8}u^6 + \cdots + \frac{3}{8}u + \frac{1}{8} \\ 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -u^2 + 1 \\ -u^4 + 2u^2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} \frac{3}{8}u^7 + \frac{5}{8}u^6 + \cdots + \frac{9}{8}u - \frac{21}{8} \\ -\frac{1}{2}u^7 - \frac{1}{2}u^6 + \cdots - 3u^2 + 3 \end{pmatrix}$$

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

$$a_5 = \begin{pmatrix} \frac{1}{4}u^7 - \frac{1}{4}u^6 + \cdots - \frac{5}{4}u - \frac{3}{4} \\ u^7 + u^6 - 3u^5 - 4u^4 + 2u^3 + 6u^2 - u - 6 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} \frac{1}{8}u^7 - \frac{1}{8}u^6 + \cdots - \frac{9}{8}u - \frac{3}{8} \\ \frac{1}{2}u^7 + \frac{1}{2}u^6 + \cdots + 3u^2 - 3 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 2u^7 - 6u^5 - 4u^4 + 8u^3 + 10u^2 - 6u - 22$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^8 + 9u^7 + 34u^6 + 76u^5 + 127u^4 + 179u^3 + 199u^2 + 153u + 64$
c_2, c_6, c_7 c_{11}, c_{12}	$u^8 - u^7 - 4u^6 + 2u^5 + 7u^4 + u^3 - 9u^2 - 3u + 8$
c_3, c_4, c_5 c_9, c_{10}	$(u^4 - u^3 + 3u^2 - 2u + 1)^2$
c_8	$(u^4 - u^3 + u^2 + 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^8 - 13y^7 + \cdots + 2063y + 4096$
c_2, c_6, c_7 c_{11}, c_{12}	$y^8 - 9y^7 + 34y^6 - 76y^5 + 127y^4 - 179y^3 + 199y^2 - 153y + 64$
c_3, c_4, c_5 c_9, c_{10}	$(y^4 + 5y^3 + 7y^2 + 2y + 1)^2$
c_8	$(y^4 + y^3 + 3y^2 + 2y + 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.974589 + 0.525375I$ $a = -0.575851 + 1.230320I$ $b = -0.395123 - 0.506844I$	$-3.50087 - 1.41510I$	$-13.8267 + 4.9087I$
$u = 0.974589 - 0.525375I$ $a = -0.575851 - 1.230320I$ $b = -0.395123 + 0.506844I$	$-3.50087 + 1.41510I$	$-13.8267 - 4.9087I$
$u = -0.728625 + 0.959908I$ $a = -0.72016 - 2.57269I$ $b = -0.10488 + 1.55249I$	$3.50087 + 3.16396I$	$-10.17326 - 2.56480I$
$u = -0.728625 - 0.959908I$ $a = -0.72016 + 2.57269I$ $b = -0.10488 - 1.55249I$	$3.50087 - 3.16396I$	$-10.17326 + 2.56480I$
$u = -1.326400 + 0.194967I$ $a = -0.267111 + 0.013410I$ $b = -0.395123 - 0.506844I$	$-3.50087 - 1.41510I$	$-13.8267 + 4.9087I$
$u = -1.326400 - 0.194967I$ $a = -0.267111 - 0.013410I$ $b = -0.395123 + 0.506844I$	$-3.50087 + 1.41510I$	$-13.8267 - 4.9087I$
$u = 1.58043 + 0.04862I$ $a = -0.374382 + 0.959864I$ $b = -0.10488 - 1.55249I$	$3.50087 - 3.16396I$	$-10.17326 + 2.56480I$
$u = 1.58043 - 0.04862I$ $a = -0.374382 - 0.959864I$ $b = -0.10488 + 1.55249I$	$3.50087 + 3.16396I$	$-10.17326 - 2.56480I$

III. $I_3^u = \langle b + a + 1,\ a^2 + 2a + 4,\ u + 1\rangle$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} a \\ -a-1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -1 \\ -a-1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -1 \\ -a \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -1 \\ -a-1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -a-3 \\ 3 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -a+1 \\ 2a+2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} a+2 \\ -3 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_7	$(u-1)^2$
c_3, c_4, c_5 c_8, c_9, c_{10}	u^2+3
c_6, c_{11}, c_{12}	$(u+1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6 c_7, c_{11}, c_{12}	$(y-1)^2$
c_3, c_4, c_5 c_8, c_9, c_{10}	$(y+3)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.00000$ $a = -1.00000 + 1.73205I$ $b = \quad - 1.73205I$	9.86960	-12.0000
$u = -1.00000$ $a = -1.00000 - 1.73205I$ $b = \quad 1.73205I$	9.86960	-12.0000

IV. $I_4^u = \langle b,\ a+1,\ u+1 \rangle$

(i) Arc colorings

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

$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

$a_{12} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

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

$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

$a_3 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

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

$a_1 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

$a_6 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

$a_{10} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

$a_5 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

$a_9 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_7	$u - 1$
c_3, c_4, c_5 c_8, c_9, c_{10}	u
c_6, c_{11}, c_{12}	$u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6 c_7, c_{11}, c_{12}	$y - 1$
c_3, c_4, c_5 c_8, c_9, c_{10}	y

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_4	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.00000$ $a = -1.00000$ $b = 0$	-3.28987	-12.0000

V. $\boldsymbol{I^u_5 = \langle b + a + 1,\ a^2 + 2a + 2,\ u - 1\rangle}$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -1 \\ -a - 1 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -1 \\ -a \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 1 \\ a + 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -a - 1 \\ 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} a + 1 \\ 0 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -a - 2 \\ 1 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_6, c_{11} c_{12}	$(u-1)^2$
c_2, c_7	$(u+1)^2$
c_3, c_4, c_5 c_8, c_9, c_{10}	u^2+1

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6 c_7, c_{11}, c_{12}	$(y-1)^2$
c_3, c_4, c_5 c_8, c_9, c_{10}	$(y+1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I^u_5	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -1.00000 + 1.00000I$ $b = -1.000000I$	0	-12.0000
$u = 1.00000$ $a = -1.00000 - 1.00000I$ $b = 1.000000I$	0	-12.0000

VI. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$(u-1)^5$ $\cdot\,(u^8+9u^7+34u^6+76u^5+127u^4+179u^3+199u^2+153u+64)$ $\cdot\,(u^{10}+17u^9+\cdots+16u+1)$
c_2, c_7	$(u-1)^3(u+1)^2(u^8-u^7-4u^6+2u^5+7u^4+u^3-9u^2-3u+8)$ $\cdot\,(u^{10}-u^9-8u^8+7u^7+21u^6-13u^5-19u^4+u^3+6u^2-2u-1)$
c_3, c_4, c_5 c_9, c_{10}	$u(u^2+1)(u^2+3)(u^4-u^3+\cdots-2u+1)^2(u^{10}+3u^9+\cdots+12u+2)$
c_6, c_{11}, c_{12}	$(u-1)^2(u+1)^3(u^8-u^7-4u^6+2u^5+7u^4+u^3-9u^2-3u+8)$ $\cdot\,(u^{10}-u^9-8u^8+7u^7+21u^6-13u^5-19u^4+u^3+6u^2-2u-1)$
c_8	$u(u^2+1)(u^2+3)(u^4-u^3+u^2+1)^2(u^{10}+3u^9+\cdots+108u+58)$

VII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$((y-1)^5)(y^8-13y^7+\cdots+2063y+4096)$ $\cdot\,(y^{10}-49y^9+\cdots-100y+1)$
c_2, c_6, c_7 c_{11}, c_{12}	$(y-1)^5$ $\cdot\,(y^8-9y^7+34y^6-76y^5+127y^4-179y^3+199y^2-153y+64)$ $\cdot\,(y^{10}-17y^9+\cdots-16y+1)$
c_3, c_4, c_5 c_9, c_{10}	$y(y+1)^2(y+3)^2(y^4+5y^3+7y^2+2y+1)^2$ $\cdot\,(y^{10}+13y^9+\cdots-36y+4)$
c_8	$y(y+1)^2(y+3)^2(y^4+y^3+3y^2+2y+1)^2$ $\cdot\,(y^{10}-51y^9+\cdots-9460y+3364)$