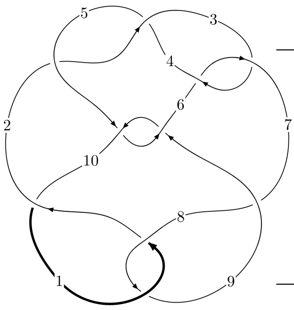
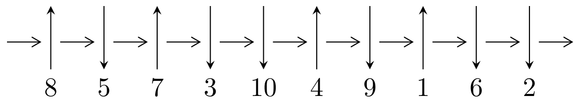
10_{58} $(K10a_{20})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I^u_1 = \langle u^7 + u^5 + 2u^3 + b + u,\ -u^6 - u^4 - 2u^2 + a - 1,\ u^{10} - u^9 + 2u^8 - u^7 + 4u^6 - 2u^5 + 4u^4 - u^3 + 3u^2 + u + 1$$
$$I^u_2 = \langle u^{25} + 2u^{24} + \cdots + b + 3,\ 3u^{25} - 7u^{24} + \cdots + a - 6,\ u^{26} - 2u^{25} + \cdots - u + 1\rangle$$
$$I^u_3 = \langle b + u + 1,\ a - u,\ u^2 + u + 1\rangle$$
$$I^u_4 = \langle b - u,\ a - 1,\ u^2 + u + 1\rangle$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 40 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. $\boldsymbol{I_1^u = \langle u^7 + u^5 + 2u^3 + b + u,\ -u^6 - u^4 - 2u^2 + a - 1,\ u^{10} - u^9 + \cdots + u + 1\rangle}$

(i) Arc colorings

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

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

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

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

$$a_2 = \begin{pmatrix} u^4 + u^2 + 1 \\ -u^4 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} -u \\ u^8 - u^7 + 2u^6 - u^5 + 3u^4 - u^3 + 3u^2 + 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u^3 \\ -u^6 + u^5 - u^4 + u^3 - 2u^2 - 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^2 + 1 \\ -u^7 + u^6 - u^5 - 2u^3 - u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u^9 - 6u^8 + 6u^7 - 4u^6 + 14u^5 - 14u^4 + 10u^3 - 6u^2 + 10u$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_6 c_8	$y^{10} + 3y^9 + \cdots + 5y + 1$
c_2, c_4, c_7 c_{10}	$y^{10} + 11y^9 + \cdots + 13y + 1$
c_5, c_9	$y^{10} + 5y^9 + \cdots + 32y + 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.100577 + 0.954526I$ $a = -0.658857 - 0.498555I$ $b = -0.542150 + 0.578753I$	$-3.48123 - 2.16643I$	$-9.00466 + 4.21901I$
$u = -0.100577 - 0.954526I$ $a = -0.658857 + 0.498555I$ $b = -0.542150 - 0.578753I$	$-3.48123 + 2.16643I$	$-9.00466 - 4.21901I$
$u = 0.900362 + 0.768734I$ $a = -1.68093 + 0.92466I$ $b = 2.22427 + 0.45966I$	$10.21950 - 0.19532I$	$4.14143 - 1.59060I$
$u = 0.900362 - 0.768734I$ $a = -1.68093 - 0.92466I$ $b = 2.22427 - 0.45966I$	$10.21950 + 0.19532I$	$4.14143 + 1.59060I$
$u = -0.774061 + 0.907730I$ $a = -0.053403 + 0.383357I$ $b = 0.306648 + 0.345217I$	$4.50100 - 5.87397I$	$1.27770 + 5.35715I$
$u = -0.774061 - 0.907730I$ $a = -0.053403 - 0.383357I$ $b = 0.306648 - 0.345217I$	$4.50100 + 5.87397I$	$1.27770 - 5.35715I$
$u = 0.782324 + 1.035710I$ $a = 1.19625 - 1.47594I$ $b = -2.46450 - 0.08430I$	$8.4959 + 12.7213I$	$1.50029 - 7.98966I$
$u = 0.782324 - 1.035710I$ $a = 1.19625 + 1.47594I$ $b = -2.46450 + 0.08430I$	$8.4959 - 12.7213I$	$1.50029 + 7.98966I$
$u = -0.308049 + 0.477623I$ $a = 0.696944 - 0.500305I$ $b = -0.024265 - 0.486995I$	$0.004061 - 1.246020I$	$0.08524 + 5.02615I$
$u = -0.308049 - 0.477623I$ $a = 0.696944 + 0.500305I$ $b = -0.024265 + 0.486995I$	$0.004061 + 1.246020I$	$0.08524 - 5.02615I$

II.

$\boldsymbol{I_2^u = \langle u^{25}+2u^{24}+\cdots+b+3,\ 3u^{25}-7u^{24}+\cdots+a-6,\ u^{26}-2u^{25}+\cdots-u+1\rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_7 = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_4 = \begin{pmatrix}1\\-u^2\end{pmatrix}$$
$$a_5 = \begin{pmatrix}u^2+1\\-u^2\end{pmatrix}$$
$$a_2 = \begin{pmatrix}u^4+u^2+1\\-u^4\end{pmatrix}$$
$$a_6 = \begin{pmatrix}-u\\u^3+u\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}-3u^{25}+7u^{24}+\cdots-4u+6\\-u^{25}-2u^{24}+\cdots-3u-3\end{pmatrix}$$
$$a_9 = \begin{pmatrix}-u^{25}+3u^{24}+\cdots-2u+4\\-u^{22}-3u^{20}+\cdots-3u-1\end{pmatrix}$$
$$a_8 = \begin{pmatrix}-u^{25}+u^{24}+\cdots-3u-1\\u^{25}-2u^{24}+\cdots+3u-1\end{pmatrix}$$
$$a_1 = \begin{pmatrix}-u^{25}+3u^{24}+\cdots-u+5\\-u^{25}-4u^{23}+\cdots-3u-2\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 5u^{25}-12u^{24}+25u^{23}-43u^{22}+75u^{21}-109u^{20}+126u^{19}-175u^{18}+168u^{17}-200u^{16}+98u^{15}-164u^{14}-6u^{13}-49u^{12}-144u^{11}-10u^{10}-179u^9+26u^8-112u^7-28u^6-47u^5-26u^4+9u^3-16u^2+15u-5$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_3, c_6 c_8	$u^{26} + 2u^{25} + \cdots + u + 1$
c_2, c_4, c_7 c_{10}	$u^{26} + 8u^{25} + \cdots + 13u + 1$
c_5, c_9	$(u^{13} + 2u^{12} + \cdots + 3u + 2)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_6 c_8	$y^{26} + 8y^{25} + \cdots + 13y + 1$
c_2, c_4, c_7 c_{10}	$y^{26} + 20y^{25} + \cdots - 11y + 1$
c_5, c_9	$(y^{13} + 10y^{12} + \cdots - 7y - 4)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.752045 + 0.803934I$ $a = 1.97258 - 1.23710I$ $b = -2.47801 - 0.65547I$	$1.88524 - 0.96841I$	$0.413632 + 1.140295I$
$u = 0.752045 - 0.803934I$ $a = 1.97258 + 1.23710I$ $b = -2.47801 + 0.65547I$	$1.88524 + 0.96841I$	$0.413632 - 1.140295I$
$u = -0.578645 + 0.950081I$ $a = 0.030039 + 0.285319I$ $b = 0.288458 + 0.136559I$	$-0.80957 - 3.02973I$	$-5.16840 + 1.62282I$
$u = -0.578645 - 0.950081I$ $a = 0.030039 - 0.285319I$ $b = 0.288458 - 0.136559I$	$-0.80957 + 3.02973I$	$-5.16840 - 1.62282I$
$u = -0.496478 + 0.720203I$ $a = 0.299461 - 0.224790I$ $b = -0.013218 - 0.327276I$	$0.00150 - 1.41503I$	$-1.90513 + 4.60201I$
$u = -0.496478 - 0.720203I$ $a = 0.299461 + 0.224790I$ $b = -0.013218 + 0.327276I$	$0.00150 + 1.41503I$	$-1.90513 - 4.60201I$
$u = -0.335785 + 1.109920I$ $a = 0.267955 + 0.444237I$ $b = 0.583042 - 0.148240I$	$1.88524 - 0.96841I$	$0.413632 + 1.140295I$
$u = -0.335785 - 1.109920I$ $a = 0.267955 - 0.444237I$ $b = 0.583042 + 0.148240I$	$1.88524 + 0.96841I$	$0.413632 - 1.140295I$
$u = 0.905446 + 0.730041I$ $a = 1.71372 - 0.85399I$ $b = -2.17513 - 0.47784I$	$9.45063 - 6.48172I$	$3.04187 + 3.27257I$
$u = 0.905446 - 0.730041I$ $a = 1.71372 + 0.85399I$ $b = -2.17513 + 0.47784I$	$9.45063 + 6.48172I$	$3.04187 - 3.27257I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.269616+1.131670I$ $a=-0.308288-0.503667I$ $b=-0.653102+0.213082I$	$1.46125-6.61332I$	$-1.15142+6.72912I$
$u=-0.269616-1.131670I$ $a=-0.308288+0.503667I$ $b=-0.653102-0.213082I$	$1.46125+6.61332I$	$-1.15142-6.72912I$
$u=-0.786233+0.860060I$ $a=\ \ 0.072545-0.387289I$ $b=-0.276054-0.366893I$	4.64840	$1.75564+0.I$
$u=-0.786233-0.860060I$ $a=\ \ 0.072545+0.387289I$ $b=-0.276054+0.366893I$	4.64840	$1.75564+0.I$
$u=-0.819468+0.042718I$ $a=\ \ 0.021039-0.644673I$ $b=-0.010298-0.529188I$	$5.42596-2.97283I$	$4.39163+2.88376I$
$u=-0.819468-0.042718I$ $a=\ \ 0.021039+0.644673I$ $b=-0.010298+0.529188I$	$5.42596+2.97283I$	$4.39163-2.88376I$
$u=\ \ 0.791857+0.886903I$ $a=-1.65384+1.34745I$ $b=\ \ 2.50466+0.39980I$	$5.42596+2.97283I$	$4.39163-2.88376I$
$u=\ \ 0.791857-0.886903I$ $a=-1.65384-1.34745I$ $b=\ \ 2.50466-0.39980I$	$5.42596-2.97283I$	$4.39163+2.88376I$
$u=\ \ 0.732196+0.941652I$ $a=\ \ 1.54369-1.64448I$ $b=-2.67881-0.24953I$	$1.46125+6.61332I$	$-1.15142-6.72912I$
$u=\ \ 0.732196-0.941652I$ $a=\ \ 1.54369+1.64448I$ $b=-2.67881+0.24953I$	$1.46125-6.61332I$	$-1.15142+6.72912I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.156803 + 0.747604I$ $a = -1.50536 - 0.52470I$ $b = -0.156223 + 1.207680I$	$-0.80957 + 3.02973I$	$-5.16840 - 1.62282I$
$u = 0.156803 - 0.747604I$ $a = -1.50536 + 0.52470I$ $b = -0.156223 - 1.207680I$	$-0.80957 - 3.02973I$	$-5.16840 + 1.62282I$
$u = 0.799863 + 1.014160I$ $a = -1.26195 + 1.42943I$ $b = 2.45906 + 0.13647I$	$9.45063 + 6.48172I$	$3.04187 - 3.27257I$
$u = 0.799863 - 1.014160I$ $a = -1.26195 - 1.42943I$ $b = 2.45906 - 0.13647I$	$9.45063 - 6.48172I$	$3.04187 + 3.27257I$
$u = 0.148015 + 0.419312I$ $a = 1.80840 - 0.30217I$ $b = -0.394374 - 0.713561I$	$0.00150 - 1.41503I$	$-1.90513 + 4.60201I$
$u = 0.148015 - 0.419312I$ $a = 1.80840 + 0.30217I$ $b = -0.394374 + 0.713561I$	$0.00150 + 1.41503I$	$-1.90513 - 4.60201I$

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 8u + 4$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.500000+0.866025I$ $a=-0.500000+0.866025I$ $b=-0.500000-0.866025I$	$-4.05977I$	$0.+6.92820I$
$u=-0.500000-0.866025I$ $a=-0.500000-0.866025I$ $b=-0.500000+0.866025I$	$4.05977I$	$0.-6.92820I$

IV. $I_4^u = \langle b-u,\ a-1,\ u^2+u+1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -3$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = \quad 1.00000$ $b = -0.500000 + 0.866025I$	0	-3.00000
$u = -0.500000 - 0.866025I$ $a = \quad 1.00000$ $b = -0.500000 - 0.866025I$	0	-3.00000

V. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_6	$((u^2-u+1)^2)(u^{10}+u^9+\cdots-u+1)$ $\cdot(u^{26}+2u^{25}+\cdots+u+1)$
c_2, c_7, c_{10}	$((u^2-u+1)^2)(u^{10}+3u^9+\cdots+5u+1)(u^{26}+8u^{25}+\cdots+13u+1)$
c_3, c_8	$((u^2+u+1)^2)(u^{10}+u^9+\cdots-u+1)$ $\cdot(u^{26}+2u^{25}+\cdots+u+1)$
c_4	$((u^2+u+1)^2)(u^{10}+3u^9+\cdots+5u+1)(u^{26}+8u^{25}+\cdots+13u+1)$
c_5, c_9	$u^4(u^{10}-5u^9+\cdots-8u+4)(u^{13}+2u^{12}+\cdots+3u+2)^2$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_3, c_6 c_8	$((y^2+y+1)^2)(y^{10}+3y^9+\cdots+5y+1)(y^{26}+8y^{25}+\cdots+13y+1)$
c_2, c_4, c_7 c_{10}	$((y^2+y+1)^2)(y^{10}+11y^9+\cdots+13y+1)(y^{26}+20y^{25}+\cdots-11y+1)$
c_5, c_9	$y^4(y^{10}+5y^9+\cdots+32y+16)(y^{13}+10y^{12}+\cdots-7y-4)^2$