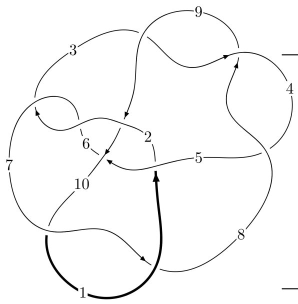
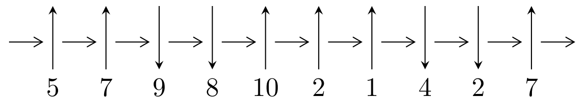
10_{162} $(K10n_{40})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u = \langle & b-u,\ -u^9+u^8+3u^7-2u^6-8u^5+3u^4+8u^3+a-5u+2,\\
& u^{10}-u^9-3u^8+3u^7+7u^6-5u^5-6u^4+4u^3+3u^2-3u+1\rangle\\
I_2^u = \langle & -30u^{11}+6u^{10}+76u^9-92u^8+34u^7+209u^6-204u^5-228u^4+66u^3+529u^2+95b+28u-416,\\
& -336u^{11}+50u^{10}+\cdots+1045a-3305,\\
& u^{12}-u^{11}-2u^{10}+5u^9-4u^8-5u^7+11u^6+u^5-6u^4-16u^3+16u^2+10u-11\rangle\\
I_3^u = \langle & b+u,\ u^2+a-1,\ u^5-u^4-u^3+u^2+1\rangle
\end{aligned}$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 27 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. $\boldsymbol{I^u_1 = \langle b - u,\ -u^9 + u^8 + \cdots + a + 2,\ u^{10} - u^9 + \cdots - 3u + 1\rangle}$

(i) Arc colorings

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

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} u^9 - u^8 - 3u^7 + 2u^6 + 8u^5 - 3u^4 - 8u^3 + 5u - 2 \\ u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^9 - u^8 - 2u^7 + 3u^6 + 3u^5 - 3u^4 + u^3 + 3u^2 - 2u \\ -u^8 + u^7 + 2u^6 - 2u^5 - 4u^4 + 2u^3 + u^2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u^9 - u^8 - 3u^7 + 2u^6 + 8u^5 - 3u^4 - 8u^3 + 4u - 2 \\ u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -2u^9 + u^8 + 5u^7 - u^6 - 12u^5 - 2u^4 + 7u^3 + 2u^2 - 4u + 3 \\ u^9 - u^8 - 2u^7 + 2u^6 + 4u^5 - u^4 - u^3 - u^2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} u^9 - 4u^7 + 10u^5 + u^4 - 9u^3 - u^2 + 4u - 2 \\ -u^8 + u^7 + 3u^6 - 4u^5 - 5u^4 + 4u^3 + 3u^2 - 2u + 1 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} -u^9 + u^8 + u^7 - u^6 - 2u^5 - u^4 - 3u^3 + 2u^2 + u \\ u^9 - u^8 - 3u^7 + 4u^6 + 5u^5 - 5u^4 - 3u^3 + 4u^2 - u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -5u^9 + 4u^8 + 16u^7 - 11u^6 - 39u^5 + 15u^4 + 38u^3 - 11u^2 - 21u + 14$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_7, c_{10}	$u^{10} - u^9 - 3u^8 + 3u^7 + 7u^6 - 5u^5 - 6u^4 + 4u^3 + 3u^2 - 3u + 1$
c_2, c_5, c_6	$u^{10} + 7u^8 - u^7 + 20u^6 - 6u^5 + 25u^4 - 8u^3 + 10u^2 - 2u + 1$
c_3, c_4, c_8	$u^{10} + 5u^9 + \cdots + 18u + 4$
c_9	$u^{10} - 9u^9 + \cdots - 20u + 8$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_7, c_{10}	$y^{10} - 7y^9 + \cdots - 3y + 1$
c_2, c_5, c_6	$y^{10} + 14y^9 + \cdots + 16y + 1$
c_3, c_4, c_8	$y^{10} + 9y^9 + \cdots + 68y + 16$
c_9	$y^{10} - 5y^9 + \cdots + 496y + 64$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.834890 + 0.288236I$ $a = -1.16719 - 0.85231I$ $b = 0.834890 + 0.288236I$	$-1.336140 - 0.440636I$	$5.86082 - 0.80149I$
$u = 0.834890 - 0.288236I$ $a = -1.16719 + 0.85231I$ $b = 0.834890 - 0.288236I$	$-1.336140 + 0.440636I$	$5.86082 + 0.80149I$
$u = -0.989389 + 0.553558I$ $a = -0.604538 + 1.276350I$ $b = -0.989389 + 0.553558I$	$7.86026 - 2.34852I$	$3.25800 + 2.98056I$
$u = -0.989389 - 0.553558I$ $a = -0.604538 - 1.276350I$ $b = -0.989389 - 0.553558I$	$7.86026 + 2.34852I$	$3.25800 - 2.98056I$
$u = -1.093020 + 0.614392I$ $a = 0.571463 + 0.630872I$ $b = -1.093020 + 0.614392I$	$-3.41629 - 5.60135I$	$2.31471 + 5.03009I$
$u = -1.093020 - 0.614392I$ $a = 0.571463 - 0.630872I$ $b = -1.093020 - 0.614392I$	$-3.41629 + 5.60135I$	$2.31471 - 5.03009I$
$u = 0.329249 + 0.368284I$ $a = 0.479615 + 1.097570I$ $b = 0.329249 + 0.368284I$	$0.201388 + 1.011140I$	$3.39938 - 6.83831I$
$u = 0.329249 - 0.368284I$ $a = 0.479615 - 1.097570I$ $b = 0.329249 - 0.368284I$	$0.201388 - 1.011140I$	$3.39938 + 6.83831I$
$u = 1.41827 + 0.76674I$ $a = 0.220652 + 0.935375I$ $b = 1.41827 + 0.76674I$	$2.44804 + 10.69340I$	$5.16708 - 5.74333I$
$u = 1.41827 - 0.76674I$ $a = 0.220652 - 0.935375I$ $b = 1.41827 - 0.76674I$	$2.44804 - 10.69340I$	$5.16708 + 5.74333I$

II. $\boldsymbol{I^u_2 = \langle -30u^{11} + 6u^{10} + \cdots + 95b - 416,\ -336u^{11} + 50u^{10} + \cdots + 1045a - 3305,\ u^{12} - u^{11} + \cdots + 10u - 11\rangle}$

(i) Arc colorings

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

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} 0.321531u^{11} - 0.0478469u^{10} + \cdots + 0.449761u + 3.16268 \\ 0.315789u^{11} - 0.0631579u^{10} + \cdots - 0.294737u + 4.37895 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0.107177u^{11} + 0.0612440u^{10} + \cdots - 1.03254u - 0.359809 \\ 0.284211u^{11} + 0.126316u^{10} + \cdots - u + 1.53684 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0.00574163u^{11} + 0.0153110u^{10} + \cdots + 0.744498u - 1.21627 \\ 0.315789u^{11} - 0.0631579u^{10} + \cdots - 0.294737u + 4.37895 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0.123445u^{11} - 0.0181818u^{10} + \cdots + 0.0277512u + 2.61340 \\ -0.0210526u^{11} - 0.147368u^{10} + \cdots + 1.27368u + 0.936842 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -0.478469u^{11} - 0.00574163u^{10} + \cdots + 1.18660u - 5.82679 \\ \frac{4}{5}u^{11} - \frac{1}{19}u^{10} + \cdots - \frac{2}{95}u + \frac{944}{95} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -0.144498u^{11} - 0.129187u^{10} + \cdots + 1.24593u - 1.67656 \\ 0.284211u^{11} + 0.273684u^{10} + \cdots - 2.42105u + 2.07368 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.123445u^{11} + 0.0181818u^{10} + \cdots - 0.0277512u - 2.61340 \\ 0.0315789u^{11} + 0.126316u^{10} + \cdots - 0.968421u + 0.221053 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= \frac{8}{19}u^{11} - \frac{36}{95}u^{10} - \frac{88}{95}u^9 + \frac{32}{19}u^8 - \frac{128}{95}u^7 - \frac{44}{19}u^6 + \frac{68}{19}u^5 + \frac{8}{5}u^4 - \frac{316}{95}u^3 - \frac{148}{19}u^2 + \frac{524}{95}u + \frac{706}{95}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_7, c_{10}	$u^{12} - u^{11} + \cdots + 10u - 11$
c_2, c_5, c_6	$u^{12} + u^{11} + \cdots - 26u - 1$
c_3, c_4, c_8	$(u^3 - u^2 + 2u - 1)^4$
c_9	$(u^2 + u - 1)^6$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_7, c_{10}	$y^{12} - 5y^{11} + \cdots - 452y + 121$
c_2, c_5, c_6	$y^{12} + 7y^{11} + \cdots - 680y + 1$
c_3, c_4, c_8	$(y^3 + 3y^2 + 2y - 1)^4$
c_9	$(y^2 - 3y + 1)^6$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.968966 + 0.268874I$ $a = -0.141468 - 1.309750I$ $b = 0.45076 - 1.47409I$	$-0.92371 + 2.82812I$	$5.50976 - 2.97945I$
$u = 0.968966 - 0.268874I$ $a = -0.141468 + 1.309750I$ $b = 0.45076 + 1.47409I$	$-0.92371 - 2.82812I$	$5.50976 + 2.97945I$
$u = -0.610709 + 0.902723I$ $a = -0.292966 - 0.433049I$ $b = -0.610709 - 0.902723I$	-5.06130	$-6 - 1.019511 + 0.10I$
$u = -0.610709 - 0.902723I$ $a = -0.292966 + 0.433049I$ $b = -0.610709 + 0.902723I$	-5.06130	$-6 - 1.019511 + 0.10I$
$u = -0.816782$ $a = -0.697665$ $b = 1.28332$	2.83439	-1.01950
$u = 1.008300 + 0.692219I$ $a = -0.459918 - 0.980637I$ $b = -1.55059 - 0.23187I$	$6.97197 + 2.82812I$	$5.50976 - 2.97945I$
$u = 1.008300 - 0.692219I$ $a = -0.459918 + 0.980637I$ $b = -1.55059 + 0.23187I$	$6.97197 - 2.82812I$	$5.50976 + 2.97945I$
$u = 1.28332$ $a = 0.444035$ $b = -0.816782$	2.83439	-1.01950
$u = 0.45076 + 1.47409I$ $a = 0.851722 + 0.114540I$ $b = 0.968966 - 0.268874I$	$-0.92371 - 2.82812I$	$5.50976 + 2.97945I$
$u = 0.45076 - 1.47409I$ $a = 0.851722 - 0.114540I$ $b = 0.968966 + 0.268874I$	$-0.92371 + 2.82812I$	$5.50976 - 2.97945I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.55059+0.23187I$ $a=-0.012373-0.844848I$ $b=\quad 1.008300-0.692219I$	$6.97197-2.82812I$	$5.50976+2.97945I$
$u=-1.55059-0.23187I$ $a=-0.012373+0.844848I$ $b=\quad 1.008300+0.692219I$	$6.97197+2.82812I$	$5.50976-2.97945I$

III. $I_3^u = \langle b + u,\ u^2 + a - 1,\ u^5 - u^4 - u^3 + u^2 + 1 \rangle$

(i) Arc colorings

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

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

$$a_4 = \begin{pmatrix} u^4 - u^3 - u^2 + u - 1 \\ u^4 - u^2 + u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u^2 + u + 1 \\ -u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} u^4 - u^3 - u^2 + 2u \\ -u^2 + 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} u^4 - u^3 - 2u^2 + 2u + 1 \\ 0 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} u^3 - u \\ -u^4 + 2u^2 \end{pmatrix}$$

(ii) Obstruction class $= 1$

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

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_7, c_{10}	$y^5 - 3y^4 + 3y^3 + y^2 - 2y - 1$
c_2, c_5, c_6	$y^5 + 2y^4 - y^3 - 3y^2 + 3y - 1$
c_3, c_4, c_8	$y^5 + 6y^4 + 13y^3 + 12y^2 + 4y - 1$
c_9	$y^5 - 2y^4 - 3y^3 + 4y^2 + 8y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.15950$ $a = -0.344435$ $b = 1.15950$	3.66375	11.0100
$u = -0.144591 + 0.695997I$ $a = 1.46351 + 0.20127I$ $b = 0.144591 - 0.695997I$	$-2.68365 + 1.36579I$	$1.66321 - 1.28728I$
$u = -0.144591 - 0.695997I$ $a = 1.46351 - 0.20127I$ $b = 0.144591 + 0.695997I$	$-2.68365 - 1.36579I$	$1.66321 + 1.28728I$
$u = 1.224340 + 0.455764I$ $a = -0.291288 - 1.116020I$ $b = -1.224340 - 0.455764I$	$9.07644 + 2.10101I$	$10.83155 - 1.02320I$
$u = 1.224340 - 0.455764I$ $a = -0.291288 + 1.116020I$ $b = -1.224340 + 0.455764I$	$9.07644 - 2.10101I$	$10.83155 + 1.02320I$

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_7	$(u^5 - u^4 - u^3 + u^2 + 1)$ $\cdot (u^{10} - u^9 - 3u^8 + 3u^7 + 7u^6 - 5u^5 - 6u^4 + 4u^3 + 3u^2 - 3u + 1)$ $\cdot (u^{12} - u^{11} + \cdots + 10u - 11)$
c_2, c_5	$(u^5 + u^3 - u^2 - u + 1)$ $\cdot (u^{10} + 7u^8 - u^7 + 20u^6 - 6u^5 + 25u^4 - 8u^3 + 10u^2 - 2u + 1)$ $\cdot (u^{12} + u^{11} + \cdots - 26u - 1)$
c_3, c_4	$((u^3 - u^2 + 2u - 1)^4)(u^5 + 3u^3 + 2u + 1)(u^{10} + 5u^9 + \cdots + 18u + 4)$
c_6	$(u^5 + u^3 + u^2 - u - 1)$ $\cdot (u^{10} + 7u^8 - u^7 + 20u^6 - 6u^5 + 25u^4 - 8u^3 + 10u^2 - 2u + 1)$ $\cdot (u^{12} + u^{11} + \cdots - 26u - 1)$
c_8	$((u^3 - u^2 + 2u - 1)^4)(u^5 + 3u^3 + 2u - 1)(u^{10} + 5u^9 + \cdots + 18u + 4)$
c_9	$((u^2 + u - 1)^6)(u^5 - 2u^4 + \cdots + 2u + 1)(u^{10} - 9u^9 + \cdots - 20u + 8)$
c_{10}	$(u^5 + u^4 - u^3 - u^2 - 1)$ $\cdot (u^{10} - u^9 - 3u^8 + 3u^7 + 7u^6 - 5u^5 - 6u^4 + 4u^3 + 3u^2 - 3u + 1)$ $\cdot (u^{12} - u^{11} + \cdots + 10u - 11)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_7, c_{10}	$(y^5 - 3y^4 + 3y^3 + y^2 - 2y - 1)(y^{10} - 7y^9 + \cdots - 3y + 1)$ $\cdot (y^{12} - 5y^{11} + \cdots - 452y + 121)$
c_2, c_5, c_6	$(y^5 + 2y^4 - y^3 - 3y^2 + 3y - 1)(y^{10} + 14y^9 + \cdots + 16y + 1)$ $\cdot (y^{12} + 7y^{11} + \cdots - 680y + 1)$
c_3, c_4, c_8	$(y^3 + 3y^2 + 2y - 1)^4(y^5 + 6y^4 + 13y^3 + 12y^2 + 4y - 1)$ $\cdot (y^{10} + 9y^9 + \cdots + 68y + 16)$
c_9	$(y^2 - 3y + 1)^6(y^5 - 2y^4 - 3y^3 + 4y^2 + 8y - 1)$ $\cdot (y^{10} - 5y^9 + \cdots + 496y + 64)$