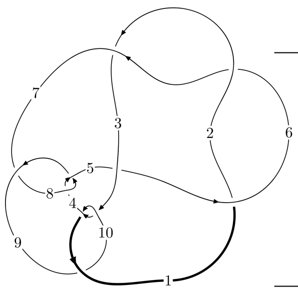
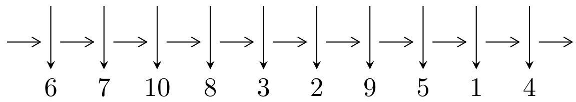
10_{66} $(K10a_{40})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned} I_1^u = \langle & b-u,\ u^{15}+u^{14}-2u^{13}-3u^{12}+4u^{11}+6u^{10}-u^9-6u^8+2u^7+5u^6+3u^5-3u^4+2u^3+2u^2+2a+3u, \\ & u^{16}+u^{15}-3u^{14}-4u^{13}+6u^{12}+9u^{11}-5u^{10}-12u^9+3u^8+11u^7+u^6-8u^5-u^4+5u^3+3u^2-2u-1\rangle \\ I_2^u = \langle & 11603u^{23}+6022u^{22}+\cdots+8177b+4273,\ 3426u^{23}-2155u^{22}+\cdots+8177a-28435, \\ & u^{24}+u^{23}+\cdots+4u+1\rangle \\ I_3^u = \langle & b-1,\ a^2-4a+2,\ u+1\rangle \\ I_4^u = \langle & b+1,\ a+2,\ u-1\rangle \end{aligned}$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 43 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. $\boldsymbol{I_1^u = \langle b - u,\ u^{15} + u^{14} + \cdots + 2a + 3u,\ u^{16} + u^{15} + \cdots - 2u - 1\rangle}$

(i) Arc colorings

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

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

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

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

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

$$a_1 = \begin{pmatrix} -\frac{1}{2}u^{15} - \frac{1}{2}u^{14} + \cdots - u^2 - \frac{5}{2}u \\ u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} \frac{1}{2}u^{14} + \frac{1}{2}u^{13} + \cdots + u + \frac{3}{2} \\ -u^2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -\frac{1}{2}u^{15} - \frac{3}{2}u^{14} + \cdots - \frac{9}{2}u - 1 \\ \frac{1}{2}u^{14} + \frac{1}{2}u^{13} + \cdots + u + \frac{1}{2} \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} u^{10} - u^8 + 2u^6 + u^4 + u^2 + 1 \\ -\frac{1}{2}u^{14} - \frac{1}{2}u^{13} + \cdots - u - \frac{1}{2} \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= u^{15} + u^{14} - 4u^{13} - 3u^{12} + 12u^{11} + 8u^{10} - 19u^9 - 12u^8 + 22u^7 + 17u^6 - 13u^5 - 13u^4 + 6u^3 + 12u^2 - u - 16$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_6	$u^{16} + 3u^{15} + \cdots - 2u - 2$
c_3, c_4, c_8 c_{10}	$u^{16} + u^{15} + \cdots - 2u - 1$
c_5	$u^{16} - 9u^{15} + \cdots - 34u + 14$
c_7, c_9	$u^{16} + 7u^{15} + \cdots + 10u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6	$y^{16} - 15y^{15} + \cdots - 20y + 4$
c_3, c_4, c_8 c_{10}	$y^{16} - 7y^{15} + \cdots - 10y + 1$
c_5	$y^{16} - 3y^{15} + \cdots - 1156y + 196$
c_7, c_9	$y^{16} + 9y^{15} + \cdots - 38y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.788317 + 0.682807I$ $a = -0.862130 - 0.839659I$ $b = -0.788317 + 0.682807I$	$-0.17586 + 4.85157I$	$-10.18415 - 6.53900I$
$u = -0.788317 - 0.682807I$ $a = -0.862130 + 0.839659I$ $b = -0.788317 - 0.682807I$	$-0.17586 - 4.85157I$	$-10.18415 + 6.53900I$
$u = 0.591599 + 0.705742I$ $a = 0.502397 - 0.588564I$ $b = 0.591599 + 0.705742I$	$3.06515 - 1.13134I$	$-4.88295 + 2.50814I$
$u = 0.591599 - 0.705742I$ $a = 0.502397 + 0.588564I$ $b = 0.591599 - 0.705742I$	$3.06515 + 1.13134I$	$-4.88295 - 2.50814I$
$u = -0.403938 + 0.782402I$ $a = -0.331306 - 0.329211I$ $b = -0.403938 + 0.782402I$	$-1.21964 - 2.39915I$	$-9.20728 + 0.67092I$
$u = -0.403938 - 0.782402I$ $a = -0.331306 + 0.329211I$ $b = -0.403938 - 0.782402I$	$-1.21964 + 2.39915I$	$-9.20728 - 0.67092I$
$u = 1.043770 + 0.418403I$ $a = 1.76067 - 2.04191I$ $b = 1.043770 + 0.418403I$	$-8.80698 - 2.79176I$	$-16.7106 + 5.2072I$
$u = 1.043770 - 0.418403I$ $a = 1.76067 + 2.04191I$ $b = 1.043770 - 0.418403I$	$-8.80698 + 2.79176I$	$-16.7106 - 5.2072I$
$u = -1.034800 + 0.560504I$ $a = -1.60194 - 1.34258I$ $b = -1.034800 + 0.560504I$	$-1.63698 + 4.78532I$	$-12.50670 - 3.64348I$
$u = -1.034800 - 0.560504I$ $a = -1.60194 + 1.34258I$ $b = -1.034800 - 0.560504I$	$-1.63698 - 4.78532I$	$-12.50670 + 3.64348I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.123030+0.603482I$ $a = 1.88319-1.11133I$ $b = 1.123030+0.603482I$	$-0.34351-9.16484I$	$-10.75715+8.12303I$
$u = 1.123030-0.603482I$ $a = 1.88319+1.11133I$ $b = 1.123030-0.603482I$	$-0.34351+9.16484I$	$-10.75715-8.12303I$
$u = 0.703289$ $a = -2.07989$ $b = 0.703289$	-6.93855	-11.2730
$u = -1.184280+0.595800I$ $a = -2.08419-1.05231I$ $b = -1.184280+0.595800I$	$-5.9872+13.0293I$	$-14.9902-8.3428I$
$u = -1.184280-0.595800I$ $a = -2.08419+1.05231I$ $b = -1.184280-0.595800I$	$-5.9872-13.0293I$	$-14.9902+8.3428I$
$u = -0.397419$ $a = 0.546503$ $b = -0.397419$	-0.684897	-14.2490

II. $\boldsymbol{I_2^u = \langle 11603u^{23} + 6022u^{22} + \cdots + 8177b + 4273,\ 3426u^{23} - 2155u^{22} + \cdots + 8177a - 28435,\ u^{24} + u^{23} + \cdots + 4u + 1\rangle}$

(i) Arc colorings

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

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

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

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

$$a_{10} = \begin{pmatrix} -0.418980u^{23} + 0.263544u^{22} + \cdots + 0.0328972u + 3.47744 \\ -1.41898u^{23} - 0.736456u^{22} + \cdots - 5.96710u - 0.522563 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^{23} + u^{22} + \cdots + 6u + 4 \\ -1.41898u^{23} - 0.736456u^{22} + \cdots - 5.96710u - 0.522563 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1.20509u^{23} - 0.359300u^{22} + \cdots + 1.96025u - 2.45787 \\ 0.682524u^{23} + 0.537116u^{22} + \cdots + 5.15336u + 0.418980 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -0.203987u^{23} + 1.29118u^{22} + \cdots + 4.42057u + 5.51266 \\ -0.997187u^{23} - 0.285190u^{22} + \cdots - 4.02678u + 0.362236 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} 1.12511u^{23} - 0.0760670u^{22} + \cdots + 0.287025u - 3.10578 \\ 0.00195671u^{23} + 0.323346u^{22} + \cdots - 0.322979u - 0.791488 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= \frac{19748}{8177}u^{23} + \frac{17088}{8177}u^{22} + \cdots + \frac{29544}{8177}u - \frac{105438}{8177}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2, c_6	$(u^{12} - u^{11} - 5u^{10} + 4u^9 + 9u^8 - 4u^7 - 6u^6 - 2u^5 + 3u^3 + u^2 + 1)^2$
c_3, c_4, c_8 c_{10}	$u^{24} + u^{23} + \cdots + 4u + 1$
c_5	$(u^{12} + 3u^{11} + \cdots + 4u + 1)^2$
c_7, c_9	$u^{24} + 13u^{23} + \cdots + 4u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6	$(y^{12} - 11y^{11} + \cdots + 2y + 1)^2$
c_3, c_4, c_8 c_{10}	$y^{24} - 13y^{23} + \cdots - 4y + 1$
c_5	$(y^{12} + y^{11} + \cdots - 2y + 1)^2$
c_7, c_9	$y^{24} - 5y^{23} + \cdots + 48y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.961597 + 0.331697I$ $a = -2.11926 + 0.49208I$ $b = -1.189900 + 0.171507I$	$-3.28987 - 1.20211I$	$-12.00000 + 5.63740I$
$u = 0.961597 - 0.331697I$ $a = -2.11926 - 0.49208I$ $b = -1.189900 - 0.171507I$	$-3.28987 + 1.20211I$	$-12.00000 - 5.63740I$
$u = -0.778724 + 0.569322I$ $a = 0.272376 - 0.021441I$ $b = -0.564477 - 0.633261I$	$-0.174773 + 0.093609I$	$-10.00912 + 0.76204I$
$u = -0.778724 - 0.569322I$ $a = 0.272376 + 0.021441I$ $b = -0.564477 + 0.633261I$	$-0.174773 - 0.093609I$	$-10.00912 - 0.76204I$
$u = -0.285725 + 0.889847I$ $a = -0.777424 + 0.420961I$ $b = -1.104540 - 0.597792I$	$-3.28987 - 7.58818I$	$-12.00000 + 5.13539I$
$u = -0.285725 - 0.889847I$ $a = -0.777424 - 0.420961I$ $b = -1.104540 + 0.597792I$	$-3.28987 + 7.58818I$	$-12.00000 - 5.13539I$
$u = 0.384175 + 0.809134I$ $a = 0.520131 + 0.408228I$ $b = 0.998981 - 0.600305I$	$1.84911 + 3.88480I$	$-7.19439 - 4.17140I$
$u = 0.384175 - 0.809134I$ $a = 0.520131 - 0.408228I$ $b = 0.998981 + 0.600305I$	$1.84911 - 3.88480I$	$-7.19439 + 4.17140I$
$u = -0.564477 + 0.633261I$ $a = 0.005650 + 0.310630I$ $b = -0.778724 - 0.569322I$	$-0.174773 - 0.093609I$	$-10.00912 - 0.76204I$
$u = -0.564477 - 0.633261I$ $a = 0.005650 - 0.310630I$ $b = -0.778724 + 0.569322I$	$-0.174773 + 0.093609I$	$-10.00912 + 0.76204I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.057630 + 0.470734I$ $a = 2.07384 + 0.60989I$ $b = 1.284660 + 0.258642I$	$-8.42885 + 3.88480I$	$-16.8056 - 4.1714I$
$u = -1.057630 - 0.470734I$ $a = 2.07384 - 0.60989I$ $b = 1.284660 - 0.258642I$	$-8.42885 - 3.88480I$	$-16.8056 + 4.1714I$
$u = 0.998981 + 0.600305I$ $a = -0.351273 - 0.367190I$ $b = 0.384175 - 0.809134I$	$1.84911 - 3.88480I$	$-7.19439 + 4.17140I$
$u = 0.998981 - 0.600305I$ $a = -0.351273 + 0.367190I$ $b = 0.384175 + 0.809134I$	$1.84911 + 3.88480I$	$-7.19439 - 4.17140I$
$u = 1.165410 + 0.089633I$ $a = -1.166860 - 0.270592I$ $b = -0.313835 - 0.336199I$	$-6.40496 + 0.09361I$	$-13.99088 + 0.76204I$
$u = 1.165410 - 0.089633I$ $a = -1.166860 + 0.270592I$ $b = -0.313835 + 0.336199I$	$-6.40496 - 0.09361I$	$-13.99088 - 0.76204I$
$u = -1.189900 + 0.171507I$ $a = 1.78490 + 0.45036I$ $b = 0.961597 + 0.331697I$	$-3.28987 - 1.20211I$	$-12.00000 + 5.63740I$
$u = -1.189900 - 0.171507I$ $a = 1.78490 - 0.45036I$ $b = 0.961597 - 0.331697I$	$-3.28987 + 1.20211I$	$-12.00000 - 5.63740I$
$u = -1.104540 + 0.597792I$ $a = 0.414520 - 0.510865I$ $b = -0.285725 - 0.889847I$	$-3.28987 + 7.58818I$	$-12.00000 - 5.13539I$
$u = -1.104540 - 0.597792I$ $a = 0.414520 + 0.510865I$ $b = -0.285725 + 0.889847I$	$-3.28987 - 7.58818I$	$-12.00000 + 5.13539I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.284660 + 0.258642I$ $a = -1.80572 + 0.62135I$ $b = -1.057630 + 0.470734I$	$-8.42885 + 3.88480I$	$-16.8056 - 4.1714I$
$u = 1.284660 - 0.258642I$ $a = -1.80572 - 0.62135I$ $b = -1.057630 - 0.470734I$	$-8.42885 - 3.88480I$	$-16.8056 + 4.1714I$
$u = -0.313835 + 0.336199I$ $a = 2.64911 + 1.49979I$ $b = 1.165410 - 0.089633I$	$-6.40496 - 0.09361I$	$-13.99088 - 0.76204I$
$u = -0.313835 - 0.336199I$ $a = 2.64911 - 1.49979I$ $b = 1.165410 + 0.089633I$	$-6.40496 + 0.09361I$	$-13.99088 + 0.76204I$

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

(i) Arc colorings

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

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

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

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

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

$$a_1 = \begin{pmatrix} a-1 \\ 1 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} -a+1 \\ -a+3 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} -1 \\ a-3 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -20$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.00000$ $a = \quad 0.585786$ $b = \quad 1.00000$	-8.22467	-20.0000
$u = -1.00000$ $a = \quad 3.41421$ $b = \quad 1.00000$	-8.22467	-20.0000

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

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \quad 1.00000$ $a = -2.00000$ $b = -1.00000$	-3.28987	-12.0000

V. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_2, c_6	$u(u^2-2)(u^{12}-u^{11}+\cdots+u^2+1)^2$ $\cdot\,(u^{16}+3u^{15}+\cdots-2u-2)$
c_3, c_8	$((u-1)^2)(u+1)(u^{16}+u^{15}+\cdots-2u-1)(u^{24}+u^{23}+\cdots+4u+1)$
c_4, c_{10}	$(u-1)(u+1)^2(u^{16}+u^{15}+\cdots-2u-1)(u^{24}+u^{23}+\cdots+4u+1)$
c_5	$u(u^2-2)(u^{12}+3u^{11}+\cdots+4u+1)^2(u^{16}-9u^{15}+\cdots-34u+14)$
c_7, c_9	$((u-1)^3)(u^{16}+7u^{15}+\cdots+10u+1)(u^{24}+13u^{23}+\cdots+4u+1)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6	$y(y-2)^2(y^{12}-11y^{11}+\cdots+2y+1)^2(y^{16}-15y^{15}+\cdots-20y+4)$
c_3, c_4, c_8 c_{10}	$((y-1)^3)(y^{16}-7y^{15}+\cdots-10y+1)(y^{24}-13y^{23}+\cdots-4y+1)$
c_5	$y(y-2)^2(y^{12}+y^{11}+\cdots-2y+1)^2$ $\cdot\,(y^{16}-3y^{15}+\cdots-1156y+196)$
c_7, c_9	$((y-1)^3)(y^{16}+9y^{15}+\cdots-38y+1)(y^{24}-5y^{23}+\cdots+48y+1)$