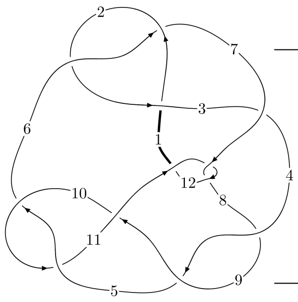
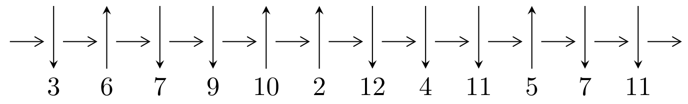
$12n_{0296}$ $(K12n_{0296})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned} I_1^u = \langle & 508219866971u^{31} - 100745166922u^{30} + \cdots + 21576816205486b - 1727274605244, \\ & -659556719114u^{31} + 420249241465u^{30} + \cdots + 2157681620548a - 609787719508, \\ & u^{32} - u^{31} + \cdots + 12u - 4\rangle \end{aligned}$$

$$I_2^u = \langle -au - u^2 + b - 1,\ -u^3a + 2u^2a + 3u^3 + 2a^2 + 2au + u^2 + 2a + 2u - 2,\ u^4 + 2u^2 + 2\rangle$$

$$I_1^v = \langle a,\ b + v,\ v^2 + v + 1\rangle$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 42 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.

$$\boldsymbol{I_1^u = \langle 5.08\times10^{11}u^{31} - 1.01\times10^{11}u^{30} + \cdots + 2.16\times10^{12}b - 1.73\times10^{12},\ -6.60\times10^{11}u^{31} + 4.20\times10^{11}u^{30} + \cdots + 2.16\times10^{12}a - 6.10\times10^{11},\ u^{32} - u^{31} + \cdots + 12u - 4\rangle}$$

(i) Arc colorings

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

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

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

$$a_2 = \begin{pmatrix} 0.305678u^{31} - 0.194769u^{30} + \cdots + 0.947602u + 0.282612 \\ -0.235540u^{31} + 0.0466914u^{30} + \cdots + 0.152492u + 0.800523 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} 0.569624u^{31} - 0.540602u^{30} + \cdots - 0.831433u + 0.738674 \\ -0.374580u^{31} + 0.0319571u^{30} + \cdots + 0.411896u + 0.929033 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -0.0263408u^{31} - 0.0396638u^{30} + \cdots - 0.0912398u - 0.0158334 \\ 0.286928u^{31} - 0.815573u^{30} + \cdots - 6.66152u + 2.51686 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -0.111217u^{31} - 0.545439u^{30} + \cdots - 5.88693u + 3.81525 \\ -0.346449u^{31} + 0.596107u^{30} + \cdots + 3.53802u - 0.422190 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0.235232u^{31} - 1.14155u^{30} + \cdots - 9.42495u + 4.23744 \\ -0.346449u^{31} + 0.596107u^{30} + \cdots + 3.53802u - 0.422190 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u^2 + 1 \\ u^2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^5 + 2u^3 + u \\ u^5 + u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u^8 - 3u^6 - 3u^4 + 1 \\ -u^8 - 2u^6 - 2u^4 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes

$$= \frac{518677209154}{539420405137}u^{31} - \frac{1641358644799}{539420405137}u^{30} + \cdots - \frac{8769457355210}{539420405137}u + \frac{688678562270}{539420405137}$$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{32} + 24u^{31} + \cdots + 16u + 1$
c_2, c_6	$u^{32} - 2u^{31} + \cdots + 6u + 1$
c_3	$u^{32} + 2u^{31} + \cdots + 742u + 173$
c_4, c_8	$u^{32} - u^{31} + \cdots + 20u - 4$
c_5, c_{10}	$u^{32} + u^{31} + \cdots - 12u - 4$
c_7, c_{11}	$u^{32} + 3u^{31} + \cdots + 43u - 13$
c_9	$u^{32} + 21u^{31} + \cdots + 80u + 16$
c_{12}	$u^{32} + 53u^{31} + \cdots + 1745u + 169$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{32} - 24y^{31} + \cdots - 816y + 1$
c_2, c_6	$y^{32} + 24y^{31} + \cdots + 16y + 1$
c_3	$y^{32} - 72y^{31} + \cdots + 762852y + 29929$
c_4, c_8	$y^{32} - 51y^{31} + \cdots - 112y + 16$
c_5, c_{10}	$y^{32} + 21y^{31} + \cdots + 80y + 16$
c_7, c_{11}	$y^{32} - 53y^{31} + \cdots - 1745y + 169$
c_9	$y^{32} - 15y^{31} + \cdots + 256y + 256$
c_{12}	$y^{32} - 133y^{31} + \cdots - 9350077y + 28561$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.01428$ $a=-0.536855$ $b=\ \ 0.0938357$	-12.7729	-5.31340
$u=-0.300579+0.918264I$ $a=\ \ 0.391932-0.210423I$ $b=-0.161520+0.335427I$	$-0.55082-1.63457I$	$-3.27047+3.85284I$
$u=-0.300579-0.918264I$ $a=\ \ 0.391932+0.210423I$ $b=-0.161520-0.335427I$	$-0.55082+1.63457I$	$-3.27047-3.85284I$
$u=\ \ 1.043470+0.101095I$ $a=-0.26843-1.93217I$ $b=-0.57959-2.65577I$	$-17.2641-6.3638I$	$-7.47410+2.59633I$
$u=\ \ 1.043470-0.101095I$ $a=-0.26843+1.93217I$ $b=-0.57959+2.65577I$	$-17.2641+6.3638I$	$-7.47410-2.59633I$
$u=\ \ 0.123488+1.046200I$ $a=-0.560397+1.014520I$ $b=\ \ 0.578687-0.837647I$	$-3.34462+2.78018I$	$-9.66898-3.45316I$
$u=\ \ 0.123488-1.046200I$ $a=-0.560397-1.014520I$ $b=\ \ 0.578687+0.837647I$	$-3.34462-2.78018I$	$-9.66898+3.45316I$
$u=-0.880708+0.236833I$ $a=-0.59959+1.89659I$ $b=\ \ 0.17577+2.14910I$	$-5.35743-0.84578I$	$-8.20870+1.07921I$
$u=-0.880708-0.236833I$ $a=-0.59959-1.89659I$ $b=\ \ 0.17577-2.14910I$	$-5.35743+0.84578I$	$-8.20870-1.07921I$
$u=\ \ 0.419631+1.045310I$ $a=-1.39528-0.99960I$ $b=-0.207451-1.209000I$	$-2.17363+5.75346I$	$-5.15068-8.16213I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.419631 - 1.045310I$ $a = -1.39528 + 0.99960I$ $b = -0.207451 + 1.209000I$	$-2.17363 - 5.75346I$	$-5.15068 + 8.16213I$
$u = -0.011003 + 1.154310I$ $a = 1.50102 - 0.43416I$ $b = 0.532426 + 0.445478I$	$-4.29088 - 1.34269I$	$-11.00178 + 0.73571I$
$u = -0.011003 - 1.154310I$ $a = 1.50102 + 0.43416I$ $b = 0.532426 - 0.445478I$	$-4.29088 + 1.34269I$	$-11.00178 - 0.73571I$
$u = 0.429441 + 1.086430I$ $a = -0.368309 - 1.007620I$ $b = 1.129540 - 0.239167I$	$-4.20427 + 3.60564I$	$-10.41579 - 4.53089I$
$u = 0.429441 - 1.086430I$ $a = -0.368309 + 1.007620I$ $b = 1.129540 + 0.239167I$	$-4.20427 - 3.60564I$	$-10.41579 + 4.53089I$
$u = 0.300263 + 0.761792I$ $a = 0.357934 + 0.706332I$ $b = 0.690935 + 1.189790I$	$-2.49558 - 0.98889I$	$-10.28745 - 0.57316I$
$u = 0.300263 - 0.761792I$ $a = 0.357934 - 0.706332I$ $b = 0.690935 - 1.189790I$	$-2.49558 + 0.98889I$	$-10.28745 + 0.57316I$
$u = -0.384747 + 0.600251I$ $a = 0.721932 + 0.539648I$ $b = -0.302394 + 0.210503I$	$0.25012 - 1.51862I$	$0.08529 + 4.58805I$
$u = -0.384747 - 0.600251I$ $a = 0.721932 - 0.539648I$ $b = -0.302394 - 0.210503I$	$0.25012 + 1.51862I$	$0.08529 - 4.58805I$
$u = -0.613650 + 1.166290I$ $a = 1.41978 - 0.58897I$ $b = 0.11410 - 2.43615I$	$-8.05657 - 4.56260I$	$-10.63691 + 3.18178I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.613650 - 1.166290I$ $a = 1.41978 + 0.58897I$ $b = 0.11410 + 2.43615I$	$-8.05657 + 4.56260I$	$-10.63691 - 3.18178I$
$u = -0.356156 + 1.331570I$ $a = -1.82084 - 0.21954I$ $b = -0.07721 + 2.01088I$	$-10.24520 - 5.08725I$	$-11.32137 + 3.44892I$
$u = -0.356156 - 1.331570I$ $a = -1.82084 + 0.21954I$ $b = -0.07721 - 2.01088I$	$-10.24520 + 5.08725I$	$-11.32137 - 3.44892I$
$u = 0.459215 + 0.354759I$ $a = 0.80233 + 2.03995I$ $b = -0.151979 + 0.783354I$	$-0.25749 - 2.03582I$	$-0.07050 + 3.37549I$
$u = 0.459215 - 0.354759I$ $a = 0.80233 - 2.03995I$ $b = -0.151979 - 0.783354I$	$-0.25749 + 2.03582I$	$-0.07050 - 3.37549I$
$u = -0.50730 + 1.33114I$ $a = -0.533965 + 0.005339I$ $b = 0.0323333 - 0.1210510I$	$-16.9136 - 5.4099I$	$-8.22953 + 2.64698I$
$u = -0.50730 - 1.33114I$ $a = -0.533965 - 0.005339I$ $b = 0.0323333 + 0.1210510I$	$-16.9136 + 5.4099I$	$-8.22953 - 2.64698I$
$u = 0.56860 + 1.30790I$ $a = 1.95984 + 0.66591I$ $b = -0.66128 + 2.62930I$	$18.4866 + 12.1069I$	$-9.82586 - 5.57772I$
$u = 0.56860 - 1.30790I$ $a = 1.95984 - 0.66591I$ $b = -0.66128 - 2.62930I$	$18.4866 - 12.1069I$	$-9.82586 + 5.57772I$
$u = 0.541663$ $a = 0.857323$ $b = 0.704419$	-1.42188	-6.40410

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \quad 0.44634 + 1.39008I$ $a = -1.268180 + 0.456140I$ $b = -0.51150 - 2.59045I$	$17.4567 - 1.0678I$	$-10.66447 + 0.I$
$u = \quad 0.44634 - 1.39008I$ $a = -1.268180 - 0.456140I$ $b = -0.51150 + 2.59045I$	$17.4567 + 1.0678I$	$-10.66447 + 0.I$

II. $\boldsymbol{I_2^u = \langle -au - u^2 + b - 1,\ -u^3a + 3u^3 + \cdots + 2a - 2,\ u^4 + 2u^2 + 2\rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

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

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2	$(u^2 - u + 1)^4$
c_3, c_6	$(u^2 + u + 1)^4$
c_4, c_8	$(u^4 - 2u^2 + 2)^2$
c_5, c_{10}	$(u^4 + 2u^2 + 2)^2$
c_7, c_{12}	$(u + 1)^8$
c_9	$(u^2 - 2u + 2)^4$
c_{11}	$(u - 1)^8$

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.455090 + 1.098680I$ $a = 0.922841 - 0.931556I$ $b = 1.44346 + 1.58997I$	$-4.11234 + 1.63398I$	$-10.00000 - 0.53590I$
$u = 0.455090 + 1.098680I$ $a = -2.15482 - 1.48893I$ $b = 0.65522 - 2.04506I$	$-4.11234 + 5.69375I$	$-10.0000 - 7.46410I$
$u = 0.455090 - 1.098680I$ $a = 0.922841 + 0.931556I$ $b = 1.44346 - 1.58997I$	$-4.11234 - 1.63398I$	$-10.00000 + 0.53590I$
$u = 0.455090 - 1.098680I$ $a = -2.15482 + 1.48893I$ $b = 0.65522 + 2.04506I$	$-4.11234 - 5.69375I$	$-10.0000 + 7.46410I$
$u = -0.455090 + 1.098680I$ $a = 0.809210 + 0.068444I$ $b = -0.443461 - 0.142082I$	$-4.11234 - 1.63398I$	$-10.00000 + 0.53590I$
$u = -0.455090 + 1.098680I$ $a = 0.422767 - 0.488925I$ $b = 0.344777 - 0.313008I$	$-4.11234 - 5.69375I$	$-10.00000 + 7.46410I$
$u = -0.455090 - 1.098680I$ $a = 0.809210 - 0.068444I$ $b = -0.443461 + 0.142082I$	$-4.11234 + 1.63398I$	$-10.00000 - 0.53590I$
$u = -0.455090 - 1.098680I$ $a = 0.422767 + 0.488925I$ $b = 0.344777 + 0.313008I$	$-4.11234 + 5.69375I$	$-10.00000 - 7.46410I$

III. $I_1^v = \langle a,\ b+v,\ v^2+v+1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -4v - 8$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$v = -0.500000 + 0.866025I$ $a = 0$ $b = 0.500000 - 0.866025I$	$-1.64493 + 2.02988I$	$-6.00000 - 3.46410I$
$v = -0.500000 - 0.866025I$ $a = 0$ $b = 0.500000 + 0.866025I$	$-1.64493 - 2.02988I$	$-6.00000 + 3.46410I$

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u^2-u+1)^5)(u^{32}+24u^{31}+\cdots+16u+1)$
c_2	$((u^2-u+1)^4)(u^2+u+1)(u^{32}-2u^{31}+\cdots+6u+1)$
c_3	$(u^2-u+1)(u^2+u+1)^4(u^{32}+2u^{31}+\cdots+742u+173)$
c_4, c_8	$u^2(u^4-2u^2+2)^2(u^{32}-u^{31}+\cdots+20u-4)$
c_5, c_{10}	$u^2(u^4+2u^2+2)^2(u^{32}+u^{31}+\cdots-12u-4)$
c_6	$(u^2-u+1)(u^2+u+1)^4(u^{32}-2u^{31}+\cdots+6u+1)$
c_7	$((u-1)^2)(u+1)^8(u^{32}+3u^{31}+\cdots+43u-13)$
c_9	$u^2(u^2-2u+2)^4(u^{32}+21u^{31}+\cdots+80u+16)$
c_{11}	$((u-1)^8)(u+1)^2(u^{32}+3u^{31}+\cdots+43u-13)$
c_{12}	$((u+1)^{10})(u^{32}+53u^{31}+\cdots+1745u+169)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$((y^2+y+1)^5)(y^{32}-24y^{31}+\cdots-816y+1)$
c_2, c_6	$((y^2+y+1)^5)(y^{32}+24y^{31}+\cdots+16y+1)$
c_3	$((y^2+y+1)^5)(y^{32}-72y^{31}+\cdots+762852y+29929)$
c_4, c_8	$y^2(y^2-2y+2)^4(y^{32}-51y^{31}+\cdots-112y+16)$
c_5, c_{10}	$y^2(y^2+2y+2)^4(y^{32}+21y^{31}+\cdots+80y+16)$
c_7, c_{11}	$((y-1)^{10})(y^{32}-53y^{31}+\cdots-1745y+169)$
c_9	$y^2(y^2+4)^4(y^{32}-15y^{31}+\cdots+256y+256)$
c_{12}	$((y-1)^{10})(y^{32}-133y^{31}+\cdots-9350077y+28561)$