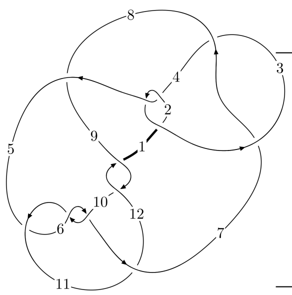
$12n_{0169}$ ($K12n_{0169}$)



A knot diagram[1]

Linearized knot diagam

3 5 8 2 11 10 3 5 12 6 7 9

Solving Sequence

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

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

$$I_1^u = \langle -u^{31} + u^{30} + \cdots + b + 2u,\ u^{31} - u^{30} + \cdots + a - 5u,\ u^{32} - 2u^{31} + \cdots + 5u - 1 \rangle$$
$$I_2^u = \langle b + u,\ u^2 + a + 2,\ u^3 + 2u - 1 \rangle$$
$$I_3^u = \langle -u^2 + b - u,\ u^3 + u^2 + a + 2u + 1,\ u^4 + u^3 + 2u^2 + 2u + 1 \rangle$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 39 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.

$$I_1^u = \langle -u^{31}+u^{30}+\cdots+b+2u,\ u^{31}-u^{30}+\cdots+a-5u,\ u^{32}-2u^{31}+\cdots+5u-1\rangle$$

(i) Arc colorings

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

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

$$a_3 = \begin{pmatrix} -u^{31} + u^{30} + \cdots - 7u^2 + 5u \\ u^{31} - u^{30} + \cdots + 3u^2 - 2u \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} u^{13} + 6u^{11} + 13u^9 + 12u^7 + 6u^5 + 4u^3 + u \\ -u^{13} - 5u^{11} - 7u^9 + 2u^5 - 3u^3 + u \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -u \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -u^3 - 2u \\ -u^5 - u^3 + u \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} u^{25} + 12u^{23} + \cdots - 4u^2 + 3u \\ u^{27} - u^{26} + \cdots + 3u^2 - 2u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^{11} + 6u^9 + 12u^7 + 8u^5 + u^3 + 2u \\ u^{13} + 5u^{11} + 7u^9 - 2u^5 + 3u^3 - u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^{31} - u^{30} + \cdots + u + 1 \\ -u^{31} + u^{30} + \cdots + u^2 - u \end{pmatrix}$$

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^{31} + 8u^{30} - 69u^{29} + 118u^{28} - 516u^{27} + 760u^{26} - 2191u^{25} + 2774u^{24} - 5768u^{23} + 6188u^{22} - 9542u^{21} + 8335u^{20} - 9334u^{19} + 5857u^{18} - 4125u^{17} + 549u^{16} + 634u^{15} - 1814u^{14} + 878u^{13} - 598u^{12} - 232u^{11} - 15u^{10} + 140u^9 - 465u^8 + 354u^7 - 156u^6 - 44u^5 + 113u^4 - 54u^3 - 27u^2 + 31u - 23$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{32}+44u^{31}+\cdots+48u+1$
c_2, c_4	$u^{32}-8u^{31}+\cdots+24u^2-1$
c_3, c_7	$u^{32}-u^{31}+\cdots+192u+128$
c_5, c_6, c_{10}	$u^{32}+2u^{31}+\cdots-5u-1$
c_8	$u^{32}+2u^{31}+\cdots-3u-1$
c_9, c_{12}	$u^{32}-6u^{31}+\cdots-39u+19$
c_{11}	$u^{32}-2u^{31}+\cdots-40u-8$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{32} - 104y^{31} + \cdots - 1812y + 1$
c_2, c_4	$y^{32} - 44y^{31} + \cdots - 48y + 1$
c_3, c_7	$y^{32} - 45y^{31} + \cdots - 12288y + 16384$
c_5, c_6, c_{10}	$y^{32} + 30y^{31} + \cdots - 9y + 1$
c_8	$y^{32} - 66y^{31} + \cdots - 9y + 1$
c_9, c_{12}	$y^{32} + 18y^{31} + \cdots - 1673y + 361$
c_{11}	$y^{32} + 6y^{31} + \cdots + 368y + 64$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.066411 + 1.151990I$ $a = 1.410670 + 0.024945I$ $b = -2.76292 - 0.86053I$	$-0.138725 + 1.342600I$	$-14.3827 - 1.1828I$
$u = -0.066411 - 1.151990I$ $a = 1.410670 - 0.024945I$ $b = -2.76292 + 0.86053I$	$-0.138725 - 1.342600I$	$-14.3827 + 1.1828I$
$u = 0.513081 + 0.643079I$ $a = -0.646531 + 0.515194I$ $b = 1.64282 - 0.89836I$	$-9.52014 + 3.30104I$	$-13.33638 + 0.19936I$
$u = 0.513081 - 0.643079I$ $a = -0.646531 - 0.515194I$ $b = 1.64282 + 0.89836I$	$-9.52014 - 3.30104I$	$-13.33638 - 0.19936I$
$u = 0.737634 + 0.348273I$ $a = 2.23105 - 1.72413I$ $b = -0.0831051 - 0.0958486I$	$-10.57590 - 7.60354I$	$-15.1269 + 5.2212I$
$u = 0.737634 - 0.348273I$ $a = 2.23105 + 1.72413I$ $b = -0.0831051 + 0.0958486I$	$-10.57590 + 7.60354I$	$-15.1269 - 5.2212I$
$u = -0.298547 + 1.193750I$ $a = -1.40936 - 1.46969I$ $b = 2.94438 + 2.80689I$	$-11.30460 + 3.80890I$	$-14.0876 - 3.1596I$
$u = -0.298547 - 1.193750I$ $a = -1.40936 + 1.46969I$ $b = 2.94438 - 2.80689I$	$-11.30460 - 3.80890I$	$-14.0876 + 3.1596I$
$u = -0.748139$ $a = 3.59916$ $b = -0.104790$	-14.9662	-18.4420
$u = -0.606144 + 0.421198I$ $a = 0.546855 + 0.039840I$ $b = 0.102884 + 0.314041I$	$2.64609 + 1.95373I$	$-5.09513 - 3.50992I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.606144 - 0.421198I$ $a = 0.546855 - 0.039840I$ $b = 0.102884 - 0.314041I$	$2.64609 - 1.95373I$	$-5.09513 + 3.50992I$
$u = 0.087660 + 1.285000I$ $a = -0.478992 + 0.327569I$ $b = 1.049280 - 0.185331I$	$3.25069 - 1.60094I$	$-6.41790 + 3.90851I$
$u = 0.087660 - 1.285000I$ $a = -0.478992 - 0.327569I$ $b = 1.049280 + 0.185331I$	$3.25069 + 1.60094I$	$-6.41790 - 3.90851I$
$u = 0.636337 + 0.293336I$ $a = -1.79875 + 1.45255I$ $b = 0.098008 - 0.391373I$	$-1.49855 - 3.68796I$	$-14.9081 + 6.2088I$
$u = 0.636337 - 0.293336I$ $a = -1.79875 - 1.45255I$ $b = 0.098008 + 0.391373I$	$-1.49855 + 3.68796I$	$-14.9081 - 6.2088I$
$u = -0.570243 + 0.210892I$ $a = -2.18842 - 0.55206I$ $b = -0.306041 - 0.510133I$	$-2.65931 + 1.04311I$	$-15.7710 - 5.3018I$
$u = -0.570243 - 0.210892I$ $a = -2.18842 + 0.55206I$ $b = -0.306041 + 0.510133I$	$-2.65931 - 1.04311I$	$-15.7710 + 5.3018I$
$u = -0.223261 + 1.390520I$ $a = 1.39534 + 1.47490I$ $b = -2.07768 - 2.46657I$	$2.48306 + 3.95929I$	$-10.08448 - 4.02414I$
$u = -0.223261 - 1.390520I$ $a = 1.39534 - 1.47490I$ $b = -2.07768 + 2.46657I$	$2.48306 - 3.95929I$	$-10.08448 + 4.02414I$
$u = 0.17860 + 1.41277I$ $a = -0.040682 + 0.405502I$ $b = 0.92757 - 1.07299I$	$4.99294 - 1.76578I$	$-7.97967 + 0.I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.17860 - 1.41277I$ $a = -0.040682 - 0.405502I$ $b = 0.92757 + 1.07299I$	$4.99294 + 1.76578I$	$-7.97967 + 0.I$
$u = 0.24778 + 1.41576I$ $a = 0.414031 - 1.342460I$ $b = -1.22414 + 3.01107I$	$3.97101 - 6.92815I$	$-10.07608 + 5.79570I$
$u = 0.24778 - 1.41576I$ $a = 0.414031 + 1.342460I$ $b = -1.22414 - 3.01107I$	$3.97101 + 6.92815I$	$-10.07608 - 5.79570I$
$u = 0.362402 + 0.388238I$ $a = 1.219120 - 0.628084I$ $b = -0.742946 + 0.324636I$	$-0.624317 + 0.441347I$	$-12.18762 + 0.45370I$
$u = 0.362402 - 0.388238I$ $a = 1.219120 + 0.628084I$ $b = -0.742946 - 0.324636I$	$-0.624317 - 0.441347I$	$-12.18762 - 0.45370I$
$u = 0.28464 + 1.44733I$ $a = -0.48786 + 2.28909I$ $b = 0.97778 - 4.42043I$	$-4.81611 - 11.32490I$	$-11.18818 + 5.52166I$
$u = 0.28464 - 1.44733I$ $a = -0.48786 - 2.28909I$ $b = 0.97778 + 4.42043I$	$-4.81611 + 11.32490I$	$-11.18818 - 5.52166I$
$u = -0.22536 + 1.45912I$ $a = -0.502797 - 0.538242I$ $b = 0.712769 + 0.835870I$	$8.69537 + 5.01097I$	$0. - 2.91597I$
$u = -0.22536 - 1.45912I$ $a = -0.502797 + 0.538242I$ $b = 0.712769 - 0.835870I$	$8.69537 - 5.01097I$	$0. + 2.91597I$
$u = 0.13561 + 1.49035I$ $a = -0.978732 + 0.012239I$ $b = 0.422885 - 0.072441I$	$-2.61419 + 1.12722I$	$-9.88189 + 0.I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.13561 - 1.49035I$ $a = -0.978732 - 0.012239I$ $b = 0.422885 + 0.072441I$	$-2.61419 - 1.12722I$	$-9.88189 + 0.I$
$u = 0.360560$ $a = 1.03093$ $b = -0.258292$	-0.601323	-16.4090

II. $I^u_2 = \langle b + u,\ u^2 + a + 2,\ u^3 + 2u - 1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -u^2 - 3u - 14$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_2	$(u-1)^3$
c_3, c_7	u^3
c_4	$(u+1)^3$
c_5, c_6, c_9	u^3+2u-1
c_8, c_{10}, c_{12}	u^3+2u+1
c_{11}	u^3+3u^2+5u+2

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_4	$(y-1)^3$
c_3, c_7	y^3
c_5, c_6, c_8 c_9, c_{10}, c_{12}	y^3+4y^2+4y-1
c_{11}	$y^3+y^2+13y-4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.22670 + 1.46771I$ $a = 0.102785 + 0.665457I$ $b = 0.22670 - 1.46771I$	$7.79580 + 5.13794I$	$-11.21712 - 3.73768I$
$u = -0.22670 - 1.46771I$ $a = 0.102785 - 0.665457I$ $b = 0.22670 + 1.46771I$	$7.79580 - 5.13794I$	$-11.21712 + 3.73768I$
$u = 0.453398$ $a = -2.20557$ $b = -0.453398$	-2.43213	-15.5660

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

(i) Arc colorings

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

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

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

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

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

$$a_{11} = \begin{pmatrix} -u \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -u^3 - 2u \\ -1 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} -u^3 - 2u^2 - 2u - 2 \\ 2u^2 + u \end{pmatrix}$$

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

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

$$a_9 = \begin{pmatrix} 2u^3 + u^2 + 3u + 3 \\ -u^3 - u - 1 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -5u^3 - 2u^2 - 6u - 17$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.621744 + 0.440597I$ $a = -0.070696 - 0.758745I$ $b = -0.429304 - 0.107280I$	$1.64493 + 2.02988I$	$-14.2631 - 3.6750I$
$u = -0.621744 - 0.440597I$ $a = -0.070696 + 0.758745I$ $b = -0.429304 + 0.107280I$	$1.64493 - 2.02988I$	$-14.2631 + 3.6750I$
$u = 0.121744 + 1.306620I$ $a = 1.070700 - 0.758745I$ $b = -1.57070 + 1.62477I$	$1.64493 - 2.02988I$	$-11.23686 + 2.38721I$
$u = 0.121744 - 1.306620I$ $a = 1.070700 + 0.758745I$ $b = -1.57070 - 1.62477I$	$1.64493 + 2.02988I$	$-11.23686 - 2.38721I$

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u-1)^7)(u^{32}+44u^{31}+\cdots+48u+1)$
c_2	$((u-1)^7)(u^{32}-8u^{31}+\cdots+24u^2-1)$
c_3, c_7	$u^7(u^{32}-u^{31}+\cdots+192u+128)$
c_4	$((u+1)^7)(u^{32}-8u^{31}+\cdots+24u^2-1)$
c_5, c_6	$(u^3+2u-1)(u^4+u^3+2u^2+2u+1)(u^{32}+2u^{31}+\cdots-5u-1)$
c_8	$(u^3+2u+1)(u^4-u^3+2u^2-2u+1)(u^{32}+2u^{31}+\cdots-3u-1)$
c_9	$(u^3+2u-1)(u^4+u^3+2u^2+2u+1)(u^{32}-6u^{31}+\cdots-39u+19)$
c_{10}	$(u^3+2u+1)(u^4-u^3+2u^2-2u+1)(u^{32}+2u^{31}+\cdots-5u-1)$
c_{11}	$((u^2-u+1)^2)(u^3+3u^2+5u+2)(u^{32}-2u^{31}+\cdots-40u-8)$
c_{12}	$(u^3+2u+1)(u^4-u^3+2u^2-2u+1)(u^{32}-6u^{31}+\cdots-39u+19)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$((y-1)^7)(y^{32}-104y^{31}+\cdots-1812y+1)$
c_2, c_4	$((y-1)^7)(y^{32}-44y^{31}+\cdots-48y+1)$
c_3, c_7	$y^7(y^{32}-45y^{31}+\cdots-12288y+16384)$
c_5, c_6, c_{10}	$(y^3+4y^2+4y-1)(y^4+3y^3+2y^2+1)(y^{32}+30y^{31}+\cdots-9y+1)$
c_8	$(y^3+4y^2+4y-1)(y^4+3y^3+2y^2+1)(y^{32}-66y^{31}+\cdots-9y+1)$
c_9, c_{12}	$(y^3+4y^2+4y-1)(y^4+3y^3+2y^2+1)(y^{32}+18y^{31}+\cdots-1673y+361)$
c_{11}	$((y^2+y+1)^2)(y^3+y^2+13y-4)(y^{32}+6y^{31}+\cdots+368y+64)$