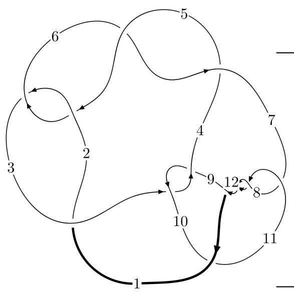
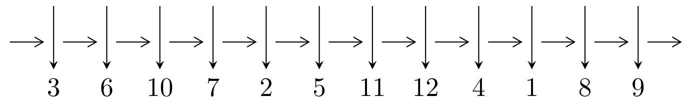
$12a_{0420}$ ($K12a_{0420}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I_1^u = \langle -2u^{60} + u^{59} + \cdots + 2b - u,\ 2u^{60} - 7u^{59} + \cdots + 2a + 6,\ u^{61} - 3u^{60} + \cdots + 6u - 1\rangle$$
$$I_2^u = \langle b - a,\ -u^2a + a^2 - au - u - 1,\ u^3 + u^2 - 1\rangle$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 67 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. $I_1^u = \langle -2u^{60}+u^{59}+\cdots+2b-u,\ 2u^{60}-7u^{59}+\cdots+2a+6,\ u^{61}-3u^{60}+\cdots+6u-1\rangle$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_1 = \begin{pmatrix} -u^2+1 \\ -u^4 \end{pmatrix}$$

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

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

$$a_{11} = \begin{pmatrix} -u^{60}+\frac{7}{2}u^{59}+\cdots+\frac{5}{2}u-3 \\ u^{60}-\frac{1}{2}u^{59}+\cdots+8u^2+\frac{1}{2}u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} \frac{1}{2}u^{59}-u^{58}+\cdots-\frac{1}{2}u-1 \\ \frac{1}{2}u^{59}-u^{58}+\cdots+2u^2+\frac{3}{2}u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -\frac{1}{2}u^{58}+u^{57}+\cdots-2u-\frac{3}{2} \\ -\frac{1}{2}u^{60}+u^{59}+\cdots+\frac{1}{2}u^2+u \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} -2u^{60}+8u^{59}+\cdots+12u-\frac{9}{2} \\ \frac{7}{2}u^{60}-3u^{59}+\cdots+\frac{31}{2}u^2-u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u^{59}+\frac{1}{2}u^{58}+\cdots-8u-\frac{1}{2} \\ -\frac{1}{2}u^{60}+\frac{7}{2}u^{58}+\cdots-3u+1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{13}{2}u^{60}+11u^{59}+\cdots+29u-\frac{41}{2}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4, c_6	$u^{61} + 15u^{60} + \cdots + 32u + 1$
c_2, c_5	$u^{61} + 3u^{60} + \cdots + 6u + 1$
c_3, c_9	$u^{61} + u^{60} + \cdots + 288u + 64$
c_7, c_8, c_{11} c_{12}	$u^{61} + 4u^{60} + \cdots + u + 1$
c_{10}	$u^{61} - 14u^{60} + \cdots + 1883u + 233$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_6	$y^{61} + 65y^{60} + \cdots + 360y - 1$
c_2, c_5	$y^{61} - 15y^{60} + \cdots + 32y - 1$
c_3, c_9	$y^{61} + 35y^{60} + \cdots - 48128y - 4096$
c_7, c_8, c_{11} c_{12}	$y^{61} - 70y^{60} + \cdots + 33y - 1$
c_{10}	$y^{61} + 14y^{60} + \cdots - 820731y - 54289$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.903295 + 0.462746I$ $a = -0.695546 - 0.562869I$ $b = -0.271804 - 0.008793I$	$1.64912 + 3.33623I$	$-8.90726 - 4.06280I$
$u = -0.903295 - 0.462746I$ $a = -0.695546 + 0.562869I$ $b = -0.271804 + 0.008793I$	$1.64912 - 3.33623I$	$-8.90726 + 4.06280I$
$u = 0.965632 + 0.071466I$ $a = 0.255352 - 0.811455I$ $b = 0.583357 - 0.467416I$	$-1.45506 + 1.38293I$	$-14.5746 - 4.7781I$
$u = 0.965632 - 0.071466I$ $a = 0.255352 + 0.811455I$ $b = 0.583357 + 0.467416I$	$-1.45506 - 1.38293I$	$-14.5746 + 4.7781I$
$u = 0.891866 + 0.371875I$ $a = 0.025117 + 0.353693I$ $b = 0.48374 - 1.47821I$	$-9.20574 - 3.82983I$	$-18.3699 + 4.7525I$
$u = 0.891866 - 0.371875I$ $a = 0.025117 - 0.353693I$ $b = 0.48374 + 1.47821I$	$-9.20574 + 3.82983I$	$-18.3699 - 4.7525I$
$u = 1.027100 + 0.122511I$ $a = -0.577403 + 0.901803I$ $b = -1.53356 + 0.54056I$	$-8.53214 + 3.20048I$	$-17.8758 - 2.0778I$
$u = 1.027100 - 0.122511I$ $a = -0.577403 - 0.901803I$ $b = -1.53356 - 0.54056I$	$-8.53214 - 3.20048I$	$-17.8758 + 2.0778I$
$u = -0.973990 + 0.420575I$ $a = 0.605744 + 0.194442I$ $b = -0.223113 - 0.672957I$	$0.54572 + 6.96672I$	$-12.0000 - 9.8175I$
$u = -0.973990 - 0.420575I$ $a = 0.605744 - 0.194442I$ $b = -0.223113 + 0.672957I$	$0.54572 - 6.96672I$	$-12.0000 + 9.8175I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.015250 + 0.392641I$ $a = -0.579050 + 0.148607I$ $b = 0.52059 + 1.42782I$	$-6.92985 + 9.41761I$	$-12.0000 - 7.9710I$
$u = -1.015250 - 0.392641I$ $a = -0.579050 - 0.148607I$ $b = 0.52059 - 1.42782I$	$-6.92985 - 9.41761I$	$-12.0000 + 7.9710I$
$u = -0.558526 + 0.717048I$ $a = 1.30900 + 0.57411I$ $b = 0.615035 + 0.129276I$	$-2.84419 + 2.86741I$	$-10.16234 - 3.32231I$
$u = -0.558526 - 0.717048I$ $a = 1.30900 - 0.57411I$ $b = 0.615035 - 0.129276I$	$-2.84419 - 2.86741I$	$-10.16234 + 3.32231I$
$u = -0.877865 + 0.718484I$ $a = -0.507669 - 0.573262I$ $b = -0.710801 - 0.319209I$	$2.45258 + 2.74784I$	0
$u = -0.877865 - 0.718484I$ $a = -0.507669 + 0.573262I$ $b = -0.710801 + 0.319209I$	$2.45258 - 2.74784I$	0
$u = 0.804516 + 0.318031I$ $a = 0.196739 - 0.606198I$ $b = -0.308799 + 0.790106I$	$-1.74945 - 2.32779I$	$-16.2262 + 7.6362I$
$u = 0.804516 - 0.318031I$ $a = 0.196739 + 0.606198I$ $b = -0.308799 - 0.790106I$	$-1.74945 + 2.32779I$	$-16.2262 - 7.6362I$
$u = -0.958834 + 0.651543I$ $a = 0.741491 + 1.069760I$ $b = 1.03234 + 1.20463I$	$-3.94098 + 2.19391I$	0
$u = -0.958834 - 0.651543I$ $a = 0.741491 - 1.069760I$ $b = 1.03234 - 1.20463I$	$-3.94098 - 2.19391I$	0

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.808720 + 0.190086I$ $a = -1.90972 - 1.06246I$ $b = -2.26441 - 0.31552I$	$-10.29000 + 0.53665I$	$-18.8353 - 9.0691I$
$u = -0.808720 - 0.190086I$ $a = -1.90972 + 1.06246I$ $b = -2.26441 + 0.31552I$	$-10.29000 - 0.53665I$	$-18.8353 + 9.0691I$
$u = -0.761071 + 0.320943I$ $a = 1.15383 + 0.94285I$ $b = 1.234600 + 0.239084I$	$-1.85024 + 1.25608I$	$-15.1118 - 4.8976I$
$u = -0.761071 - 0.320943I$ $a = 1.15383 - 0.94285I$ $b = 1.234600 - 0.239084I$	$-1.85024 - 1.25608I$	$-15.1118 + 4.8976I$
$u = 0.898416 + 0.813498I$ $a = 1.20213 - 0.99182I$ $b = 1.22884 - 0.86819I$	$-4.53737 - 3.04417I$	0
$u = 0.898416 - 0.813498I$ $a = 1.20213 + 0.99182I$ $b = 1.22884 + 0.86819I$	$-4.53737 + 3.04417I$	0
$u = -0.856068 + 0.862516I$ $a = -1.22457 + 2.63205I$ $b = 1.20834 + 2.93387I$	$-1.50415 - 0.89126I$	0
$u = -0.856068 - 0.862516I$ $a = -1.22457 - 2.63205I$ $b = 1.20834 - 2.93387I$	$-1.50415 + 0.89126I$	0
$u = 0.820898 + 0.899902I$ $a = -2.06541 - 1.89264I$ $b = -0.15813 - 2.95041I$	$1.58971 + 7.54690I$	0
$u = 0.820898 - 0.899902I$ $a = -2.06541 + 1.89264I$ $b = -0.15813 + 2.95041I$	$1.58971 - 7.54690I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.886180 + 0.839133I$ $a = 1.67113 - 1.82782I$ $b = 0.00358 - 2.86721I$	$5.10715 + 1.32327I$	0
$u = -0.886180 - 0.839133I$ $a = 1.67113 + 1.82782I$ $b = 0.00358 + 2.86721I$	$5.10715 - 1.32327I$	0
$u = 0.842192 + 0.896151I$ $a = 1.85971 + 1.34927I$ $b = 0.56016 + 2.65833I$	$9.11750 + 4.54405I$	0
$u = 0.842192 - 0.896151I$ $a = 1.85971 - 1.34927I$ $b = 0.56016 - 2.65833I$	$9.11750 - 4.54405I$	0
$u = -0.413830 + 0.644735I$ $a = -0.606570 - 0.053578I$ $b = -0.437841 - 0.476673I$	$3.19857 + 0.74045I$	$-5.48051 - 3.33968I$
$u = -0.413830 - 0.644735I$ $a = -0.606570 + 0.053578I$ $b = -0.437841 + 0.476673I$	$3.19857 - 0.74045I$	$-5.48051 + 3.33968I$
$u = -0.921108 + 0.827807I$ $a = -2.24258 + 1.12030I$ $b = -1.29799 + 2.86920I$	$4.99860 + 4.88810I$	0
$u = -0.921108 - 0.827807I$ $a = -2.24258 - 1.12030I$ $b = -1.29799 - 2.86920I$	$4.99860 - 4.88810I$	0
$u = 0.864695 + 0.889666I$ $a = -1.48550 - 0.77368I$ $b = -0.87847 - 2.12723I$	$10.20040 + 0.14626I$	0
$u = 0.864695 - 0.889666I$ $a = -1.48550 + 0.77368I$ $b = -0.87847 + 2.12723I$	$10.20040 - 0.14626I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.898542 + 0.870061I$ $a = 0.474229 + 0.038157I$ $b = 0.796656 + 0.869534I$	$5.34141 - 3.08631I$	0
$u = 0.898542 - 0.870061I$ $a = 0.474229 - 0.038157I$ $b = 0.796656 - 0.869534I$	$5.34141 + 3.08631I$	0
$u = -0.218197 + 0.712691I$ $a = 0.502777 + 0.882359I$ $b = -0.541108 - 0.948954I$	$-4.36643 - 5.46439I$	$-10.79014 + 3.37482I$
$u = -0.218197 - 0.712691I$ $a = 0.502777 - 0.882359I$ $b = -0.541108 + 0.948954I$	$-4.36643 + 5.46439I$	$-10.79014 - 3.37482I$
$u = 0.928575 + 0.852722I$ $a = -0.522895 - 0.567519I$ $b = 0.296827 - 0.457150I$	$5.24177 - 3.29859I$	0
$u = 0.928575 - 0.852722I$ $a = -0.522895 + 0.567519I$ $b = 0.296827 + 0.457150I$	$5.24177 + 3.29859I$	0
$u = -0.952556 + 0.826132I$ $a = 2.82339 - 0.54814I$ $b = 2.58806 - 2.93805I$	$-1.80666 + 7.16585I$	0
$u = -0.952556 - 0.826132I$ $a = 2.82339 + 0.54814I$ $b = 2.58806 + 2.93805I$	$-1.80666 - 7.16585I$	0
$u = -0.297713 + 0.668924I$ $a = 0.038251 - 0.431492I$ $b = 0.427836 + 0.712970I$	$2.69330 - 2.99488I$	$-7.10794 + 4.32236I$
$u = -0.297713 - 0.668924I$ $a = 0.038251 + 0.431492I$ $b = 0.427836 - 0.712970I$	$2.69330 + 2.99488I$	$-7.10794 - 4.32236I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.963248 + 0.846430I$ $a = 1.30769 + 1.41106I$ $b = 0.00611 + 2.16662I$	$9.88678 - 6.57001I$	0
$u = 0.963248 - 0.846430I$ $a = 1.30769 - 1.41106I$ $b = 0.00611 - 2.16662I$	$9.88678 + 6.57001I$	0
$u = 0.979698 + 0.836583I$ $a = -1.85878 - 1.61789I$ $b = -0.64482 - 2.99145I$	$8.68110 - 10.95380I$	0
$u = 0.979698 - 0.836583I$ $a = -1.85878 + 1.61789I$ $b = -0.64482 + 2.99145I$	$8.68110 + 10.95380I$	0
$u = 0.992523 + 0.826283I$ $a = 2.32375 + 1.68082I$ $b = 1.36651 + 3.55718I$	$1.04634 - 13.93150I$	0
$u = 0.992523 - 0.826283I$ $a = 2.32375 - 1.68082I$ $b = 1.36651 - 3.55718I$	$1.04634 + 13.93150I$	0
$u = 0.584427 + 0.143584I$ $a = -0.768708 + 0.414329I$ $b = 0.282890 - 0.137929I$	$-0.764972 - 0.051966I$	$-11.69477 - 1.11358I$
$u = 0.584427 - 0.143584I$ $a = -0.768708 - 0.414329I$ $b = 0.282890 + 0.137929I$	$-0.764972 + 0.051966I$	$-11.69477 + 1.11358I$
$u = 0.327187 + 0.491156I$ $a = 1.56928 - 1.31367I$ $b = -0.647027 + 0.145084I$	$-7.50998 + 0.52039I$	$-13.78782 + 1.07094I$
$u = 0.327187 - 0.491156I$ $a = 1.56928 + 1.31367I$ $b = -0.647027 - 0.145084I$	$-7.50998 - 0.52039I$	$-13.78782 - 1.07094I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.227354$ $a = -2.03044$ $b = 0.364783$	-0.700986	-13.7360

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= u^2a + 2au + 3u^2 - 19$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.877439 + 0.744862I$ $a = -1.071720 - 0.909787I$ $b = -1.071720 - 0.909787I$	$-5.85852 + 2.82812I$	$-16.5384 - 2.7162I$
$u = -0.877439 + 0.744862I$ $a = 0.409360 + 0.347508I$ $b = 0.409360 + 0.347508I$	$2.03717 + 2.82812I$	$-19.0485 - 4.3818I$
$u = -0.877439 - 0.744862I$ $a = -1.071720 + 0.909787I$ $b = -1.071720 + 0.909787I$	$-5.85852 - 2.82812I$	$-16.5384 + 2.7162I$
$u = -0.877439 - 0.744862I$ $a = 0.409360 - 0.347508I$ $b = 0.409360 - 0.347508I$	$2.03717 - 2.82812I$	$-19.0485 + 4.3818I$
$u = 0.754878$ $a = -0.818721$ $b = -0.818721$	-2.10041	-18.9930
$u = 0.754878$ $a = 2.14344$ $b = 2.14344$	-9.99610	-12.8330

III. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_4	$((u^3 - u^2 + 2u - 1)^2)(u^{61} + 15u^{60} + \cdots + 32u + 1)$
c_2	$((u^3 + u^2 - 1)^2)(u^{61} + 3u^{60} + \cdots + 6u + 1)$
c_3, c_9	$u^6(u^{61} + u^{60} + \cdots + 288u + 64)$
c_5	$((u^3 - u^2 + 1)^2)(u^{61} + 3u^{60} + \cdots + 6u + 1)$
c_6	$((u^3 + u^2 + 2u + 1)^2)(u^{61} + 15u^{60} + \cdots + 32u + 1)$
c_7, c_8	$((u^2 + u - 1)^3)(u^{61} + 4u^{60} + \cdots + u + 1)$
c_{10}	$((u^2 + u - 1)^3)(u^{61} - 14u^{60} + \cdots + 1883u + 233)$
c_{11}, c_{12}	$((u^2 - u - 1)^3)(u^{61} + 4u^{60} + \cdots + u + 1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_6	$((y^3+3y^2+2y-1)^2)(y^{61}+65y^{60}+\cdots+360y-1)$
c_2, c_5	$((y^3-y^2+2y-1)^2)(y^{61}-15y^{60}+\cdots+32y-1)$
c_3, c_9	$y^6(y^{61}+35y^{60}+\cdots-48128y-4096)$
c_7, c_8, c_{11} c_{12}	$((y^2-3y+1)^3)(y^{61}-70y^{60}+\cdots+33y-1)$
c_{10}	$((y^2-3y+1)^3)(y^{61}+14y^{60}+\cdots-820731y-54289)$