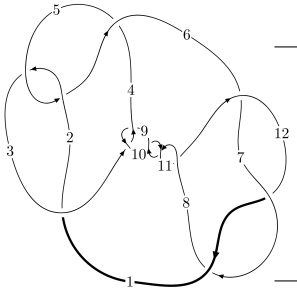
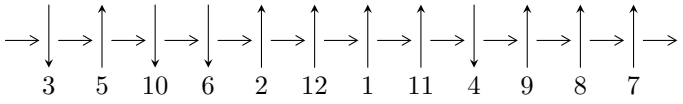
$12a_{0196}$ $(K12a_{0196})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I_1^u = \langle u^{25} - 9u^{23} + \cdots + b + u,\ -u^{64} - 2u^{63} + \cdots + 2a - 3,\ u^{65} + 3u^{64} + \cdots + 2u - 1 \rangle$$
$$I_2^u = \langle b + 1,\ a^2 - a + 1,\ u - 1 \rangle$$

* 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.

$\boldsymbol{I_1^u = \langle u^{25}-9u^{23}+\cdots+b+u,\ -u^{64}-2u^{63}+\cdots+2a-3,\ u^{65}+3u^{64}+\cdots+2u-1\rangle}$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} u \\ -u^3+u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} \frac{1}{2}u^{64}+u^{63}+\cdots-\frac{9}{2}u+\frac{3}{2} \\ -u^{25}+9u^{23}+\cdots+4u^2-u \end{pmatrix}$$

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

$$a_5 = \begin{pmatrix} -4u^{64}-7u^{63}+\cdots-13u+3 \\ \frac{1}{2}u^{64}+u^{63}+\cdots+\frac{5}{2}u-\frac{1}{2} \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -\frac{1}{2}u^{64}-u^{63}+\cdots+\frac{1}{2}u+\frac{3}{2} \\ 5u^{64}+9u^{63}+\cdots+11u-4 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -\frac{19}{2}u^{64}-17u^{63}+\cdots-\frac{51}{2}u+\frac{15}{2} \\ 6u^{64}+11u^{63}+\cdots+15u-5 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -u^4+u^2+1 \\ u^6-2u^4+u^2 \end{pmatrix}$$

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

$$a_{10} = \begin{pmatrix} -u^{10}+3u^8-2u^6-3u^4+3u^2+1 \\ u^{12}-4u^{10}+6u^8-2u^6-3u^4+2u^2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -23u^{64}-35u^{63}+\cdots-75u+24$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4	$u^{65} + 24u^{64} + \cdots + 7u - 1$
c_2, c_5	$u^{65} + 2u^{64} + \cdots - u + 1$
c_3, c_9	$u^{65} - u^{64} + \cdots - 4u - 4$
c_6, c_7, c_{12}	$u^{65} + 3u^{64} + \cdots + 2u - 1$
c_8, c_{10}, c_{11}	$u^{65} - 15u^{64} + \cdots - 152u + 16$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$y^{65} + 36y^{64} + \cdots + 127y - 1$
c_2, c_5	$y^{65} + 24y^{64} + \cdots + 7y - 1$
c_3, c_9	$y^{65} + 15y^{64} + \cdots - 152y - 16$
c_6, c_7, c_{12}	$y^{65} - 51y^{64} + \cdots - 22y - 1$
c_8, c_{10}, c_{11}	$y^{65} + 67y^{64} + \cdots - 1760y - 256$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.830964 + 0.370556I$ $a = 0.414128 + 1.222280I$ $b = -0.659634 - 0.034107I$	$2.82432 - 2.82669I$	$9.20461 + 4.33058I$
$u = 0.830964 - 0.370556I$ $a = 0.414128 - 1.222280I$ $b = -0.659634 + 0.034107I$	$2.82432 + 2.82669I$	$9.20461 - 4.33058I$
$u = 0.066558 + 0.901955I$ $a = 0.06137 + 1.43251I$ $b = -1.28652 - 0.78803I$	$-6.76619 + 10.19040I$	$0. - 7.34564I$
$u = 0.066558 - 0.901955I$ $a = 0.06137 - 1.43251I$ $b = -1.28652 + 0.78803I$	$-6.76619 - 10.19040I$	$0. + 7.34564I$
$u = 0.024152 + 0.893253I$ $a = -0.241320 + 0.052855I$ $b = 1.52166 - 0.03451I$	$-11.12980 + 3.22994I$	$-3.82673 - 2.58821I$
$u = 0.024152 - 0.893253I$ $a = -0.241320 - 0.052855I$ $b = 1.52166 + 0.03451I$	$-11.12980 - 3.22994I$	$-3.82673 + 2.58821I$
$u = 0.062913 + 0.882423I$ $a = 0.600816 + 0.907451I$ $b = -0.0566985 + 0.0369613I$	$-5.21752 + 4.69393I$	$2.36653 - 2.83625I$
$u = 0.062913 - 0.882423I$ $a = 0.600816 - 0.907451I$ $b = -0.0566985 - 0.0369613I$	$-5.21752 - 4.69393I$	$2.36653 + 2.83625I$
$u = 1.11897$ $a = 0.950189$ $b = -1.18495$	2.10269	0
$u = -0.016371 + 0.867847I$ $a = 0.03955 - 1.52936I$ $b = -1.27847 + 0.81240I$	$-7.11500 - 3.79480I$	$-0.49729 + 2.45032I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.016371-0.867847I$ $a=\ \ 0.03955+1.52936I$ $b=-1.27847-0.81240I$	$-7.11500+3.79480I$	$-0.49729-2.45032I$
$u=\ \ 1.114100+0.234415I$ $a=\ \ 1.30619-0.76462I$ $b=-1.51455+0.07170I$	$-0.070748+1.002540I$	0
$u=\ \ 1.114100-0.234415I$ $a=\ \ 1.30619+0.76462I$ $b=-1.51455-0.07170I$	$-0.070748-1.002540I$	0
$u=\ \ 0.005459+0.854340I$ $a=\ \ 0.622687-0.842608I$ $b=-0.0319577-0.0652390I$	$-5.46649+1.55705I$	$1.83939-2.39316I$
$u=\ \ 0.005459-0.854340I$ $a=\ \ 0.622687+0.842608I$ $b=-0.0319577+0.0652390I$	$-5.46649-1.55705I$	$1.83939+2.39316I$
$u=\ \ 0.715576+0.377441I$ $a=-0.083470-0.122092I$ $b=-1.096020-0.383591I$	$3.10104+2.22312I$	$10.61157-3.44892I$
$u=\ \ 0.715576-0.377441I$ $a=-0.083470+0.122092I$ $b=-1.096020+0.383591I$	$3.10104-2.22312I$	$10.61157+3.44892I$
$u=-1.201100+0.088561I$ $a=\ \ 0.660258-1.069540I$ $b=-0.986878+0.212897I$	$2.56341+1.29431I$	0
$u=-1.201100-0.088561I$ $a=\ \ 0.660258+1.069540I$ $b=-0.986878-0.212897I$	$2.56341-1.29431I$	0
$u=\ \ 1.264370+0.105797I$ $a=-1.59167+2.24205I$ $b=\ \ 2.07417-2.88479I$	$4.34245-0.22990I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.264370 - 0.105797I$ $a = -1.59167 - 2.24205I$ $b = 2.07417 + 2.88479I$	$4.34245 + 0.22990I$	0
$u = -1.253070 + 0.208336I$ $a = 1.03231 + 1.06068I$ $b = -1.314840 - 0.300085I$	$1.07506 - 4.90470I$	0
$u = -1.253070 - 0.208336I$ $a = 1.03231 - 1.06068I$ $b = -1.314840 + 0.300085I$	$1.07506 + 4.90470I$	0
$u = 0.296526 + 0.660870I$ $a = -0.417175 + 0.983556I$ $b = -1.162320 - 0.683557I$	$1.24443 + 6.73457I$	$4.49555 - 9.38933I$
$u = 0.296526 - 0.660870I$ $a = -0.417175 - 0.983556I$ $b = -1.162320 + 0.683557I$	$1.24443 - 6.73457I$	$4.49555 + 9.38933I$
$u = 1.271700 + 0.149643I$ $a = -3.61249 - 0.52455I$ $b = 4.21319 + 1.18292I$	$3.83870 + 4.96968I$	0
$u = 1.271700 - 0.149643I$ $a = -3.61249 + 0.52455I$ $b = 4.21319 - 1.18292I$	$3.83870 - 4.96968I$	0
$u = -1.280910 + 0.122024I$ $a = 0.841025 + 0.030121I$ $b = -1.319450 + 0.068717I$	$4.74156 - 2.53764I$	0
$u = -1.280910 - 0.122024I$ $a = 0.841025 - 0.030121I$ $b = -1.319450 - 0.068717I$	$4.74156 + 2.53764I$	0
$u = 1.217380 + 0.430410I$ $a = 0.645359 + 0.037607I$ $b = -1.339890 - 0.221192I$	$-1.65945 + 0.00019I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.217380 - 0.430410I$ $a = 0.645359 - 0.037607I$ $b = -1.339890 + 0.221192I$	$-1.65945 - 0.00019I$	0
$u = 1.221140 + 0.453912I$ $a = 0.546680 + 1.232540I$ $b = -0.731588 - 0.300425I$	$-3.20943 - 5.35553I$	0
$u = 1.221140 - 0.453912I$ $a = 0.546680 - 1.232540I$ $b = -0.731588 + 0.300425I$	$-3.20943 + 5.35553I$	0
$u = 0.331431 + 0.600598I$ $a = 0.71215 + 1.26973I$ $b = -0.283162 + 0.112072I$	$1.96106 + 1.49753I$	$6.66169 - 4.12095I$
$u = 0.331431 - 0.600598I$ $a = 0.71215 - 1.26973I$ $b = -0.283162 - 0.112072I$	$1.96106 - 1.49753I$	$6.66169 + 4.12095I$
$u = -1.261550 + 0.406598I$ $a = 0.567428 - 1.227950I$ $b = -0.768468 + 0.314906I$	$-3.25565 - 0.77125I$	0
$u = -1.261550 - 0.406598I$ $a = 0.567428 + 1.227950I$ $b = -0.768468 - 0.314906I$	$-3.25565 + 0.77125I$	0
$u = 1.270390 + 0.393882I$ $a = -0.371976 + 0.875631I$ $b = 0.81144 - 1.43667I$	$-1.53986 + 2.92050I$	0
$u = 1.270390 - 0.393882I$ $a = -0.371976 - 0.875631I$ $b = 0.81144 + 1.43667I$	$-1.53986 - 2.92050I$	0
$u = 1.259520 + 0.431707I$ $a = 1.19388 - 1.33090I$ $b = -1.47420 + 0.52784I$	$-7.30459 + 1.50541I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.259520 - 0.431707I$ $a = 1.19388 + 1.33090I$ $b = -1.47420 - 0.52784I$	$-7.30459 - 1.50541I$	0
$u = -1.279100 + 0.393239I$ $a = 0.701587 - 0.036472I$ $b = -1.358830 + 0.193709I$	$-1.47317 - 6.03292I$	0
$u = -1.279100 - 0.393239I$ $a = 0.701587 + 0.036472I$ $b = -1.358830 - 0.193709I$	$-1.47317 + 6.03292I$	0
$u = 1.288150 + 0.402371I$ $a = -2.76510 + 0.75793I$ $b = 3.46338 - 0.15706I$	$-3.05519 + 8.34787I$	0
$u = 1.288150 - 0.402371I$ $a = -2.76510 - 0.75793I$ $b = 3.46338 + 0.15706I$	$-3.05519 - 8.34787I$	0
$u = -1.297920 + 0.419236I$ $a = 1.14982 + 1.32131I$ $b = -1.43370 - 0.52696I$	$-7.01228 - 7.92581I$	0
$u = -1.297920 - 0.419236I$ $a = 1.14982 - 1.32131I$ $b = -1.43370 + 0.52696I$	$-7.01228 + 7.92581I$	0
$u = -1.355680 + 0.197509I$ $a = -1.18478 - 1.33241I$ $b = 1.66192 + 1.92791I$	$7.25490 - 4.25204I$	0
$u = -1.355680 - 0.197509I$ $a = -1.18478 + 1.33241I$ $b = 1.66192 - 1.92791I$	$7.25490 + 4.25204I$	0
$u = -1.358940 + 0.225362I$ $a = -2.94873 + 0.05360I$ $b = 3.57045 - 0.66704I$	$6.47155 - 9.82570I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.358940-0.225362I$ $a=-2.94873-0.05360I$ $b=\ \ 3.57045+0.66704I$	$6.47155+9.82570I$	0
$u=-1.378690+0.015478I$ $a=-2.40374+1.10451I$ $b=\ \ 2.94698-1.72078I$	$9.54691-2.80083I$	0
$u=-1.378690-0.015478I$ $a=-2.40374-1.10451I$ $b=\ \ 2.94698+1.72078I$	$9.54691+2.80083I$	0
$u=-1.322040+0.404776I$ $a=-0.523462-0.791434I$ $b=\ \ 0.97175+1.35042I$	$-0.88717-9.30751I$	0
$u=-1.322040-0.404776I$ $a=-0.523462+0.791434I$ $b=\ \ 0.97175-1.35042I$	$-0.88717+9.30751I$	0
$u=-1.328270+0.415651I$ $a=-2.64876-0.66443I$ $b=\ \ 3.34028+0.07943I$	$-2.4034-14.9064I$	0
$u=-1.328270-0.415651I$ $a=-2.64876+0.66443I$ $b=\ \ 3.34028-0.07943I$	$-2.4034+14.9064I$	0
$u=\ \ 0.093193+0.588157I$ $a=\ \ 0.617551+0.336841I$ $b=\ \ 0.947496-0.243938I$	$-3.01176+2.07036I$	$-3.85437-4.88526I$
$u=\ \ 0.093193-0.588157I$ $a=\ \ 0.617551-0.336841I$ $b=\ \ 0.947496+0.243938I$	$-3.01176-2.07036I$	$-3.85437+4.88526I$
$u=-0.129828+0.412841I$ $a=-1.47954-1.43101I$ $b=-0.988859+0.789862I$	$-0.41631-2.93173I$	$-1.44022+3.23621I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.129828-0.412841I$ $a=-1.47954+1.43101I$ $b=-0.988859-0.789862I$	$-0.41631+2.93173I$	$-1.44022-3.23621I$
$u=0.225456+0.313448I$ $a=0.977902-0.161888I$ $b=0.0023464-0.1336720I$	$0.265807+0.934765I$	$5.23289-7.07384I$
$u=0.225456-0.313448I$ $a=0.977902+0.161888I$ $b=0.0023464+0.1336720I$	$0.265807-0.934765I$	$5.23289+7.07384I$
$u=-0.154982+0.228760I$ $a=1.60645-2.67271I$ $b=-0.346535-0.504076I$	$0.14978+1.56979I$	$-1.36396-3.31802I$
$u=-0.154982-0.228760I$ $a=1.60645+2.67271I$ $b=-0.346535+0.504076I$	$0.14978-1.56979I$	$-1.36396+3.31802I$

II. $I_2^u = \langle b+1,\ a^2-a+1,\ u-1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4a + 1$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = \quad 1.00000$ $a = \quad 0.500000 + 0.866025I$ $b = -1.00000$	$1.64493 - 2.02988I$	$3.00000 + 3.46410I$
$u = \quad 1.00000$ $a = \quad 0.500000 - 0.866025I$ $b = -1.00000$	$1.64493 + 2.02988I$	$3.00000 - 3.46410I$

III. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_4	$(u^2-u+1)(u^{65}+24u^{64}+\cdots+7u-1)$
c_2	$(u^2+u+1)(u^{65}+2u^{64}+\cdots-u+1)$
c_3, c_9	$u^2(u^{65}-u^{64}+\cdots-4u-4)$
c_5	$(u^2-u+1)(u^{65}+2u^{64}+\cdots-u+1)$
c_6, c_7	$((u+1)^2)(u^{65}+3u^{64}+\cdots+2u-1)$
c_8, c_{10}, c_{11}	$u^2(u^{65}-15u^{64}+\cdots-152u+16)$
c_{12}	$((u-1)^2)(u^{65}+3u^{64}+\cdots+2u-1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_4	$(y^2+y+1)(y^{65}+36y^{64}+\cdots+127y-1)$
c_2, c_5	$(y^2+y+1)(y^{65}+24y^{64}+\cdots+7y-1)$
c_3, c_9	$y^2(y^{65}+15y^{64}+\cdots-152y-16)$
c_6, c_7, c_{12}	$((y-1)^2)(y^{65}-51y^{64}+\cdots-22y-1)$
c_8, c_{10}, c_{11}	$y^2(y^{65}+67y^{64}+\cdots-1760y-256)$