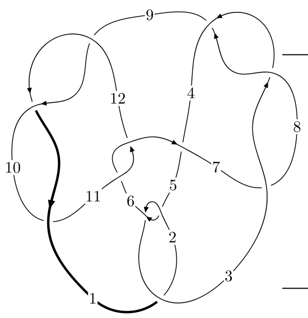
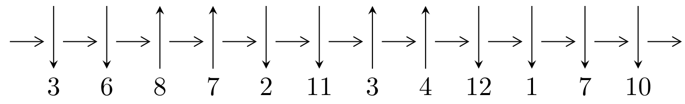
$12n_{0345}$ ($K12n_{0345}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned} I_1^u = \langle & -4.30590 \times 10^{29} u^{38} + 1.40716 \times 10^{30} u^{37} + \cdots + 3.25262 \times 10^{28} b - 5.80343 \times 10^{30}, \\ & -1.92426 \times 10^{30} u^{38} + 6.35210 \times 10^{30} u^{37} + \cdots + 3.25262 \times 10^{28} a - 2.53835 \times 10^{31}, \\ & u^{39} - 3u^{38} + \cdots + 36u + 4 \rangle \\ I_2^u = \langle & -au + b - 2a - 1,\ 2a^2 - au + 2a + 2u - 3,\ u^2 - 2 \rangle \end{aligned}$$

$$I_1^v = \langle a,\ b + v + 2,\ v^2 + 3v + 1 \rangle$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 45 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. $\boldsymbol{I_1^u = \langle -4.31 \times 10^{29} u^{38} + 1.41 \times 10^{30} u^{37} + \cdots + 3.25 \times 10^{28} b - 5.80 \times 10^{30},\ -1.92 \times 10^{30} u^{38} + 6.35 \times 10^{30} u^{37} + \cdots + 3.25 \times 10^{28} a - 2.54 \times 10^{31},\ u^{39} - 3u^{38} + \cdots + 36u + 4 \rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_9 = \begin{pmatrix} -u^2 + 1 \\ u^4 - 2u^2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 59.1604u^{38} - 195.292u^{37} + \cdots + 4436.04u + 780.403 \\ 13.2382u^{38} - 43.2623u^{37} + \cdots + 993.748u + 178.423 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 45.9221u^{38} - 152.030u^{37} + \cdots + 3442.29u + 601.980 \\ 13.2382u^{38} - 43.2623u^{37} + \cdots + 993.748u + 178.423 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 51.1260u^{38} - 169.150u^{37} + \cdots + 3814.68u + 661.729 \\ 23.7145u^{38} - 78.2230u^{37} + \cdots + 1784.77u + 313.995 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -1.07361u^{38} + 3.79195u^{37} + \cdots - 41.8527u + 1.03040 \\ 26.3378u^{38} - 87.1349u^{37} + \cdots + 1988.06u + 348.765 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -1.07361u^{38} + 3.79195u^{37} + \cdots - 41.8527u + 1.03040 \\ 26.7461u^{38} - 88.2756u^{37} + \cdots + 2004.32u + 351.049 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u^3 + 2u \\ -u^3 + u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 7.08403u^{38} - 23.4120u^{37} + \cdots + 528.155u + 95.4828 \\ -26.7461u^{38} + 88.2756u^{37} + \cdots - 2004.32u - 351.049 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -56.2608u^{38} + 183.733u^{37} + \cdots - 4395.07u - 821.737$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{39} + 15u^{38} + \cdots + 5679u + 81$
c_2, c_5	$u^{39} + 3u^{38} + \cdots - 45u + 9$
c_3, c_7, c_8	$u^{39} - 3u^{38} + \cdots + 36u + 4$
c_4	$u^{39} + 9u^{38} + \cdots - 12340u - 380$
c_6, c_{11}	$u^{39} - 2u^{38} + \cdots - 10u + 1$
c_9, c_{10}, c_{12}	$u^{39} - 4u^{38} + \cdots - 6u - 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{39} + 25y^{38} + \cdots + 19679031y - 6561$
c_2, c_5	$y^{39} - 15y^{38} + \cdots + 5679y - 81$
c_3, c_7, c_8	$y^{39} - 49y^{38} + \cdots + 560y - 16$
c_4	$y^{39} - 109y^{38} + \cdots + 28757360y - 144400$
c_6, c_{11}	$y^{39} - 6y^{38} + \cdots + 46y - 1$
c_9, c_{10}, c_{12}	$y^{39} - 30y^{38} + \cdots + 38y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.278366 + 0.955359I$ $a = -0.591023 + 0.828865I$ $b = -0.623478 + 0.614458I$	$-3.35402 + 4.18126I$	$-7.78277 - 6.99514I$
$u = -0.278366 - 0.955359I$ $a = -0.591023 - 0.828865I$ $b = -0.623478 - 0.614458I$	$-3.35402 - 4.18126I$	$-7.78277 + 6.99514I$
$u = -0.887627 + 0.471243I$ $a = -1.50907 + 0.17598I$ $b = -0.886394 - 0.797483I$	$2.35149 - 5.07575I$	$-1.77054 + 6.40036I$
$u = -0.887627 - 0.471243I$ $a = -1.50907 - 0.17598I$ $b = -0.886394 + 0.797483I$	$2.35149 + 5.07575I$	$-1.77054 - 6.40036I$
$u = -0.957964$ $a = -0.302923$ $b = 1.25836$	-8.12538	-10.0210
$u = 1.065650 + 0.085902I$ $a = -0.718491 + 0.083392I$ $b = -0.515563 + 0.600875I$	$2.77568 - 0.03264I$	0
$u = 1.065650 - 0.085902I$ $a = -0.718491 - 0.083392I$ $b = -0.515563 - 0.600875I$	$2.77568 + 0.03264I$	0
$u = -0.796295 + 0.736026I$ $a = 1.42339 + 0.01369I$ $b = 0.950413 + 0.884348I$	$-1.74573 - 9.69427I$	$0. + 8.10788I$
$u = -0.796295 - 0.736026I$ $a = 1.42339 - 0.01369I$ $b = 0.950413 - 0.884348I$	$-1.74573 + 9.69427I$	$0. - 8.10788I$
$u = 0.851097 + 0.768811I$ $a = 0.636558 - 0.270946I$ $b = 0.379215 - 0.675835I$	$0.64343 + 2.93674I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.851097 - 0.768811I$ $a = 0.636558 + 0.270946I$ $b = 0.379215 + 0.675835I$	$0.64343 - 2.93674I$	0
$u = 0.756459 + 0.321115I$ $a = 0.848073 + 0.323450I$ $b = 0.687338 + 0.927457I$	$-1.16384 + 3.37058I$	$-4.85431 - 4.93903I$
$u = 0.756459 - 0.321115I$ $a = 0.848073 - 0.323450I$ $b = 0.687338 - 0.927457I$	$-1.16384 - 3.37058I$	$-4.85431 + 4.93903I$
$u = -0.729654 + 0.114009I$ $a = 1.94616 - 0.30625I$ $b = 0.877049 + 0.529169I$	$-0.720527 - 0.677496I$	$-4.45492 + 3.52872I$
$u = -0.729654 - 0.114009I$ $a = 1.94616 + 0.30625I$ $b = 0.877049 - 0.529169I$	$-0.720527 + 0.677496I$	$-4.45492 - 3.52872I$
$u = 1.36027$ $a = -1.02723$ $b = -0.392618$	3.15342	0
$u = 0.025858 + 0.596227I$ $a = 1.28935 - 0.78910I$ $b = 0.476410 - 0.516668I$	$-0.39053 + 1.36769I$	$-3.78544 - 4.37417I$
$u = 0.025858 - 0.596227I$ $a = 1.28935 + 0.78910I$ $b = 0.476410 + 0.516668I$	$-0.39053 - 1.36769I$	$-3.78544 + 4.37417I$
$u = -1.42742$ $a = -10.9292$ $b = -0.157920$	1.67196	0
$u = 1.47236$ $a = 0.751761$ $b = 1.74885$	-4.21706	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.111960 + 0.411759I$ $a = -4.18092 - 0.61496I$ $b = -0.394904 + 0.488828I$	$-3.05808 - 0.73206I$	$-13.3386 - 6.5570I$
$u = 0.111960 - 0.411759I$ $a = -4.18092 + 0.61496I$ $b = -0.394904 - 0.488828I$	$-3.05808 + 0.73206I$	$-13.3386 + 6.5570I$
$u = 1.64569 + 0.02330I$ $a = -0.940304 - 0.261465I$ $b = -1.33024 + 0.90609I$	$7.65877 + 1.14141I$	0
$u = 1.64569 - 0.02330I$ $a = -0.940304 + 0.261465I$ $b = -1.33024 - 0.90609I$	$7.65877 - 1.14141I$	0
$u = -1.64517 + 0.08077I$ $a = -0.403452 - 0.032549I$ $b = -0.98617 + 1.32010I$	$7.20723 - 4.84674I$	0
$u = -1.64517 - 0.08077I$ $a = -0.403452 + 0.032549I$ $b = -0.98617 - 1.32010I$	$7.20723 + 4.84674I$	0
$u = 1.65274 + 0.23220I$ $a = -1.008000 - 0.471693I$ $b = -1.18235 + 1.09377I$	$6.4748 + 13.4066I$	0
$u = 1.65274 - 0.23220I$ $a = -1.008000 + 0.471693I$ $b = -1.18235 - 1.09377I$	$6.4748 - 13.4066I$	0
$u = 1.66262 + 0.24913I$ $a = -0.241455 - 0.016965I$ $b = -0.136254 + 0.574075I$	$2.81425 + 0.97653I$	0
$u = 1.66262 - 0.24913I$ $a = -0.241455 + 0.016965I$ $b = -0.136254 - 0.574075I$	$2.81425 - 0.97653I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.315278$ $a=\ \ 4.23572$ $b=-0.575388$	-2.39339	9.22220
$u=\ \ 1.67924+0.13585I$ $a=\ \ 0.987276+0.371552I$ $b=\ \ 1.25098-1.02158I$	$11.24360+7.46891I$	0
$u=\ \ 1.67924-0.13585I$ $a=\ \ 0.987276-0.371552I$ $b=\ \ 1.25098+1.02158I$	$11.24360-7.46891I$	0
$u=-0.301204$ $a=-2.36999$ $b=-1.68053$	-10.3072	10.7730
$u=-1.69258+0.19776I$ $a=-0.675700+0.148591I$ $b=-0.787702-1.170530I$	$9.38751-6.54529I$	0
$u=-1.69258-0.19776I$ $a=-0.675700-0.148591I$ $b=-0.787702+1.170530I$	$9.38751+6.54529I$	0
$u=-1.70589+0.04672I$ $a=\ \ 0.538540-0.089371I$ $b=\ \ 0.85440+1.24646I$	$12.52260-0.71174I$	0
$u=-1.70589-0.04672I$ $a=\ \ 0.538540+0.089371I$ $b=\ \ 0.85440-1.24646I$	$12.52260+0.71174I$	0
$u=-0.262239$ $a=\ \ 2.84003$ $b=\ \ 0.533756$	-1.18388	-7.92960

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -8$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.41421$ $a = -0.473911$ $b = -0.618034$	2.30291	−8.00000
$u = 1.41421$ $a = 0.181018$ $b = 1.61803$	−5.59278	−8.00000
$u = -1.41421$ $a = 1.05505$ $b = 1.61803$	−5.59278	−8.00000
$u = -1.41421$ $a = -2.76216$ $b = -0.618034$	2.30291	−8.00000

III. $I_1^v = \langle a,\ b + v + 2,\ v^2 + 3v + 1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -26$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v = -0.381966$ $a = 0$ $b = -1.61803$	-10.5276	-26.0000
$v = -2.61803$ $a = 0$ $b = 0.618034$	-2.63189	-26.0000

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u-1)^6)(u^{39}+15u^{38}+\cdots+5679u+81)$
c_2	$((u-1)^2)(u+1)^4(u^{39}+3u^{38}+\cdots-45u+9)$
c_3, c_7, c_8	$u^2(u^2-2)^2(u^{39}-3u^{38}+\cdots+36u+4)$
c_4	$u^2(u^2-2)^2(u^{39}+9u^{38}+\cdots-12340u-380)$
c_5	$((u-1)^4)(u+1)^2(u^{39}+3u^{38}+\cdots-45u+9)$
c_6	$((u^2-u-1)^2)(u^2+u-1)(u^{39}-2u^{38}+\cdots-10u+1)$
c_9, c_{10}	$((u^2+u-1)^3)(u^{39}-4u^{38}+\cdots-6u-1)$
c_{11}	$(u^2-u-1)(u^2+u-1)^2(u^{39}-2u^{38}+\cdots-10u+1)$
c_{12}	$((u^2-u-1)^3)(u^{39}-4u^{38}+\cdots-6u-1)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$((y-1)^6)(y^{39}+25y^{38}+\cdots+19679031y-6561)$
c_2, c_5	$((y-1)^6)(y^{39}-15y^{38}+\cdots+5679y-81)$
c_3, c_7, c_8	$y^2(y-2)^4(y^{39}-49y^{38}+\cdots+560y-16)$
c_4	$y^2(y-2)^4(y^{39}-109y^{38}+\cdots+2.87574\times 10^7 y-144400)$
c_6, c_{11}	$((y^2-3y+1)^3)(y^{39}-6y^{38}+\cdots+46y-1)$
c_9, c_{10}, c_{12}	$((y^2-3y+1)^3)(y^{39}-30y^{38}+\cdots+38y-1)$