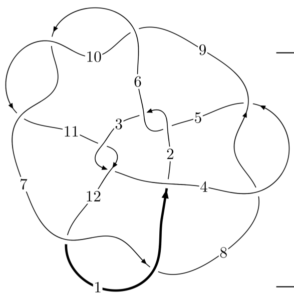
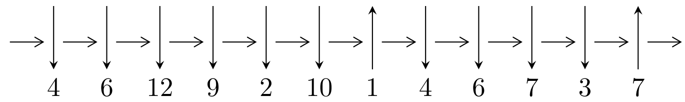
$12n_{0830}$ ($K12n_{0830}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u = \langle & 7u^{11} - 9u^{10} - 37u^9 + 25u^8 + 84u^7 - 6u^6 - 54u^5 - 45u^4 - 53u^3 + 27u^2 + 11b + 46u + 9, \\
& 10u^{11} - 38u^{10} - 12u^9 + 152u^8 - 12u^7 - 249u^6 + 36u^5 + 85u^4 + 6u^3 + 180u^2 + 11a - 82u - 83, \\
& u^{12} - 4u^{11} + 15u^9 - 6u^8 - 24u^7 + 11u^6 + 8u^5 + 17u^3 - 14u^2 - 6u + 1\rangle \\
I_2^u = \langle & u^3 + 2u^2 + b,\ u^2 + a + u - 1,\ u^4 + 3u^3 + 2u^2 + 1\rangle \\
I_3^u = \langle & u^2 + b + a + u - 2,\ 2u^2a + a^2 + au - u^2 - 4a - u + 4,\ u^3 + u^2 - 2u - 1\rangle \\
I_4^u = \langle & -u^2 + b + a + u + 2,\ -2u^2a + a^2 + au - u^2 + 4a + u + 2,\ u^3 - u^2 - 2u + 1\rangle
\end{aligned}$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 28 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. $I_1^u = \langle 7u^{11}-9u^{10}+\cdots+11b+9,\ 10u^{11}-38u^{10}+\cdots+11a-83,\ u^{12}-4u^{11}+\cdots-6u+1\rangle$

(i) Arc colorings

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

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

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

$$a_4 = \begin{pmatrix}-0.909091u^{11}+3.45455u^{10}+\cdots+7.45455u+7.54545\\-0.636364u^{11}+0.818182u^{10}+\cdots-4.18182u-0.818182\end{pmatrix}$$

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

$$a_3 = \begin{pmatrix}-1.54545u^{11}+4.27273u^{10}+\cdots+3.27273u+6.72727\\-0.636364u^{11}+0.818182u^{10}+\cdots-4.18182u-0.818182\end{pmatrix}$$

$$a_{11} = \begin{pmatrix}-0.818182u^{11}+3.90909u^{10}+\cdots+13.9091u+9.09091\\0.545455u^{11}-1.27273u^{10}+\cdots-2.27273u-1.72727\end{pmatrix}$$

$$a_{10} = \begin{pmatrix}-0.818182u^{11}+3.90909u^{10}+\cdots+13.9091u+9.09091\\-1.18182u^{11}+2.09091u^{10}+\cdots-6.90909u-1.09091\end{pmatrix}$$

$$a_6 = \begin{pmatrix}-1.72727u^{11}+6.36364u^{10}+\cdots+20.3636u+12.6364\\2.81818u^{11}-6.90909u^{10}+\cdots+5.09091u-4.09091\end{pmatrix}$$

$$a_2 = \begin{pmatrix}2.72727u^{11}-8.36364u^{10}+\cdots-10.3636u-8.63636\\-0.0909091u^{11}+0.545455u^{10}+\cdots+2.54545u+1.45455\end{pmatrix}$$

$$a_5 = \begin{pmatrix}-5.63636u^{11}+12.8182u^{10}+\cdots-5.18182u+6.18182\\10.6364u^{11}-24.8182u^{10}+\cdots+33.1818u-7.18182\end{pmatrix}$$

$$a_9 = \begin{pmatrix}2.72727u^{11}-8.36364u^{10}+\cdots-9.36364u-9.63636\\-0.0909091u^{11}+0.545455u^{10}+\cdots+3.54545u+1.45455\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes

$$= -\tfrac{5}{11}u^{11}-\tfrac{14}{11}u^{10}+\tfrac{72}{11}u^9+\tfrac{67}{11}u^8-\tfrac{225}{11}u^7-\tfrac{189}{11}u^6+\tfrac{224}{11}u^5+\tfrac{194}{11}u^4+\tfrac{151}{11}u^3+\tfrac{53}{11}u^2-\tfrac{278}{11}u-\tfrac{206}{11}$$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4, c_8	$u^{12} - u^{11} + \cdots + 3u + 1$
c_2, c_5	$u^{12} + 6u^{10} + \cdots + 6u - 1$
c_3, c_6, c_9 c_{10}, c_{11}	$u^{12} + 2u^{11} + \cdots - 5u - 1$
c_7, c_{12}	$u^{12} - 4u^{11} + 15u^9 - 6u^8 - 24u^7 + 11u^6 + 8u^5 + 17u^3 - 14u^2 - 6u + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_8	$y^{12} + 21y^{11} + \cdots + 7y + 1$
c_2, c_5	$y^{12} + 12y^{11} + \cdots - 24y + 1$
c_3, c_6, c_9 c_{10}, c_{11}	$y^{12} - 10y^{11} + \cdots - 27y + 1$
c_7, c_{12}	$y^{12} - 16y^{11} + \cdots - 64y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.10971$ $a = 0.161640$ $b = 1.43592$	-8.31956	-9.86310
$u = -0.047522 + 0.875928I$ $a = 0.550543 - 0.109390I$ $b = 0.620121 - 0.344417I$	$-0.93869 + 1.18818I$	$-6.72604 - 6.20651I$
$u = -0.047522 - 0.875928I$ $a = 0.550543 + 0.109390I$ $b = 0.620121 + 0.344417I$	$-0.93869 - 1.18818I$	$-6.72604 + 6.20651I$
$u = -1.25634$ $a = -1.19132$ $b = 1.21703$	-6.81354	-13.0130
$u = -1.235650 + 0.562992I$ $a = -0.167466 + 0.934549I$ $b = -1.095690 - 0.804498I$	$3.14055 - 6.45902I$	$-9.32911 + 6.09999I$
$u = -1.235650 - 0.562992I$ $a = -0.167466 - 0.934549I$ $b = -1.095690 + 0.804498I$	$3.14055 + 6.45902I$	$-9.32911 - 6.09999I$
$u = -0.405006$ $a = 1.79428$ $b = 0.222902$	-0.968428	-8.39760
$u = 1.68726 + 0.16814I$ $a = 0.086359 - 0.758415I$ $b = -0.723528 + 0.260031I$	$5.78393 + 2.23624I$	$-8.95764 - 2.44896I$
$u = 1.68726 - 0.16814I$ $a = 0.086359 + 0.758415I$ $b = -0.723528 - 0.260031I$	$5.78393 - 2.23624I$	$-8.95764 + 2.44896I$
$u = 1.80553 + 0.13825I$ $a = -0.47270 + 1.37792I$ $b = 1.46230 - 1.09221I$	$14.0244 + 9.4961I$	$-8.37495 - 3.79641I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.80553 - 0.13825I$ $a = -0.47270 - 1.37792I$ $b = 1.46230 + 1.09221I$	$14.0244 - 9.4961I$	$-8.37495 + 3.79641I$
$u = 0.132401$ $a = 8.24194$ $b = -1.40225$	-11.4695	-21.9510

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

(i) Arc colorings

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

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

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

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

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

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

$$a_{11} = \begin{pmatrix} u^2 + 2u \\ -u^3 - u^2 + u - 1 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} -u^3 - 2u^2 - u - 1 \\ 0 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -u^3 - 2u^2 + 1 \\ -u^3 - 2u^2 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u^3 - 2u^2 \\ u^3 + u^2 + 1 \end{pmatrix}$$

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4u^3 + 5u^2 - 5u - 13$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_8	$y^4 + 4y^3 + 6y^2 - 5y + 1$
c_2, c_5	$y^4 + 3y^3 + 2y^2 + 1$
c_3, c_6, c_9 c_{10}, c_{11}	$y^4 - 3y^3 + 5y^2 - 3y + 1$
c_7, c_{12}	$y^4 - 5y^3 + 6y^2 + 4y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.192440 + 0.547877I$ $a = 1.070700 - 0.758745I$ $b = 0.692440 - 0.318148I$	$-1.74699 + 0.56550I$	$-15.9426 - 2.0994I$
$u = 0.192440 - 0.547877I$ $a = 1.070700 + 0.758745I$ $b = 0.692440 + 0.318148I$	$-1.74699 - 0.56550I$	$-15.9426 + 2.0994I$
$u = -1.69244 + 0.31815I$ $a = -0.070696 + 0.758745I$ $b = -1.192440 - 0.547877I$	$5.03685 - 4.62527I$	$-8.05745 + 3.83145I$
$u = -1.69244 - 0.31815I$ $a = -0.070696 - 0.758745I$ $b = -1.192440 + 0.547877I$	$5.03685 + 4.62527I$	$-8.05745 - 3.83145I$

III.

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

(i) Arc colorings

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

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

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

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

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

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

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

$$a_{10} = \begin{pmatrix} -u^2a - au + 2u^2 + 2a + u - 4 \\ 0 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u^2 - a - u + 2 \\ u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -3u^2 - a + 5 \\ u^2a - a - u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -3u^2a + au + u^2 + 2a - 4 \\ u^2a - au - u^2 + 3u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u^2a - au + 3u^2 + 2a + u - 4 \\ au - u^2 + 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -7$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4, c_8	$u^6 - u^5 + 12u^4 - 6u^3 - 7u^2 + 7u + 7$
c_2, c_5	$u^6 + u^5 + 9u^4 + 18u^3 + 26u^2 + 29u + 13$
c_3, c_6, c_9 c_{10}, c_{11}	$u^6 + u^5 + 3u^4 + 5u^2 + 2u + 1$
c_7, c_{12}	$(u^3 + u^2 - 2u - 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_8	$y^6 + 23y^5 + 118y^4 - 176y^3 + 301y^2 - 147y + 49$
c_2, c_5	$y^6 + 17y^5 + 97y^4 + 112y^3 - 134y^2 - 165y + 169$
c_3, c_6, c_9 c_{10}, c_{11}	$y^6 + 5y^5 + 19y^4 + 28y^3 + 31y^2 + 6y + 1$
c_7, c_{12}	$(y^3 - 5y^2 + 6y - 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.24698$ $a = -0.178448 + 1.079920I$ $b = -0.623490 - 1.079920I$	4.69981	-7.00000
$u = 1.24698$ $a = -0.178448 - 1.079920I$ $b = -0.623490 + 1.079920I$	4.69981	-7.00000
$u = -0.445042$ $a = 2.02446 + 0.38542I$ $b = 0.222521 - 0.385418I$	-0.939962	-7.00000
$u = -0.445042$ $a = 2.02446 - 0.38542I$ $b = 0.222521 + 0.385418I$	-0.939962	-7.00000
$u = -1.80194$ $a = -0.34601 + 1.56052I$ $b = 0.90097 - 1.56052I$	15.9794	-7.00000
$u = -1.80194$ $a = -0.34601 - 1.56052I$ $b = 0.90097 + 1.56052I$	15.9794	-7.00000

IV.

$$\boldsymbol{I_4^u = \langle -u^2+b+a+u+2,\ -2u^2a+a^2+au-u^2+4a+u+2,\ u^3-u^2-2u+1\rangle}$$

(i) Arc colorings

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

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

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

$$a_4 = \begin{pmatrix} a \\ u^2-a-u-2 \end{pmatrix}$$

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

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

$$a_{11} = \begin{pmatrix} u^2a-au+2u^2-2a-u-4 \\ -au+u^2-3 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} u^2a-au+2u^2-2a-u-4 \\ -2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u^2-a+u+2 \\ -2u^2+2a+u+4 \end{pmatrix}$$

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

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -7$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4	$u^6 - u^5 + 2u^3 - 7u^2 + 5u - 1$
c_2	$u^6 + u^5 - u^4 + 2u^3 + 2u^2 - 3u - 1$
c_3, c_9, c_{10}	$u^6 - u^5 - 3u^4 + 4u^3 + u^2 - 4u + 1$
c_5	$u^6 - u^5 - u^4 - 2u^3 + 2u^2 + 3u - 1$
c_6, c_{11}	$u^6 + u^5 - 3u^4 - 4u^3 + u^2 + 4u + 1$
c_7	$(u^3 + u^2 - 2u - 1)^2$
c_8	$u^6 + u^5 - 2u^3 - 7u^2 - 5u - 1$
c_{12}	$(u^3 - u^2 - 2u + 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_8	$y^6 - y^5 - 10y^4 + 4y^3 + 29y^2 - 11y + 1$
c_2, c_5	$y^6 - 3y^5 + y^4 - 4y^3 + 18y^2 - 13y + 1$
c_3, c_6, c_9 c_{10}, c_{11}	$y^6 - 7y^5 + 19y^4 - 28y^3 + 27y^2 - 14y + 1$
c_7, c_{12}	$(y^3 - 5y^2 + 6y - 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.24698$ $a = 1.09156$ $b = -0.289627$	-5.16979	-7.00000
$u = -1.24698$ $a = -0.734668$ $b = 1.53661$	-5.16979	-7.00000
$u = 0.445042$ $a = -0.663777$ $b = -1.58320$	-10.8096	-7.00000
$u = 0.445042$ $a = -3.38514$ $b = 1.13816$	-10.8096	-7.00000
$u = 1.80194$ $a = 0.346011 + 0.659723I$ $b = -0.900969 - 0.659723I$	6.10976	-7.00000
$u = 1.80194$ $a = 0.346011 - 0.659723I$ $b = -0.900969 + 0.659723I$	6.10976	-7.00000

V. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_4	$(u^4+2u^2-3u+1)(u^6-u^5+2u^3-7u^2+5u-1)$ $\cdot(u^6-u^5+\cdots+7u+7)(u^{12}-u^{11}+\cdots+3u+1)$
c_2	$(u^4-u^3+2u^2-2u+1)(u^6+u^5-u^4+2u^3+2u^2-3u-1)$ $\cdot(u^6+u^5+\cdots+29u+13)(u^{12}+6u^{10}+\cdots+6u-1)$
c_3, c_9, c_{10}	$(u^4-u^3-u^2+u+1)(u^6-u^5-3u^4+4u^3+u^2-4u+1)$ $\cdot(u^6+u^5+3u^4+5u^2+2u+1)(u^{12}+2u^{11}+\cdots-5u-1)$
c_5	$(u^4+u^3+2u^2+2u+1)(u^6-u^5-u^4-2u^3+2u^2+3u-1)$ $\cdot(u^6+u^5+\cdots+29u+13)(u^{12}+6u^{10}+\cdots+6u-1)$
c_6, c_{11}	$(u^4+u^3-u^2-u+1)(u^6+u^5-3u^4-4u^3+u^2+4u+1)$ $\cdot(u^6+u^5+3u^4+5u^2+2u+1)(u^{12}+2u^{11}+\cdots-5u-1)$
c_7	$(u^3+u^2-2u-1)^4(u^4-3u^3+2u^2+1)$ $\cdot(u^{12}-4u^{11}+15u^9-6u^8-24u^7+11u^6+8u^5+17u^3-14u^2-6u+1)$
c_8	$(u^4+2u^2+3u+1)(u^6-u^5+12u^4-6u^3-7u^2+7u+7)$ $\cdot(u^6+u^5-2u^3-7u^2-5u-1)(u^{12}-u^{11}+\cdots+3u+1)$
c_{12}	$(u^3-u^2-2u+1)^2(u^3+u^2-2u-1)^2(u^4+3u^3+2u^2+1)$ $\cdot(u^{12}-4u^{11}+15u^9-6u^8-24u^7+11u^6+8u^5+17u^3-14u^2-6u+1)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_8	$(y^4+4y^3+6y^2-5y+1)(y^6-y^5-10y^4+4y^3+29y^2-11y+1)$ $\cdot(y^6+23y^5+118y^4-176y^3+301y^2-147y+49)$ $\cdot(y^{12}+21y^{11}+\cdots+7y+1)$
c_2, c_5	$(y^4+3y^3+2y^2+1)(y^6-3y^5+y^4-4y^3+18y^2-13y+1)$ $\cdot(y^6+17y^5+97y^4+112y^3-134y^2-165y+169)$ $\cdot(y^{12}+12y^{11}+\cdots-24y+1)$
c_3, c_6, c_9 c_{10}, c_{11}	$(y^4-3y^3+5y^2-3y+1)(y^6-7y^5+\cdots-14y+1)$ $\cdot(y^6+5y^5+\cdots+6y+1)(y^{12}-10y^{11}+\cdots-27y+1)$
c_7, c_{12}	$(y^3-5y^2+6y-1)^4(y^4-5y^3+6y^2+4y+1)$ $\cdot(y^{12}-16y^{11}+\cdots-64y+1)$