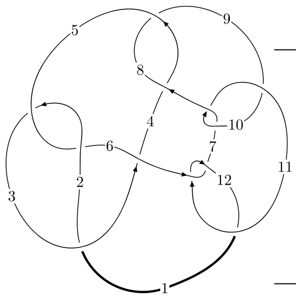
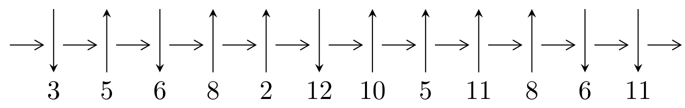
$12n_{0056}$ ($K12n_{0056}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned} I_1^u = \langle &-303u^{16} + 1548u^{15} + \cdots + 4864d + 3360,\ 413u^{16} - 1717u^{15} + \cdots + 4864c - 1676, \\ &-306u^{16} + 1521u^{15} + \cdots + 2432b + 652,\ 30u^{16} - 53u^{15} + \cdots + 1216a - 204, \\ &u^{17} - 5u^{16} + \cdots - 11u^2 + 4\rangle \\ I_2^u = \langle &d + u,\ c + u,\ b - u - 1,\ a,\ u^2 + u + 1\rangle \\ I_3^u = \langle &d + u + 1,\ c,\ b + u + 1,\ a,\ u^2 + u + 1\rangle \\ I_4^u = \langle &d - c + u + 1,\ cb - 1,\ a,\ u^2 + u + 1\rangle \end{aligned}$$

$$I_1^v = \langle c,\ d + 1,\ b,\ a - 1,\ v - 1\rangle$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 22 representations.
* 1 irreducible components of $\dim_{\mathbb{C}} = 1$

[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. $\boldsymbol{I_1^u = \langle -303u^{16} + 1548u^{15} + \cdots + 4864d + 3360,\ 413u^{16} - 1717u^{15} + \cdots + 4864c - 1676,\ -306u^{16} + 1521u^{15} + \cdots + 2432b + 652,\ 30u^{16} - 53u^{15} + \cdots + 1216a - 204,\ u^{17} - 5u^{16} + \cdots - 11u^2 + 4\rangle}$

(i) Arc colorings

$$a_2 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_5 = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_3 = \begin{pmatrix}1\\-u^2\end{pmatrix}$$
$$a_6 = \begin{pmatrix}u\\u\end{pmatrix}$$
$$a_8 = \begin{pmatrix}-0.0246711u^{16} + 0.0435855u^{15} + \cdots - 4.48355u + 0.167763\\0.125822u^{16} - 0.625411u^{15} + \cdots + 0.166118u - 0.268092\end{pmatrix}$$
$$a_9 = \begin{pmatrix}-0.0246711u^{16} + 0.0435855u^{15} + \cdots - 4.48355u + 0.167763\\0.164474u^{16} - 0.808799u^{15} + \cdots + 0.0674342u - 0.587171\end{pmatrix}$$
$$a_1 = \begin{pmatrix}u^2+1\\-u^4\end{pmatrix}$$
$$a_4 = \begin{pmatrix}u^4+u^2+1\\u^4\end{pmatrix}$$
$$a_{11} = \begin{pmatrix}-0.0849095u^{16} + 0.353002u^{15} + \cdots - 3.22204u + 0.344572\\0.0622944u^{16} - 0.318257u^{15} + \cdots - 0.00246711u - 0.690789\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}-0.00596217u^{16} - 0.0536595u^{15} + \cdots - 4.86842u + 0.451480\\0.119038u^{16} - 0.592722u^{15} + \cdots - 0.0246711u - 0.517270\end{pmatrix}$$
$$a_{12} = \begin{pmatrix}-0.0814145u^{16} + 0.337582u^{15} + \cdots - 2.63322u + 0.603618\\0.0657895u^{16} - 0.333676u^{15} + \cdots + 0.586349u - 0.431743\end{pmatrix}$$
$$a_7 = \begin{pmatrix}0.118627u^{16} - 0.572985u^{15} + \cdots + 2.09539u - 0.0238487\\-0.0750411u^{16} + 0.305099u^{15} + \cdots - 0.0254934u + 0.236842\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= \frac{409}{1216}u^{16} - \frac{1133}{608}u^{15} + \cdots - \frac{4283}{304}u - \frac{37}{152}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{17}+15u^{16}+\cdots+88u-16$
c_2, c_5	$u^{17}+5u^{16}+\cdots+11u^2-4$
c_3	$u^{17}-14u^{16}+\cdots+6768u-2592$
c_4, c_8	$u^{17}-u^{16}+\cdots-1024u-512$
c_6, c_{11}	$u^{17}-8u^{16}+\cdots-8u-16$
c_7, c_{10}	$u^{17}+8u^{16}+\cdots-8u-16$
c_9	$u^{17}+6u^{16}+\cdots+32u-256$
c_{12}	$u^{17}+34u^{16}+\cdots+6176u+256$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{17} - 21y^{16} + \cdots + 36640y - 256$
c_2, c_5	$y^{17} + 15y^{16} + \cdots + 88y - 16$
c_3	$y^{17} - 66y^{16} + \cdots + 36764928y - 6718464$
c_4, c_8	$y^{17} + 81y^{16} + \cdots - 524288y - 262144$
c_6, c_{11}	$y^{17} - 34y^{16} + \cdots + 6176y - 256$
c_7, c_{10}	$y^{17} + 6y^{16} + \cdots + 32y - 256$
c_9	$y^{17} + 66y^{16} + \cdots + 2613760y - 65536$
c_{12}	$y^{17} - 94y^{16} + \cdots + 7397888y - 65536$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.589168 + 0.828507I$ $a = 0.502465 - 0.319378I$ $b = 0.252552 - 0.424714I$ $c = 1.35395 - 1.45051I$ $d = 1.53322 - 1.04879I$	$0.79868 - 2.33972I$	$-0.33078 + 5.26516I$
$u = -0.589168 - 0.828507I$ $a = 0.502465 + 0.319378I$ $b = 0.252552 + 0.424714I$ $c = 1.35395 + 1.45051I$ $d = 1.53322 + 1.04879I$	$0.79868 + 2.33972I$	$-0.33078 - 5.26516I$
$u = -0.403846 + 0.948035I$ $a = -0.292348 - 0.569503I$ $b = -0.523078 - 0.308956I$ $c = -0.142785 - 0.400695I$ $d = -0.241825 - 1.074000I$	$-0.77904 - 2.74622I$	$2.48507 + 7.16740I$
$u = -0.403846 - 0.948035I$ $a = -0.292348 + 0.569503I$ $b = -0.523078 + 0.308956I$ $c = -0.142785 + 0.400695I$ $d = -0.241825 + 1.074000I$	$-0.77904 + 2.74622I$	$2.48507 - 7.16740I$
$u = 0.329450 + 1.030540I$ $a = 0.752669 + 0.404387I$ $b = 2.49667 - 0.33313I$ $c = 0.335662 + 0.165758I$ $d = -0.275871 + 0.445429I$	$0.72956 + 1.37071I$	$0.698150 - 0.213889I$
$u = 0.329450 - 1.030540I$ $a = 0.752669 - 0.404387I$ $b = 2.49667 + 0.33313I$ $c = 0.335662 - 0.165758I$ $d = -0.275871 - 0.445429I$	$0.72956 - 1.37071I$	$0.698150 + 0.213889I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.349370 + 0.320500I$ $a = 0.45151 - 2.07264I$ $b = 0.686769 - 0.651916I$ $c = -1.44216 + 0.34761I$ $d = 0.136010 + 0.385037I$	$-15.3110 - 5.6503I$	$2.10303 + 1.68119I$
$u = 1.349370 - 0.320500I$ $a = 0.45151 + 2.07264I$ $b = 0.686769 + 0.651916I$ $c = -1.44216 - 0.34761I$ $d = 0.136010 - 0.385037I$	$-15.3110 + 5.6503I$	$2.10303 - 1.68119I$
$u = 0.76686 + 1.31677I$ $a = -1.58212 + 0.24955I$ $b = -2.80254 - 0.41679I$ $c = 0.64759 - 1.27273I$ $d = 0.83285 - 2.52656I$	$-18.4182 + 12.9335I$	$1.01650 - 5.27491I$
$u = 0.76686 - 1.31677I$ $a = -1.58212 - 0.24955I$ $b = -2.80254 + 0.41679I$ $c = 0.64759 + 1.27273I$ $d = 0.83285 + 2.52656I$	$-18.4182 - 12.9335I$	$1.01650 + 5.27491I$
$u = 0.249371 + 0.383586I$ $a = -0.557024 - 1.287010I$ $b = -0.300121 + 0.720580I$ $c = -0.04416 - 1.47679I$ $d = -0.837375 + 0.566407I$	$-1.75773 + 0.71028I$	$-3.71531 + 0.02644I$
$u = 0.249371 - 0.383586I$ $a = -0.557024 + 1.287010I$ $b = -0.300121 - 0.720580I$ $c = -0.04416 + 1.47679I$ $d = -0.837375 - 0.566407I$	$-1.75773 - 0.71028I$	$-3.71531 - 0.02644I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.275145$ $a = 1.98253$ $b = 0.514913$ $c = 1.10798$ $d = -0.110369$	1.13318	9.61860
$u = 0.30683 + 1.77436I$ $a = 1.87716 + 1.02764I$ $b = 2.72694 + 1.21615I$ $c = -0.374205 + 0.884961I$ $d = 0.39521 + 2.00728I$	$-9.63429 + 3.26152I$	$-0.10201 - 1.44169I$
$u = 0.30683 - 1.77436I$ $a = 1.87716 - 1.02764I$ $b = 2.72694 - 1.21615I$ $c = -0.374205 - 0.884961I$ $d = 0.39521 - 2.00728I$	$-9.63429 - 3.26152I$	$-0.10201 + 1.44169I$
$u = 0.62871 + 1.82695I$ $a = 2.35642 + 0.55040I$ $b = 3.20534 + 0.91973I$ $c = 0.112128 - 0.993507I$ $d = 0.51296 - 2.44755I$	$17.4865 + 1.7702I$	$0.036073 - 0.657690I$
$u = 0.62871 - 1.82695I$ $a = 2.35642 - 0.55040I$ $b = 3.20534 - 0.91973I$ $c = 0.112128 + 0.993507I$ $d = 0.51296 + 2.44755I$	$17.4865 - 1.7702I$	$0.036073 + 0.657690I$

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4u + 11$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = 0$ $b = 0.500000 + 0.866025I$ $c = 0.500000 - 0.866025I$ $d = 0.500000 - 0.866025I$	$1.64493 - 2.02988I$	$9.00000 + 3.46410I$
$u = -0.500000 - 0.866025I$ $a = 0$ $b = 0.500000 - 0.866025I$ $c = 0.500000 + 0.866025I$ $d = 0.500000 + 0.866025I$	$1.64493 + 2.02988I$	$9.00000 - 3.46410I$

III. $I_3^u = \langle d + u + 1,\ c,\ b + u + 1,\ a,\ u^2 + u + 1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4u - 1$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.500000+0.866025I$ $a=0$ $b=-0.500000-0.866025I$ $c=0$ $d=-0.500000-0.866025I$	$-1.64493-2.02988I$	$-3.00000+3.46410I$
$u=-0.500000-0.866025I$ $a=0$ $b=-0.500000+0.866025I$ $c=0$ $d=-0.500000+0.866025I$	$-1.64493+2.02988I$	$-3.00000-3.46410I$

IV. $I_4^u = \langle d - c + u + 1,\ cb - 1,\ a,\ u^2 + u + 1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= c^2u - b^2u + c^2 + 4u + 4$

(iv) u-Polynomials at the component : It cannot be defined for a positive dimension component.

(v) Riley Polynomials at the component : It cannot be defined for a positive dimension component.

(iv) Complex Volumes and Cusp Shapes

Solution to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = \cdots$ $a = \cdots$ $b = \cdots$ $c = \cdots$ $d = \cdots$	$2.02988I$	$0.58899 + 3.27641I$

V. $\boldsymbol{I_1^v = \langle c,\ d+1,\ b,\ a-1,\ v-1 \rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$v = 1.00000$		
$a = 1.00000$		
$b = 0$	0	0
$c = 0$		
$d = -1.00000$		

VI. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$u(u^2-u+1)^2(u^{17}+15u^{16}+\cdots+88u-16)$
c_2	$u(u^2+u+1)^2(u^{17}+5u^{16}+\cdots+11u^2-4)$
c_3	$u(u^2-u+1)^2(u^{17}-14u^{16}+\cdots+6768u-2592)$
c_4, c_8	$u^5(u^{17}-u^{16}+\cdots-1024u-512)$
c_5	$u(u^2-u+1)^2(u^{17}+5u^{16}+\cdots+11u^2-4)$
c_6	$u^2(u-1)^2(u+1)(u^{17}-8u^{16}+\cdots-8u-16)$
c_7	$u^2(u+1)^3(u^{17}+8u^{16}+\cdots-8u-16)$
c_9	$u^2(u+1)^3(u^{17}+6u^{16}+\cdots+32u-256)$
c_{10}	$u^2(u-1)^3(u^{17}+8u^{16}+\cdots-8u-16)$
c_{11}	$u^2(u-1)(u+1)^2(u^{17}-8u^{16}+\cdots-8u-16)$
c_{12}	$u^2(u+1)^3(u^{17}+34u^{16}+\cdots+6176u+256)$

VII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$y(y^2+y+1)^2(y^{17}-21y^{16}+\cdots+36640y-256)$
c_2, c_5	$y(y^2+y+1)^2(y^{17}+15y^{16}+\cdots+88y-16)$
c_3	$y(y^2+y+1)^2(y^{17}-66y^{16}+\cdots+3.67649\times 10^7 y-6718464)$
c_4, c_8	$y^5(y^{17}+81y^{16}+\cdots-524288y-262144)$
c_6, c_{11}	$y^2(y-1)^3(y^{17}-34y^{16}+\cdots+6176y-256)$
c_7, c_{10}	$y^2(y-1)^3(y^{17}+6y^{16}+\cdots+32y-256)$
c_9	$y^2(y-1)^3(y^{17}+66y^{16}+\cdots+2613760y-65536)$
c_{12}	$y^2(y-1)^3(y^{17}-94y^{16}+\cdots+7397888y-65536)$