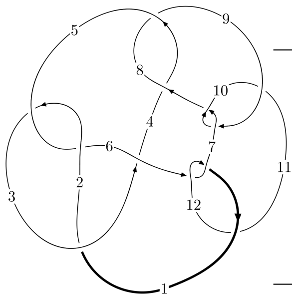
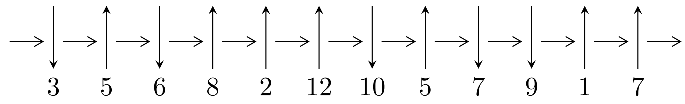
$12n_{0057}$ ($K12n_{0057}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u = \langle & 769u^{16} - 3605u^{15} + \cdots + 4864d - 844,\ 161u^{16} - 983u^{15} + \cdots + 4864c + 3868, \\
& 191u^{16} - 846u^{15} + \cdots + 4864b + 776,\ 161u^{16} - 983u^{15} + \cdots + 4864a + 3868, \\
& u^{17} - 5u^{16} + \cdots - 11u^2 + 4\rangle \\
I_2^u = \langle & d - u - 1,\ c,\ b - u - 1,\ a,\ u^2 + u + 1\rangle \\
I_3^u = \langle & d + 2u + 1,\ c + u,\ b - u,\ a - u,\ u^2 + u + 1\rangle \\
I_4^u = \langle & da + a^2 + au + a - 1,\ c + a,\ b - a - u - 1,\ u^2 + u + 1\rangle
\end{aligned}$$

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

* 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. $\boldsymbol{I_1^u = \langle 769u^{16} - 3605u^{15} + \cdots + 4864d - 844,\ 161u^{16} - 983u^{15} + \cdots + 4864c + 3868,\ 191u^{16} - 846u^{15} + \cdots + 4864b + 776,\ 161u^{16} - 983u^{15} + \cdots + 4864a + 3868,\ u^{17} - 5u^{16} + \cdots - 11u^2 + 4\rangle}$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} u \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -0.0331003u^{16} + 0.202097u^{15} + \cdots + 4.36842u - 0.795230 \\ -0.0392681u^{16} + 0.173931u^{15} + \cdots + 1.37253u - 0.159539 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -0.0331003u^{16} + 0.202097u^{15} + \cdots + 4.36842u - 0.795230 \\ -0.158100u^{16} + 0.741160u^{15} + \cdots - 0.475329u + 0.173520 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0.0246711u^{16} - 0.0435855u^{15} + \cdots + 4.48355u - 0.167763 \\ -0.125822u^{16} + 0.625411u^{15} + \cdots - 0.166118u + 0.268092 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^2 + 1 \\ -u^4 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} u^4 + u^2 + 1 \\ u^4 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 0.0246711u^{16} - 0.0435855u^{15} + \cdots + 4.48355u - 0.167763 \\ -0.164474u^{16} + 0.808799u^{15} + \cdots - 0.0674342u + 0.587171 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 0.0764803u^{16} - 0.397615u^{15} + \cdots - 2.61349u + 1.50493 \\ 0.0542763u^{16} - 0.265419u^{15} + \cdots - 0.489309u + 0.0715461 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 0.0618832u^{16} - 0.294613u^{15} + \cdots - 1.74178u + 1.47451 \\ 0.0807977u^{16} - 0.432977u^{15} + \cdots - 0.311678u + 0.136513 \end{pmatrix}$$

(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_{12}	$u^{17}+8u^{16}+\cdots-8u-16$
c_7, c_9	$u^{17}-8u^{16}+\cdots-8u-16$
c_{10}	$u^{17}+34u^{16}+\cdots+6176u+256$
c_{11}	$u^{17}+6u^{16}+\cdots+32u-256$

(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_{12}	$y^{17} + 6y^{16} + \cdots + 32y - 256$
c_7, c_9	$y^{17} - 34y^{16} + \cdots + 6176y - 256$
c_{10}	$y^{17} - 94y^{16} + \cdots + 7397888y - 65536$
c_{11}	$y^{17} + 66y^{16} + \cdots + 2613760y - 65536$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.589168 + 0.828507I$ $a = -0.334446 + 0.242523I$ $b = 0.034957 + 0.580654I$ $c = -0.334446 + 0.242523I$ $d = -0.698979 - 0.215129I$	$0.79868 - 2.33972I$	$-0.33078 + 5.26516I$
$u = -0.589168 - 0.828507I$ $a = -0.334446 - 0.242523I$ $b = 0.034957 - 0.580654I$ $c = -0.334446 - 0.242523I$ $d = -0.698979 + 0.215129I$	$0.79868 + 2.33972I$	$-0.33078 - 5.26516I$
$u = -0.403846 + 0.948035I$ $a = -0.05430 + 1.74034I$ $b = 0.19668 + 1.84724I$ $c = -0.05430 + 1.74034I$ $d = 0.10664 + 2.23981I$	$-0.77904 - 2.74622I$	$2.48507 + 7.16740I$
$u = -0.403846 - 0.948035I$ $a = -0.05430 - 1.74034I$ $b = 0.19668 - 1.84724I$ $c = -0.05430 - 1.74034I$ $d = 0.10664 - 2.23981I$	$-0.77904 + 2.74622I$	$2.48507 - 7.16740I$
$u = 0.329450 + 1.030540I$ $a = -0.533679 - 0.078695I$ $b = -1.17048 + 1.30416I$ $c = -0.533679 - 0.078695I$ $d = -2.21402 + 0.44981I$	$0.72956 + 1.37071I$	$0.698150 - 0.213889I$
$u = 0.329450 - 1.030540I$ $a = -0.533679 + 0.078695I$ $b = -1.17048 - 1.30416I$ $c = -0.533679 + 0.078695I$ $d = -2.21402 - 0.44981I$	$0.72956 - 1.37071I$	$0.698150 + 0.213889I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.349370 + 0.320500I$ $a = -0.41610 - 1.64751I$ $b = -0.40657 + 1.44659I$ $c = -0.41610 - 1.64751I$ $d = 0.216006 + 0.318534I$	$-15.3110 - 5.6503I$	$2.10303 + 1.68119I$
$u = 1.349370 - 0.320500I$ $a = -0.41610 + 1.64751I$ $b = -0.40657 - 1.44659I$ $c = -0.41610 + 1.64751I$ $d = 0.216006 - 0.318534I$	$-15.3110 + 5.6503I$	$2.10303 - 1.68119I$
$u = 0.76686 + 1.31677I$ $a = -1.25346 - 0.81948I$ $b = -3.59718 - 0.72270I$ $c = -1.25346 - 0.81948I$ $d = -2.85722 - 1.77893I$	$-18.4182 + 12.9335I$	$1.01650 - 5.27491I$
$u = 0.76686 - 1.31677I$ $a = -1.25346 + 0.81948I$ $b = -3.59718 + 0.72270I$ $c = -1.25346 + 0.81948I$ $d = -2.85722 + 1.77893I$	$-18.4182 - 12.9335I$	$1.01650 + 5.27491I$
$u = 0.249371 + 0.383586I$ $a = 0.211561 + 0.671412I$ $b = 0.189849 + 0.372765I$ $c = 0.211561 + 0.671412I$ $d = 0.330805 - 1.044730I$	$-1.75773 + 0.71028I$	$-3.71531 + 0.02644I$
$u = 0.249371 - 0.383586I$ $a = 0.211561 - 0.671412I$ $b = 0.189849 - 0.372765I$ $c = 0.211561 - 0.671412I$ $d = 0.330805 + 1.044730I$	$-1.75773 - 0.71028I$	$-3.71531 - 0.02644I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.275145$ $a=-2.98224$ $b=-0.717882$ $c=-2.98224$ $d=-0.605476$	1.13318	9.61860
$u=\ \ 0.30683+1.77436I$ $a=-0.324822-0.574504I$ $b=-1.79861-3.25766I$ $c=-0.324822-0.574504I$ $d=-0.852724+0.332528I$	$-9.63429+3.26152I$	$-0.10201-1.44169I$
$u=\ \ 0.30683-1.77436I$ $a=-0.324822+0.574504I$ $b=-1.79861+3.25766I$ $c=-0.324822+0.574504I$ $d=-0.852724-0.332528I$	$-9.63429-3.26152I$	$-0.10201+1.44169I$
$u=\ \ 0.62871+1.82695I$ $a=\ \ 1.196370+0.402403I$ $b=\ \ 4.91030-0.58153I$ $c=\ \ 1.196370+0.402403I$ $d=\ \ 2.77223+0.28963I$	$17.4865+1.7702I$	$0.036073-0.657690I$
$u=\ \ 0.62871-1.82695I$ $a=\ \ 1.196370-0.402403I$ $b=\ \ 4.91030+0.58153I$ $c=\ \ 1.196370-0.402403I$ $d=\ \ 2.77223-0.28963I$	$17.4865-1.7702I$	$0.036073+0.657690I$

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

(i) Arc colorings

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

(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_7, c_8 c_9, c_{10}	u^2
c_6, c_{11}	$(u+1)^2$
c_{12}	$(u-1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_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_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$		
$a = 0$		
$b = 0.500000 + 0.866025I$	$1.64493 - 2.02988I$	$9.00000 + 3.46410I$
$c = 0$		
$d = 0.500000 + 0.866025I$		
$u = -0.500000 - 0.866025I$		
$a = 0$		
$b = 0.500000 - 0.866025I$	$1.64493 + 2.02988I$	$9.00000 - 3.46410I$
$c = 0$		
$d = 0.500000 - 0.866025I$		

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

(i) Arc colorings

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

(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_6, c_8 c_{11}, c_{12}	u^2
c_7	$(u-1)^2$
c_9, 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^u_3	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 + 0.866025I$ $a = -0.500000 + 0.866025I$ $b = -0.500000 + 0.866025I$ $c = 0.500000 - 0.866025I$ $d = -1.73205I$	$-1.64493 - 2.02988I$	$-3.00000 + 3.46410I$
$u = -0.500000 - 0.866025I$ $a = -0.500000 - 0.866025I$ $b = -0.500000 - 0.866025I$ $c = 0.500000 + 0.866025I$ $d = 1.73205I$	$-1.64493 + 2.02988I$	$-3.00000 - 3.46410I$

IV. $I_4^u = \langle da + a^2 + au + a - 1,\ c + a,\ b - a - u - 1,\ u^2 + u + 1\rangle$

(i) Arc colorings

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

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ u+1 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} a \\ a+u+1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -a \\ d \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 0 \\ d+a+u+1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -u \\ -u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 0 \\ d+a+u+1 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} a-u \\ a+1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} a \\ a+u+1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -d^2u + 2a^2u + a^2 + 2d + 3u + 5$

(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
$u = \cdots$		
$a = \cdots$		
$b = \cdots$	$2.02988I$	$2.36062 + 3.50810I$
$c = \cdots$		
$d = \cdots$		

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

(i) Arc colorings

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

(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	$u - 1$
c_9, c_{10}, c_{11} c_{12}	$u + 1$

(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
$v = 1.00000$		
$a = 0$		
$b = -1.00000$	0	0
$c = 1.00000$		
$d = 1.00000$		

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	$u^2(u-1)(u+1)^2(u^{17}+8u^{16}+\cdots-8u-16)$
c_7	$u^2(u-1)^3(u^{17}-8u^{16}+\cdots-8u-16)$
c_9	$u^2(u+1)^3(u^{17}-8u^{16}+\cdots-8u-16)$
c_{10}	$u^2(u+1)^3(u^{17}+34u^{16}+\cdots+6176u+256)$
c_{11}	$u^2(u+1)^3(u^{17}+6u^{16}+\cdots+32u-256)$
c_{12}	$u^2(u-1)^2(u+1)(u^{17}+8u^{16}+\cdots-8u-16)$

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_{12}	$y^2(y-1)^3(y^{17}+6y^{16}+\cdots+32y-256)$
c_7, c_9	$y^2(y-1)^3(y^{17}-34y^{16}+\cdots+6176y-256)$
c_{10}	$y^2(y-1)^3(y^{17}-94y^{16}+\cdots+7397888y-65536)$
c_{11}	$y^2(y-1)^3(y^{17}+66y^{16}+\cdots+2613760y-65536)$