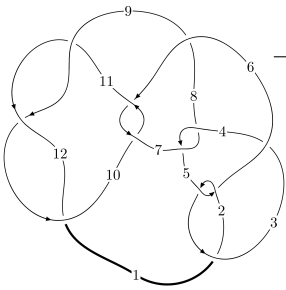
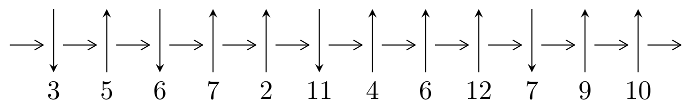
$12n_{0009}$ ($K12n_{0009}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned} I_1^u = \langle & 2.21642 \times 10^{44} u^{44} - 9.65342 \times 10^{44} u^{43} + \cdots + 5.80500 \times 10^{44} b + 4.56035 \times 10^{43}, \\ & -9.69683 \times 10^{44} u^{44} + 2.59441 \times 10^{45} u^{43} + \cdots + 5.80500 \times 10^{44} a - 1.42142 \times 10^{45},\ u^{45} - 3u^{44} + \cdots - 2u - \end{aligned}$$

$$I_2^u = \langle -u^2 a + b,\ u^4 a + u^4 + u^2 a + u^3 + a^2 - au + 3u^2 + u + 2,\ u^5 + u^4 + 2u^3 + u^2 + u + 1 \rangle$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 55 representations.

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[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.

$\boldsymbol{I_1^u = \langle 2.22\times10^{44}u^{44} - 9.65\times10^{44}u^{43} + \cdots + 5.80\times10^{44}b + 4.56\times10^{43},\ -9.70\times10^{44}u^{44} + 2.59\times10^{45}u^{43} + \cdots + 5.80\times10^{44}a - 1.42\times10^{45},\ u^{45} - 3u^{44} + \cdots - 2u + 1\rangle}$

(i) Arc colorings

$$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1.67043u^{44} - 4.46927u^{43} + \cdots + 1.43251u + 2.44861 \\ -0.381812u^{44} + 1.66295u^{43} + \cdots - 2.28564u - 0.0785591 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 1.52725u^{44} - 3.73078u^{43} + \cdots - 0.266722u + 2.91206 \\ -0.353492u^{44} + 1.38147u^{43} + \cdots - 1.52456u - 0.387507 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 0.180463u^{44} - 0.229067u^{43} + \cdots - 0.106601u - 0.509733 \\ 0.932433u^{44} - 3.31426u^{43} + \cdots + 3.71638u - 1.49789 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 1.11290u^{44} - 3.54332u^{43} + \cdots + 3.60978u - 2.00762 \\ 0.932433u^{44} - 3.31426u^{43} + \cdots + 3.71638u - 1.49789 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 0.107422u^{44} - 0.715021u^{43} + \cdots + 1.62877u + 0.305097 \\ 0.795848u^{44} - 2.98218u^{43} + \cdots + 4.34562u - 1.30977 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1.28862u^{44} - 2.80632u^{43} + \cdots - 0.853129u + 2.37005 \\ -0.381812u^{44} + 1.66295u^{43} + \cdots - 2.28564u - 0.0785591 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0.248367u^{44} - 0.966971u^{43} + \cdots + 5.08102u + 1.34780 \\ -0.418841u^{44} + 1.39898u^{43} + \cdots - 1.39587u + 0.364330 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0.180463u^{44} - 0.229067u^{43} + \cdots - 0.106601u - 0.509733 \\ -0.611791u^{44} + 2.34940u^{43} + \cdots - 3.27220u + 1.18556 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 6.45073u^{44} - 19.7307u^{43} + \cdots + 14.2789u - 6.88518$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{45} + 28u^{44} + \cdots + 13u - 1$
c_2, c_5	$u^{45} + 6u^{44} + \cdots + u - 1$
c_3	$u^{45} - 6u^{44} + \cdots + 11u - 1$
c_4, c_7	$u^{45} + 3u^{44} + \cdots - 2048u + 1024$
c_6, c_{10}	$u^{45} + 3u^{44} + \cdots - 2u - 1$
c_8	$u^{45} + 9u^{44} + \cdots - 305892u + 52489$
c_9, c_{11}, c_{12}	$u^{45} + 3u^{44} + \cdots + 8u - 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{45} - 16y^{44} + \cdots + 2813y - 1$
c_2, c_5	$y^{45} + 28y^{44} + \cdots + 13y - 1$
c_3	$y^{45} - 60y^{44} + \cdots + 13y - 1$
c_4, c_7	$y^{45} + 55y^{44} + \cdots - 12582912y - 1048576$
c_6, c_{10}	$y^{45} + 9y^{44} + \cdots - 8y - 1$
c_8	$y^{45} + 37y^{44} + \cdots - 75656299984y - 2755095121$
c_9, c_{11}, c_{12}	$y^{45} - 35y^{44} + \cdots - 8y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.996119 + 0.282709I$ $a = 0.110387 + 0.980594I$ $b = 0.080579 + 0.175761I$	$1.42637 - 0.55806I$	$2.83426 - 0.60220I$
$u = -0.996119 - 0.282709I$ $a = 0.110387 - 0.980594I$ $b = 0.080579 - 0.175761I$	$1.42637 + 0.55806I$	$2.83426 + 0.60220I$
$u = 0.783242 + 0.506620I$ $a = -0.030126 - 0.893560I$ $b = -0.396180 + 0.324015I$	$-3.24493 - 1.98845I$	$-2.05742 + 2.49039I$
$u = 0.783242 - 0.506620I$ $a = -0.030126 + 0.893560I$ $b = -0.396180 - 0.324015I$	$-3.24493 + 1.98845I$	$-2.05742 - 2.49039I$
$u = -0.647911 + 0.616131I$ $a = 0.277858 + 0.505783I$ $b = -1.283800 - 0.505811I$	$-0.49292 + 5.46151I$	$3.53146 - 8.21286I$
$u = -0.647911 - 0.616131I$ $a = 0.277858 - 0.505783I$ $b = -1.283800 + 0.505811I$	$-0.49292 - 5.46151I$	$3.53146 + 8.21286I$
$u = 0.415458 + 1.074940I$ $a = -0.242176 + 0.556359I$ $b = 0.272242 + 0.056149I$	$-1.16555 - 2.65109I$	$0.66724 + 3.06904I$
$u = 0.415458 - 1.074940I$ $a = -0.242176 - 0.556359I$ $b = 0.272242 - 0.056149I$	$-1.16555 + 2.65109I$	$0.66724 - 3.06904I$
$u = -0.300364 + 0.770681I$ $a = 0.78986 - 1.26679I$ $b = -0.252806 - 0.197943I$	$0.37099 - 1.66366I$	$5.28694 + 1.76198I$
$u = -0.300364 - 0.770681I$ $a = 0.78986 + 1.26679I$ $b = -0.252806 + 0.197943I$	$0.37099 + 1.66366I$	$5.28694 - 1.76198I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.349037 + 1.204480I$ $a = 0.230921 - 0.225780I$ $b = -0.048432 + 0.642308I$	$6.11434 + 3.25836I$	$9.12554 - 6.20048I$
$u = -0.349037 - 1.204480I$ $a = 0.230921 + 0.225780I$ $b = -0.048432 - 0.642308I$	$6.11434 - 3.25836I$	$9.12554 + 6.20048I$
$u = 0.224318 + 0.711056I$ $a = 0.683426 + 0.176982I$ $b = -0.044045 - 0.249882I$	$0.376942 - 1.142080I$	$4.49943 + 6.11117I$
$u = 0.224318 - 0.711056I$ $a = 0.683426 - 0.176982I$ $b = -0.044045 + 0.249882I$	$0.376942 + 1.142080I$	$4.49943 - 6.11117I$
$u = -0.084183 + 0.723735I$ $a = -0.081939 - 0.906872I$ $b = 1.06476 + 1.42506I$	$4.88394 + 1.66123I$	$14.9262 - 3.5385I$
$u = -0.084183 - 0.723735I$ $a = -0.081939 + 0.906872I$ $b = 1.06476 - 1.42506I$	$4.88394 - 1.66123I$	$14.9262 + 3.5385I$
$u = 0.315867 + 0.654924I$ $a = 0.133646 + 1.369790I$ $b = -1.28532 - 1.81254I$	$3.26588 - 4.39540I$	$10.11446 + 8.40755I$
$u = 0.315867 - 0.654924I$ $a = 0.133646 - 1.369790I$ $b = -1.28532 + 1.81254I$	$3.26588 + 4.39540I$	$10.11446 - 8.40755I$
$u = 0.928999 + 0.912938I$ $a = 1.01128 + 1.05587I$ $b = -1.83892 + 0.11929I$	$-3.43407 + 1.56417I$	0
$u = 0.928999 - 0.912938I$ $a = 1.01128 - 1.05587I$ $b = -1.83892 - 0.11929I$	$-3.43407 - 1.56417I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.004980 + 0.829128I$ $a = -0.550201 - 1.282520I$ $b = 1.72749 + 0.74464I$	$-8.38531 - 3.39936I$	0
$u = 1.004980 - 0.829128I$ $a = -0.550201 + 1.282520I$ $b = 1.72749 - 0.74464I$	$-8.38531 + 3.39936I$	0
$u = -0.918792 + 0.952300I$ $a = 0.87791 - 1.25175I$ $b = -2.04722 + 0.30573I$	$-7.36187 + 3.39187I$	0
$u = -0.918792 - 0.952300I$ $a = 0.87791 + 1.25175I$ $b = -2.04722 - 0.30573I$	$-7.36187 - 3.39187I$	0
$u = 0.908778 + 0.983223I$ $a = 0.68380 + 1.36694I$ $b = -2.05663 - 0.74421I$	$-3.22324 - 8.34361I$	0
$u = 0.908778 - 0.983223I$ $a = 0.68380 - 1.36694I$ $b = -2.05663 + 0.74421I$	$-3.22324 + 8.34361I$	0
$u = -1.045050 + 0.865904I$ $a = -0.726480 + 1.134250I$ $b = 1.94070 - 0.29376I$	$-11.88600 - 1.79976I$	0
$u = -1.045050 - 0.865904I$ $a = -0.726480 - 1.134250I$ $b = 1.94070 + 0.29376I$	$-11.88600 + 1.79976I$	0
$u = 0.871713 + 1.077210I$ $a = -1.17410 - 0.85705I$ $b = 1.83482 - 0.04447I$	$-7.57148 - 3.49814I$	0
$u = 0.871713 - 1.077210I$ $a = -1.17410 + 0.85705I$ $b = 1.83482 + 0.04447I$	$-7.57148 + 3.49814I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.086870 + 0.893598I$ $a = -0.799128 - 0.940104I$ $b = 1.90700 - 0.12468I$	$-7.31081 + 6.80058I$	0
$u = 1.086870 - 0.893598I$ $a = -0.799128 + 0.940104I$ $b = 1.90700 + 0.12468I$	$-7.31081 - 6.80058I$	0
$u = -0.510690 + 1.315230I$ $a = -0.303054 - 0.084448I$ $b = 0.565338 - 0.295471I$	$4.91496 + 6.28302I$	0
$u = -0.510690 - 1.315230I$ $a = -0.303054 + 0.084448I$ $b = 0.565338 + 0.295471I$	$4.91496 - 6.28302I$	0
$u = -0.915870 + 1.077500I$ $a = -1.01938 + 1.15677I$ $b = 2.08407 - 0.22155I$	$-11.1799 + 8.9578I$	0
$u = -0.915870 - 1.077500I$ $a = -1.01938 - 1.15677I$ $b = 2.08407 + 0.22155I$	$-11.1799 - 8.9578I$	0
$u = -0.039688 + 0.578919I$ $a = 1.94846 + 0.78209I$ $b = -0.187471 - 0.759973I$	$0.66871 - 1.39964I$	$7.21689 + 5.45878I$
$u = -0.039688 - 0.578919I$ $a = 1.94846 - 0.78209I$ $b = -0.187471 + 0.759973I$	$0.66871 + 1.39964I$	$7.21689 - 5.45878I$
$u = -0.571271$ $a = 1.59952$ $b = 0.143336$	2.17682	3.08930
$u = 0.94832 + 1.08708I$ $a = -0.78152 - 1.29730I$ $b = 2.14143 + 0.52643I$	$-6.6450 - 14.1896I$	0

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.94832 - 1.08708I$ $a = -0.78152 + 1.29730I$ $b = 2.14143 - 0.52643I$	$-6.6450 + 14.1896I$	0
$u = -0.323389 + 0.438179I$ $a = -1.32309 - 1.43900I$ $b = -0.774207 + 0.940763I$	$-0.07007 + 2.75890I$	$1.271024 - 0.509737I$
$u = -0.323389 - 0.438179I$ $a = -1.32309 + 1.43900I$ $b = -0.774207 - 0.940763I$	$-0.07007 - 2.75890I$	$1.271024 + 0.509737I$
$u = 0.428186 + 0.132966I$ $a = 1.98389 + 7.20476I$ $b = -0.475066 + 0.996976I$	$1.97991 + 2.18754I$	$-20.6628 + 4.9777I$
$u = 0.428186 - 0.132966I$ $a = 1.98389 - 7.20476I$ $b = -0.475066 - 0.996976I$	$1.97991 - 2.18754I$	$-20.6628 - 4.9777I$

II. $\boldsymbol{I_2^u =}$
$\boldsymbol{\langle -u^2a+b,\ u^4a+u^4+u^2a+u^3+a^2-au+3u^2+u+2,\ u^5+u^4+2u^3+u^2+u+1\rangle}$

(i) Arc colorings

$$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} a \\ u^2a \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} a \\ u^2a \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u^2+1 \\ u^2 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -u^4-u^2-1 \\ -u^4-u^3-u^2-1 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u^2a+a \\ u^2a \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^4+u^2a+u^2+a-u \\ u^2a+1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} u \\ u^3+u \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 2u^4a - u^3a + u^4 - 3u^2a + 5u^3 - au + 7u^2 - a + 5u + 8$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_3 c_5	$(y^2 + y + 1)^5$
c_4, c_7	y^{10}
c_6, c_{10}	$(y^5 + 3y^4 + 4y^3 + y^2 - y - 1)^2$
c_8	$(y^5 - y^4 + 8y^3 - 3y^2 + 3y - 1)^2$
c_9, c_{11}, c_{12}	$(y^5 - 5y^4 + 8y^3 - 3y^2 - y - 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.339110 + 0.822375I$ $a = 1.219640 - 0.330957I$ $b = -0.500000 + 0.866025I$	$0.329100 + 0.499304I$	$2.59686 + 1.45733I$
$u = 0.339110 + 0.822375I$ $a = -0.323203 + 1.221720I$ $b = -0.500000 - 0.866025I$	$0.32910 - 3.56046I$	$6.44749 + 8.37485I$
$u = 0.339110 - 0.822375I$ $a = 1.219640 + 0.330957I$ $b = -0.500000 - 0.866025I$	$0.329100 - 0.499304I$	$2.59686 - 1.45733I$
$u = 0.339110 - 0.822375I$ $a = -0.323203 - 1.221720I$ $b = -0.500000 + 0.866025I$	$0.32910 + 3.56046I$	$6.44749 - 8.37485I$
$u = -0.766826$ $a = -0.85031 + 1.47278I$ $b = -0.500000 + 0.866025I$	$2.40108 + 2.02988I$	$7.10008 - 1.25892I$
$u = -0.766826$ $a = -0.85031 - 1.47278I$ $b = -0.500000 - 0.866025I$	$2.40108 - 2.02988I$	$7.10008 + 1.25892I$
$u = -0.455697 + 1.200150I$ $a = 0.575710 + 0.191698I$ $b = -0.500000 - 0.866025I$	$5.87256 + 2.37095I$	$6.27578 + 1.37298I$
$u = -0.455697 + 1.200150I$ $a = -0.121840 - 0.594429I$ $b = -0.500000 + 0.866025I$	$5.87256 + 6.43072I$	$11.57979 - 6.03904I$
$u = -0.455697 - 1.200150I$ $a = 0.575710 - 0.191698I$ $b = -0.500000 + 0.866025I$	$5.87256 - 2.37095I$	$6.27578 - 1.37298I$
$u = -0.455697 - 1.200150I$ $a = -0.121840 + 0.594429I$ $b = -0.500000 - 0.866025I$	$5.87256 - 6.43072I$	$11.57979 + 6.03904I$

III. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u^2-u+1)^5)(u^{45}+28u^{44}+\cdots+13u-1)$
c_2	$((u^2+u+1)^5)(u^{45}+6u^{44}+\cdots+u-1)$
c_3	$((u^2-u+1)^5)(u^{45}-6u^{44}+\cdots+11u-1)$
c_4, c_7	$u^{10}(u^{45}+3u^{44}+\cdots-2048u+1024)$
c_5	$((u^2-u+1)^5)(u^{45}+6u^{44}+\cdots+u-1)$
c_6	$((u^5+u^4+2u^3+u^2+u+1)^2)(u^{45}+3u^{44}+\cdots-2u-1)$
c_8	$((u^5-3u^4+4u^3-u^2-u+1)^2)(u^{45}+9u^{44}+\cdots-305892u+52489)$
c_9	$((u^5-u^4-2u^3+u^2+u+1)^2)(u^{45}+3u^{44}+\cdots+8u-1)$
c_{10}	$((u^5-u^4+2u^3-u^2+u-1)^2)(u^{45}+3u^{44}+\cdots-2u-1)$
c_{11}, c_{12}	$((u^5+u^4-2u^3-u^2+u-1)^2)(u^{45}+3u^{44}+\cdots+8u-1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$((y^2+y+1)^5)(y^{45}-16y^{44}+\cdots+2813y-1)$
c_2, c_5	$((y^2+y+1)^5)(y^{45}+28y^{44}+\cdots+13y-1)$
c_3	$((y^2+y+1)^5)(y^{45}-60y^{44}+\cdots+13y-1)$
c_4, c_7	$y^{10}(y^{45}+55y^{44}+\cdots-1.25829\times10^7y-1048576)$
c_6, c_{10}	$((y^5+3y^4+4y^3+y^2-y-1)^2)(y^{45}+9y^{44}+\cdots-8y-1)$
c_8	$(y^5-y^4+8y^3-3y^2+3y-1)^2$ $\cdot(y^{45}+37y^{44}+\cdots-75656299984y-2755095121)$
c_9, c_{11}, c_{12}	$((y^5-5y^4+8y^3-3y^2-y-1)^2)(y^{45}-35y^{44}+\cdots-8y-1)$