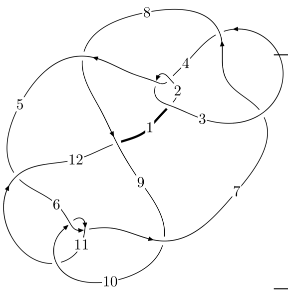
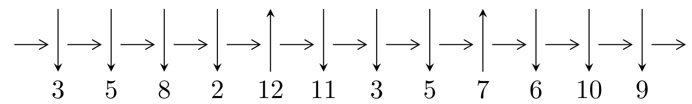
$12n_{0163}$ ($K12n_{0163}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I_1^u = \langle u^{31} - u^{30} + \cdots + b - 2u,\ -u^{31} + u^{30} + \cdots + a + 5u,\ u^{32} - 2u^{31} + \cdots + 5u - 1\rangle$$
$$I_2^u = \langle u^6 - 2u^4 - u^3 + u^2 + b + u + 1,\ u^7 + u^6 - 2u^5 - 2u^4 + u^3 + u^2 + a + u + 1,$$
$$u^9 + u^8 - 2u^7 - 3u^6 + u^5 + 3u^4 + 2u^3 - u - 1\rangle$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 41 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.

$\boldsymbol{I_1^u = \langle u^{31} - u^{30} + \cdots + b - 2u,\ -u^{31} + u^{30} + \cdots + a + 5u,\ u^{32} - 2u^{31} + \cdots + 5u - 1 \rangle}$

(i) Arc colorings

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

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

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

$$a_{10} = \begin{pmatrix} u \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -u^3 \\ -u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} u^{31} - u^{30} + \cdots + 8u^2 - 5u \\ -u^{31} + u^{30} + \cdots - 2u^2 + 2u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u^6 - u^4 + 1 \\ u^6 - 2u^4 + u^2 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -u^{29} + 8u^{27} + \cdots + 4u^2 - 2u \\ -u^{31} + u^{30} + \cdots - u^2 + 2u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -u^{11} + 2u^9 - 2u^7 - u^3 \\ -u^{13} + 3u^{11} - 5u^9 + 4u^7 - 2u^5 - u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^{31} - u^{30} + \cdots + u + 1 \\ u^{31} - u^{30} + \cdots + 6u^3 - u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u^3 \\ u^5 - u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} u^{17} - 4u^{15} + 7u^{13} - 4u^{11} - 3u^9 + 6u^7 - 2u^5 + u \\ u^{17} - 5u^{15} + 11u^{13} - 12u^{11} + 5u^9 + 2u^7 - 2u^5 + u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -10u^{31} + 11u^{30} + 82u^{29} - 109u^{28} - 303u^{27} + 492u^{26} + 589u^{25} - 1289u^{24} - 454u^{23} + 2036u^{22} - 559u^{21} - 1667u^{20} + 1827u^{19} - 152u^{18} - 1853u^{17} + 1907u^{16} + 315u^{15} - 1818u^{14} + 1090u^{13} + 295u^{12} - 980u^{11} + 734u^{10} + 52u^9 - 568u^8 + 382u^7 + 24u^6 - 173u^5 + 145u^4 - 51u^3 - 48u^2 + 51u - 23$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{32} + 50u^{31} + \cdots + 37u + 1$
c_2, c_4	$u^{32} - 10u^{31} + \cdots + 7u - 1$
c_3, c_7	$u^{32} - u^{31} + \cdots + 1024u + 512$
c_5, c_9	$u^{32} + 6u^{31} + \cdots + 49u + 5$
c_6, c_{10}	$u^{32} + 2u^{31} + \cdots - 5u - 1$
c_8	$u^{32} + 2u^{31} + \cdots - 3u - 1$
c_{11}	$u^{32} + 18u^{31} + \cdots + 9u + 1$
c_{12}	$u^{32} - 6u^{31} + \cdots + 1421u + 145$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{32} - 126y^{31} + \cdots - 181y + 1$
c_2, c_4	$y^{32} - 50y^{31} + \cdots - 37y + 1$
c_3, c_7	$y^{32} - 57y^{31} + \cdots + 1310720y + 262144$
c_5, c_9	$y^{32} + 30y^{31} + \cdots - 461y + 25$
c_6, c_{10}	$y^{32} - 18y^{31} + \cdots - 9y + 1$
c_8	$y^{32} - 66y^{31} + \cdots - 9y + 1$
c_{11}	$y^{32} - 6y^{31} + \cdots - 17y + 1$
c_{12}	$y^{32} - 30y^{31} + \cdots + 1291979y + 21025$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.920983 + 0.401471I$ $a = 0.917136 - 1.039840I$ $b = 0.415154 + 0.155618I$	$-2.04683 - 3.28761I$	$-12.15173 + 6.50570I$
$u = 0.920983 - 0.401471I$ $a = 0.917136 + 1.039840I$ $b = 0.415154 - 0.155618I$	$-2.04683 + 3.28761I$	$-12.15173 - 6.50570I$
$u = -0.907439 + 0.255427I$ $a = 1.69960 + 1.28460I$ $b = 1.49817 + 0.96455I$	$-3.08320 + 1.04878I$	$-12.81708 - 5.09104I$
$u = -0.907439 - 0.255427I$ $a = 1.69960 - 1.28460I$ $b = 1.49817 - 0.96455I$	$-3.08320 - 1.04878I$	$-12.81708 + 5.09104I$
$u = -0.777091 + 0.477881I$ $a = -0.536566 - 0.666041I$ $b = -0.649263 - 0.366597I$	$1.34788 + 1.99721I$	$-0.92513 - 4.43380I$
$u = -0.777091 - 0.477881I$ $a = -0.536566 + 0.666041I$ $b = -0.649263 + 0.366597I$	$1.34788 - 1.99721I$	$-0.92513 + 4.43380I$
$u = 0.953782 + 0.580631I$ $a = -0.13862 + 2.54860I$ $b = -0.84091 + 1.57585I$	$-11.82200 - 5.87879I$	$-11.28951 + 5.22144I$
$u = 0.953782 - 0.580631I$ $a = -0.13862 - 2.54860I$ $b = -0.84091 - 1.57585I$	$-11.82200 + 5.87879I$	$-11.28951 - 5.22144I$
$u = 0.124644 + 0.870094I$ $a = -0.488908 - 1.119880I$ $b = 2.86386 + 0.17983I$	$-16.5159 + 6.3822I$	$-11.71583 - 2.55779I$
$u = 0.124644 - 0.870094I$ $a = -0.488908 + 1.119880I$ $b = 2.86386 - 0.17983I$	$-16.5159 - 6.3822I$	$-11.71583 + 2.55779I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.534278 + 0.665517I$ $a = -1.317440 - 0.135023I$ $b = -1.75596 - 0.78631I$	$-10.62080 + 1.07852I$	$-9.17455 + 0.26224I$
$u = 0.534278 - 0.665517I$ $a = -1.317440 + 0.135023I$ $b = -1.75596 + 0.78631I$	$-10.62080 - 1.07852I$	$-9.17455 - 0.26224I$
$u = -1.15702$ $a = -2.82340$ $b = -1.47424$	-16.1082	-16.3550
$u = 0.030254 + 0.815370I$ $a = 0.892190 + 0.010385I$ $b = -1.84976 - 0.76361I$	$-5.35010 + 1.73289I$	$-12.16292 - 1.23498I$
$u = 0.030254 - 0.815370I$ $a = 0.892190 - 0.010385I$ $b = -1.84976 + 0.76361I$	$-5.35010 - 1.73289I$	$-12.16292 + 1.23498I$
$u = 1.183180 + 0.412649I$ $a = 0.200378 - 0.628582I$ $b = 0.533514 + 0.079289I$	$-4.65799 - 1.98947I$	$-10.09461 + 1.11362I$
$u = 1.183180 - 0.412649I$ $a = 0.200378 + 0.628582I$ $b = 0.533514 - 0.079289I$	$-4.65799 + 1.98947I$	$-10.09461 - 1.11362I$
$u = -0.104577 + 0.739226I$ $a = -0.423697 + 0.357022I$ $b = 0.508988 + 0.480725I$	$-1.00221 - 1.97931I$	$-5.05108 + 2.63229I$
$u = -0.104577 - 0.739226I$ $a = -0.423697 - 0.357022I$ $b = 0.508988 - 0.480725I$	$-1.00221 + 1.97931I$	$-5.05108 - 2.63229I$
$u = -1.179880 + 0.490061I$ $a = 1.118620 - 0.044684I$ $b = 1.040940 - 0.674261I$	$-4.09969 + 6.54761I$	$-8.24294 - 5.21749I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.179880 - 0.490061I$ $a = 1.118620 + 0.044684I$ $b = 1.040940 + 0.674261I$	$-4.09969 - 6.54761I$	$-8.24294 + 5.21749I$
$u = -1.222640 + 0.444091I$ $a = -2.70913 - 0.19363I$ $b = -2.46800 + 1.73197I$	$-9.06220 + 2.72579I$	$-15.5836 - 2.2463I$
$u = -1.222640 - 0.444091I$ $a = -2.70913 + 0.19363I$ $b = -2.46800 - 1.73197I$	$-9.06220 - 2.72579I$	$-15.5836 + 2.2463I$
$u = 1.218380 + 0.471883I$ $a = -1.38525 + 1.82670I$ $b = -2.45044 - 0.06343I$	$-8.86209 - 6.36925I$	$-15.2047 + 4.5478I$
$u = 1.218380 - 0.471883I$ $a = -1.38525 - 1.82670I$ $b = -2.45044 + 0.06343I$	$-8.86209 + 6.36925I$	$-15.2047 - 4.5478I$
$u = -1.257560 + 0.385869I$ $a = 2.56331 + 1.01533I$ $b = 2.30376 - 1.55155I$	$18.6867 - 2.0727I$	$-15.8105 - 0.3085I$
$u = -1.257560 - 0.385869I$ $a = 2.56331 - 1.01533I$ $b = 2.30376 + 1.55155I$	$18.6867 + 2.0727I$	$-15.8105 + 0.3085I$
$u = 1.223360 + 0.521615I$ $a = 2.66517 - 2.37727I$ $b = 4.04494 - 0.12748I$	$19.6654 - 11.4323I$	$-14.6387 + 5.6746I$
$u = 1.223360 - 0.521615I$ $a = 2.66517 + 2.37727I$ $b = 4.04494 + 0.12748I$	$19.6654 + 11.4323I$	$-14.6387 - 5.6746I$
$u = 0.653875$ $a = -0.683891$ $b = 0.233434$	-0.923628	-10.7930

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.511886 + 0.195210I$ $a = -0.803157 + 0.226384I$ $b = 0.425410 - 0.116435I$	$-0.941625 + 0.020840I$	$-9.56315 + 0.03156I$
$u = 0.511886 - 0.195210I$ $a = -0.803157 - 0.226384I$ $b = 0.425410 + 0.116435I$	$-0.941625 - 0.020840I$	$-9.56315 - 0.03156I$

II. $\boldsymbol{I_2^u = \langle u^6 - 2u^4 - u^3 + u^2 + b + u + 1,\ u^7 + u^6 - 2u^5 - 2u^4 + u^3 + u^2 + a + u + 1,\ u^9 + u^8 - 2u^7 - 3u^6 + u^5 + 3u^4 + 2u^3 - u - 1\rangle}$

(i) Arc colorings

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

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

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

$$a_{10} = \begin{pmatrix} u \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -u^3 \\ -u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^7 - u^6 + 2u^5 + 2u^4 - u^3 - u^2 - u - 1 \\ -u^6 + 2u^4 + u^3 - u^2 - u - 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u^6 - u^4 + 1 \\ u^6 - 2u^4 + u^2 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -u^7 - 2u^6 + 2u^5 + 3u^4 - u^3 - u^2 - u - 2 \\ -2u^6 + 4u^4 + u^3 - 2u^2 - u - 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -u^6 + u^4 - 1 \\ -u^6 + 2u^4 - u^2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u^7 - u^6 + 2u^5 + 2u^4 - u^3 - u^2 - u - 1 \\ -u^6 + 2u^4 + u^3 - u^2 - u - 1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u^3 \\ u^5 - u^3 + u \end{pmatrix}$$

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= u^8 - 2u^7 - u^6 + 4u^5 + 3u^4 - 6u^3 - u^2 - u - 10$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_4	$(y-1)^9$
c_3, c_7	y^9
c_5, c_9	$y^9 + 7y^8 + 20y^7 + 25y^6 + 5y^5 - 15y^4 + 22y^2 + 13y - 1$
c_6, c_{10}	$y^9 - 5y^8 + 12y^7 - 15y^6 + 9y^5 + y^4 - 4y^3 + 2y^2 + y - 1$
c_8, c_{12}	$y^9 + 3y^8 + 8y^7 + 13y^6 + 17y^5 + 17y^4 + 12y^3 + 6y^2 + y - 1$
c_{11}	$y^9 - y^8 + 12y^7 - 7y^6 + 37y^5 + y^4 - 10y^2 + 5y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.772920+0.510351I$ $a=-0.147032-1.012940I$ $b=-0.848670-0.225310I$	$0.13850+2.09337I$	$-9.40455-4.13635I$
$u=-0.772920-0.510351I$ $a=-0.147032+1.012940I$ $b=-0.848670+0.225310I$	$0.13850-2.09337I$	$-9.40455+4.13635I$
$u=\ 0.825933$ $a=-1.95176$ $b=-1.33142$	-2.84338	-12.5800
$u=\ 1.173910+0.391555I$ $a=\ 0.679689+0.626017I$ $b=\ 0.25695+1.39155I$	$-6.01628-1.33617I$	$-15.1179+0.3856I$
$u=\ 1.173910-0.391555I$ $a=\ 0.679689-0.626017I$ $b=\ 0.25695-1.39155I$	$-6.01628+1.33617I$	$-15.1179-0.3856I$
$u=-0.141484+0.739668I$ $a=-0.541407+0.753907I$ $b=\ 0.443165-0.284059I$	$-2.26187-2.45442I$	$-10.97405+3.19656I$
$u=-0.141484-0.739668I$ $a=-0.541407-0.753907I$ $b=\ 0.443165+0.284059I$	$-2.26187+2.45442I$	$-10.97405-3.19656I$
$u=-1.172470+0.500383I$ $a=\ 0.484630+0.655708I$ $b=\ 1.314260+0.168567I$	$-5.24306+7.08493I$	$-14.2133-6.7157I$
$u=-1.172470-0.500383I$ $a=\ 0.484630-0.655708I$ $b=\ 1.314260-0.168567I$	$-5.24306-7.08493I$	$-14.2133+6.7157I$

III. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u-1)^9)(u^{32}+50u^{31}+\cdots+37u+1)$
c_2	$((u-1)^9)(u^{32}-10u^{31}+\cdots+7u-1)$
c_3, c_7	$u^9(u^{32}-u^{31}+\cdots+1024u+512)$
c_4	$((u+1)^9)(u^{32}-10u^{31}+\cdots+7u-1)$
c_5	$(u^9+3u^8+8u^7+13u^6+17u^5+17u^4+12u^3+6u^2+u-1)$ $\cdot(u^{32}+6u^{31}+\cdots+49u+5)$
c_6	$(u^9+u^8+\cdots-u-1)(u^{32}+2u^{31}+\cdots-5u-1)$
c_8	$(u^9-u^8+\cdots+u+1)(u^{32}+2u^{31}+\cdots-3u-1)$
c_9	$(u^9-3u^8+8u^7-13u^6+17u^5-17u^4+12u^3-6u^2+u+1)$ $\cdot(u^{32}+6u^{31}+\cdots+49u+5)$
c_{10}	$(u^9-u^8+\cdots-u+1)(u^{32}+2u^{31}+\cdots-5u-1)$
c_{11}	$(u^9+5u^8+12u^7+15u^6+9u^5-u^4-4u^3-2u^2+u+1)$ $\cdot(u^{32}+18u^{31}+\cdots+9u+1)$
c_{12}	$(u^9-u^8+2u^7-u^6+3u^5-u^4+2u^3+u+1)$ $\cdot(u^{32}-6u^{31}+\cdots+1421u+145)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$((y-1)^9)(y^{32} - 126y^{31} + \cdots - 181y + 1)$
c_2, c_4	$((y-1)^9)(y^{32} - 50y^{31} + \cdots - 37y + 1)$
c_3, c_7	$y^9(y^{32} - 57y^{31} + \cdots + 1310720y + 262144)$
c_5, c_9	$(y^9 + 7y^8 + 20y^7 + 25y^6 + 5y^5 - 15y^4 + 22y^2 + 13y - 1)$ $\cdot (y^{32} + 30y^{31} + \cdots - 461y + 25)$
c_6, c_{10}	$(y^9 - 5y^8 + 12y^7 - 15y^6 + 9y^5 + y^4 - 4y^3 + 2y^2 + y - 1)$ $\cdot (y^{32} - 18y^{31} + \cdots - 9y + 1)$
c_8	$(y^9 + 3y^8 + 8y^7 + 13y^6 + 17y^5 + 17y^4 + 12y^3 + 6y^2 + y - 1)$ $\cdot (y^{32} - 66y^{31} + \cdots - 9y + 1)$
c_{11}	$(y^9 - y^8 + 12y^7 - 7y^6 + 37y^5 + y^4 - 10y^2 + 5y - 1)$ $\cdot (y^{32} - 6y^{31} + \cdots - 17y + 1)$
c_{12}	$(y^9 + 3y^8 + 8y^7 + 13y^6 + 17y^5 + 17y^4 + 12y^3 + 6y^2 + y - 1)$ $\cdot (y^{32} - 30y^{31} + \cdots + 1291979y + 21025)$