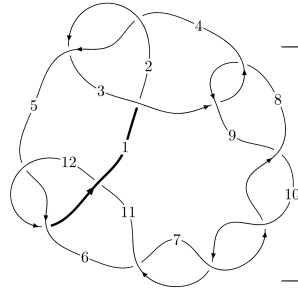
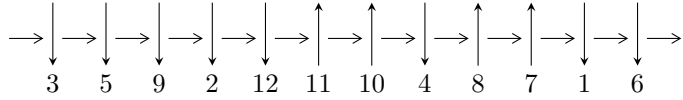


12a₀₁₆₅ (K12a₀₁₆₅)



A knot diagram¹

Linearized knot diagram



Solving Sequence

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

Ideals for irreducible components² of X_{par}

$$I_1^u = \langle 4u^{18} + 9u^{17} + \dots + b - 5, 3u^{18} + 3u^{17} + \dots + 2a - 5u, u^{19} + 3u^{18} + \dots - 2u - 2 \rangle$$

$$I_2^u = \langle u^{15}a + 3u^{16} + \dots - a + 1, -u^{14}a - u^{15} + \dots - a + 2, u^{17} - u^{16} + \dots + u - 1 \rangle$$

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

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 54 representations.

¹The 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>).

²All coefficients of polynomials are rational numbers. But the coefficients are sometimes approximated in decimal forms when there is not enough margin.

$$I_1^u = \langle 4u^{18} + 9u^{17} + \dots + b - 5, 3u^{18} + 3u^{17} + \dots + 2a - 5u, u^{19} + 3u^{18} + \dots - 2u - 2 \rangle \quad \text{I.}$$

(i) Arc colorings

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

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} u^2 + 1 \\ u^2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -\frac{3}{2}u^{18} - \frac{3}{2}u^{17} + \dots + \frac{1}{2}u^2 + \frac{5}{2}u \\ -4u^{18} - 9u^{17} + \dots + 5u + 5 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} -\frac{1}{2}u^{18} - \frac{1}{2}u^{17} + \dots + \frac{1}{2}u^2 + \frac{3}{2}u \\ -u^{18} - 2u^{17} + \dots + 2u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} \frac{1}{2}u^{18} + \frac{3}{2}u^{17} + \dots - \frac{1}{2}u - 1 \\ -u^{18} - u^{16} + \dots + 2u - 1 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u^4 + u^2 + 1 \\ u^4 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} u^6 + u^4 + 2u^2 + 1 \\ u^6 + u^2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} u^8 + u^6 + 3u^4 + 2u^2 + 1 \\ u^8 + 2u^4 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} \frac{1}{2}u^{18} + \frac{1}{2}u^{17} + \dots - \frac{1}{2}u + 1 \\ u^{18} + 2u^{17} + \dots - u - 1 \end{pmatrix}$$

(ii) Obstruction class = -1

$$\text{(iii) Cusp Shapes} = 2u^{18} + 2u^{16} - 6u^{15} + 4u^{14} - 12u^{13} + 2u^{12} - 28u^{11} - 2u^{10} - 24u^9 - 2u^8 - 28u^7 - 12u^6 - 8u^5 - 12u^4 - 6u^2$$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_{11}	$u^{19} + 11u^{18} + \dots + 3u + 1$
c_2, c_4, c_5 c_{12}	$u^{19} - u^{18} + \dots - u + 1$
c_3, c_8	$u^{19} - 3u^{18} + \dots - 2u + 2$
c_6, c_7, c_9 c_{10}	$u^{19} - 3u^{18} + \dots - 11u^2 + 4$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_{11}	$y^{19} - 3y^{18} + \dots + 11y - 1$
c_2, c_4, c_5 c_{12}	$y^{19} - 11y^{18} + \dots + 3y - 1$
c_3, c_8	$y^{19} + 3y^{18} + \dots + 11y^2 - 4$
c_6, c_7, c_9 c_{10}	$y^{19} + 23y^{18} + \dots + 88y - 16$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.347446 + 0.933456I$	$0.10929 + 6.34273I$	$-3.77049 - 10.42741I$
$a = 0.171985 - 0.194773I$		
$b = 0.969269 + 0.134564I$		
$u = -0.347446 - 0.933456I$	$0.10929 - 6.34273I$	$-3.77049 + 10.42741I$
$a = 0.171985 + 0.194773I$		
$b = 0.969269 - 0.134564I$		
$u = 0.532414 + 0.771389I$	$-0.41325 - 2.04302I$	$-2.62456 + 3.49236I$
$a = 0.511523 + 0.882342I$		
$b = 0.007510 + 0.817176I$		
$u = 0.532414 - 0.771389I$	$-0.41325 + 2.04302I$	$-2.62456 - 3.49236I$
$a = 0.511523 - 0.882342I$		
$b = 0.007510 - 0.817176I$		
$u = 0.838741 + 0.661261I$	$-6.95459 + 5.11431I$	$-11.79581 - 4.98965I$
$a = -0.960098 - 0.906788I$		
$b = -0.480763 - 0.879178I$		
$u = 0.838741 - 0.661261I$	$-6.95459 - 5.11431I$	$-11.79581 + 4.98965I$
$a = -0.960098 + 0.906788I$		
$b = -0.480763 + 0.879178I$		
$u = -0.009736 + 0.866710I$	$1.96169 - 1.46588I$	$2.04992 + 4.47072I$
$a = -0.023776 + 0.565154I$		
$b = -0.632690 + 0.365808I$		
$u = -0.009736 - 0.866710I$	$1.96169 + 1.46588I$	$2.04992 - 4.47072I$
$a = -0.023776 - 0.565154I$		
$b = -0.632690 - 0.365808I$		
$u = 0.674488 + 0.956724I$	$-5.94319 - 10.65650I$	$-9.44590 + 9.96875I$
$a = -0.561349 - 1.206360I$		
$b = -0.041367 - 1.175230I$		
$u = 0.674488 - 0.956724I$	$-5.94319 + 10.65650I$	$-9.44590 - 9.96875I$
$a = -0.561349 + 1.206360I$		
$b = -0.041367 + 1.175230I$		

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.722854 + 0.279055I$ $a = -0.268290 - 0.582437I$ $b = -0.042347 + 0.263428I$	$-2.21379 - 2.62773I$	$-8.93554 + 6.59868I$
$u = -0.722854 - 0.279055I$ $a = -0.268290 + 0.582437I$ $b = -0.042347 - 0.263428I$	$-2.21379 + 2.62773I$	$-8.93554 - 6.59868I$
$u = -0.902022 + 0.935041I$ $a = -1.22720 + 1.31378I$ $b = 0.59682 + 2.85556I$	$-9.32638 + 3.32620I$	$-5.56917 - 2.29363I$
$u = -0.902022 - 0.935041I$ $a = -1.22720 - 1.31378I$ $b = 0.59682 - 2.85556I$	$-9.32638 - 3.32620I$	$-5.56917 + 2.29363I$
$u = -0.954578 + 0.916463I$ $a = 2.01023 - 1.04776I$ $b = 0.44541 - 3.24116I$	$-17.2005 - 6.5526I$	$-12.03748 + 3.63371I$
$u = -0.954578 - 0.916463I$ $a = 2.01023 + 1.04776I$ $b = 0.44541 + 3.24116I$	$-17.2005 + 6.5526I$	$-12.03748 - 3.63371I$
$u = -0.914047 + 0.984596I$ $a = 0.93853 - 2.07020I$ $b = -1.52424 - 3.36626I$	$-16.9728 + 13.4124I$	$-11.60113 - 8.01307I$
$u = -0.914047 - 0.984596I$ $a = 0.93853 + 2.07020I$ $b = -1.52424 + 3.36626I$	$-16.9728 - 13.4124I$	$-11.60113 + 8.01307I$
$u = 0.610080$ $a = 0.816899$ $b = 0.404798$	-1.23828	-6.53970

II.

$$I_2^u = \langle u^{15}a + 3u^{16} + \dots - a + 1, -u^{14}a - u^{15} + \dots - a + 2, u^{17} - u^{16} + \dots + u - 1 \rangle$$

(i) Arc colorings

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

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} u^2 + 1 \\ u^2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} a \\ -\frac{1}{2}u^{15}a - \frac{3}{2}u^{16} + \dots + \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} \frac{1}{2}u^{16}a - \frac{1}{2}u^{16} + \dots + \frac{3}{2}a + \frac{3}{2}u \\ -u^{15}a - 3u^{16} + \dots + a - 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -\frac{1}{2}u^{15}a - \frac{3}{2}u^{16} + \dots - \frac{1}{2}a - \frac{1}{2} \\ -\frac{1}{2}u^{15}a - \frac{3}{2}u^{16} + \dots + \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u^4 + u^2 + 1 \\ u^4 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} u^6 + u^4 + 2u^2 + 1 \\ u^6 + u^2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} u^8 + u^6 + 3u^4 + 2u^2 + 1 \\ u^8 + 2u^4 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -\frac{1}{2}u^{15}a - \frac{1}{2}u^{16} + \dots + \frac{3}{2}a + \frac{3}{2} \\ -\frac{1}{2}u^{16}a - 3u^{16} + \dots + a - \frac{1}{2} \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = $-4u^{15} + 4u^{14} - 8u^{13} + 4u^{12} - 28u^{11} + 20u^{10} - 36u^9 + 16u^8 - 56u^7 + 28u^6 - 40u^5 + 16u^4 - 28u^3 + 16u^2 - 12u - 2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_{11}	$u^{34} + 21u^{33} + \dots + 12u + 1$
c_2, c_4, c_5 c_{12}	$u^{34} - u^{33} + \dots - 6u^2 + 1$
c_3, c_8	$(u^{17} + u^{16} + \dots + u + 1)^2$
c_6, c_7, c_9 c_{10}	$(u^{17} - 3u^{16} + \dots - 3u + 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_{11}	$y^{34} - 17y^{33} + \dots - 140y + 1$
c_2, c_4, c_5 c_{12}	$y^{34} - 21y^{33} + \dots - 12y + 1$
c_3, c_8	$(y^{17} + 3y^{16} + \dots - 3y - 1)^2$
c_6, c_7, c_9 c_{10}	$(y^{17} + 23y^{16} + \dots + 9y - 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.672243 + 0.786311I$ $a = -1.082100 - 0.898592I$ $b = -1.31901 - 1.59889I$	$-7.18216 - 2.50454I$	$-12.07700 + 3.85927I$
$u = 0.672243 + 0.786311I$ $a = -1.00326 - 1.62412I$ $b = 0.608646 - 0.931855I$	$-7.18216 - 2.50454I$	$-12.07700 + 3.85927I$
$u = 0.672243 - 0.786311I$ $a = -1.082100 + 0.898592I$ $b = -1.31901 + 1.59889I$	$-7.18216 + 2.50454I$	$-12.07700 - 3.85927I$
$u = 0.672243 - 0.786311I$ $a = -1.00326 + 1.62412I$ $b = 0.608646 + 0.931855I$	$-7.18216 + 2.50454I$	$-12.07700 - 3.85927I$
$u = -0.706998 + 0.642933I$ $a = -0.807968 + 0.702661I$ $b = -0.524414 + 1.168210I$	$-3.89702 - 1.19537I$	$-8.59794 + 0.58854I$
$u = -0.706998 + 0.642933I$ $a = 0.67143 - 1.25663I$ $b = -0.057241 - 0.574590I$	$-3.89702 - 1.19537I$	$-8.59794 + 0.58854I$
$u = -0.706998 - 0.642933I$ $a = -0.807968 - 0.702661I$ $b = -0.524414 - 1.168210I$	$-3.89702 + 1.19537I$	$-8.59794 - 0.58854I$
$u = -0.706998 - 0.642933I$ $a = 0.67143 + 1.25663I$ $b = -0.057241 + 0.574590I$	$-3.89702 + 1.19537I$	$-8.59794 - 0.58854I$
$u = -0.616947 + 0.891729I$ $a = 0.670001 - 0.916287I$ $b = 0.668676 - 1.015290I$	$-3.09054 + 6.12281I$	$-6.33796 - 6.84601I$
$u = -0.616947 + 0.891729I$ $a = -0.599055 + 1.125390I$ $b = 0.432694 + 1.039890I$	$-3.09054 + 6.12281I$	$-6.33796 - 6.84601I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.616947 - 0.891729I$		
$a = 0.670001 + 0.916287I$	$-3.09054 - 6.12281I$	$-6.33796 + 6.84601I$
$b = 0.668676 + 1.015290I$		
$u = -0.616947 - 0.891729I$		
$a = -0.599055 - 1.125390I$	$-3.09054 - 6.12281I$	$-6.33796 + 6.84601I$
$b = 0.432694 - 1.039890I$		
$u = 0.208716 + 0.869278I$		
$a = 0.072000 + 0.778055I$	$1.42740 - 2.28997I$	$0.30509 + 4.71022I$
$b = 0.256802 + 0.282630I$		
$u = 0.208716 + 0.869278I$		
$a = -0.172514 + 0.206222I$	$1.42740 - 2.28997I$	$0.30509 + 4.71022I$
$b = -1.016220 + 0.354488I$		
$u = 0.208716 - 0.869278I$		
$a = 0.072000 - 0.778055I$	$1.42740 + 2.28997I$	$0.30509 - 4.71022I$
$b = 0.256802 - 0.282630I$		
$u = 0.208716 - 0.869278I$		
$a = -0.172514 - 0.206222I$	$1.42740 + 2.28997I$	$0.30509 - 4.71022I$
$b = -1.016220 - 0.354488I$		
$u = 0.929005 + 0.919626I$		
$a = 1.29872 + 1.27388I$	$-13.30230 + 1.56927I$	$-8.91940 - 0.65050I$
$b = -0.39727 + 3.05185I$		
$u = 0.929005 + 0.919626I$		
$a = -1.96214 - 1.14150I$	$-13.30230 + 1.56927I$	$-8.91940 - 0.65050I$
$b = -0.17796 - 3.10658I$		
$u = 0.929005 - 0.919626I$		
$a = 1.29872 - 1.27388I$	$-13.30230 - 1.56927I$	$-8.91940 + 0.65050I$
$b = -0.39727 - 3.05185I$		
$u = 0.929005 - 0.919626I$		
$a = -1.96214 + 1.14150I$	$-13.30230 - 1.56927I$	$-8.91940 + 0.65050I$
$b = -0.17796 + 3.10658I$		

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.920829 + 0.944574I$ $a = 1.09183 - 2.00211I$ $b = -1.03641 - 3.68580I$	$-17.2424 + 3.3872I$	$-12.08288 - 2.32417I$
$u = -0.920829 + 0.944574I$ $a = 2.02633 - 1.22733I$ $b = -0.07151 - 3.28042I$	$-17.2424 + 3.3872I$	$-12.08288 - 2.32417I$
$u = -0.920829 - 0.944574I$ $a = 1.09183 + 2.00211I$ $b = -1.03641 + 3.68580I$	$-17.2424 - 3.3872I$	$-12.08288 + 2.32417I$
$u = -0.920829 - 0.944574I$ $a = 2.02633 + 1.22733I$ $b = -0.07151 + 3.28042I$	$-17.2424 - 3.3872I$	$-12.08288 + 2.32417I$
$u = 0.905075 + 0.964023I$ $a = 1.23229 + 1.39113I$ $b = -0.84889 + 2.93758I$	$-13.1567 - 8.3174I$	$-8.64033 + 5.18877I$
$u = 0.905075 + 0.964023I$ $a = -0.98957 - 1.99266I$ $b = 1.20467 - 3.37460I$	$-13.1567 - 8.3174I$	$-8.64033 + 5.18877I$
$u = 0.905075 - 0.964023I$ $a = 1.23229 - 1.39113I$ $b = -0.84889 - 2.93758I$	$-13.1567 + 8.3174I$	$-8.64033 - 5.18877I$
$u = 0.905075 - 0.964023I$ $a = -0.98957 + 1.99266I$ $b = 1.20467 + 3.37460I$	$-13.1567 + 8.3174I$	$-8.64033 - 5.18877I$
$u = -0.231740 + 0.588876I$ $a = 0.776006 + 0.665775I$ $b = 1.69903 + 1.15771I$	$-3.00025 + 0.92655I$	$-6.49670 - 7.34204I$
$u = -0.231740 + 0.588876I$ $a = -0.09148 - 2.42444I$ $b = -0.307065 + 0.314242I$	$-3.00025 + 0.92655I$	$-6.49670 - 7.34204I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.231740 - 0.588876I$		
$a = 0.776006 - 0.665775I$	$-3.00025 - 0.92655I$	$-6.49670 + 7.34204I$
$b = 1.69903 - 1.15771I$		
$u = -0.231740 - 0.588876I$		
$a = -0.09148 + 2.42444I$	$-3.00025 - 0.92655I$	$-6.49670 + 7.34204I$
$b = -0.307065 - 0.314242I$		
$u = 0.522950$		
$a = 1.21130$	-1.19234	-8.30570
$b = 0.271850$		
$u = 0.522950$		
$a = 0.527647$	-1.19234	-8.30570
$b = 0.499095$		

III. $I_1^v = \langle a, b - 1, v + 1 \rangle$

(i) Arc colorings

$$a_4 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

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

$$a_5 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

(ii) Obstruction class = 1

(iii) Cusp Shapes = -12

(iv) **u**-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$v = -1.00000$		
$a = 0$	-3.28987	-12.0000
$b = 1.00000$		

IV. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_{11}	$(u - 1)(u^{19} + 11u^{18} + \dots + 3u + 1)(u^{34} + 21u^{33} + \dots + 12u + 1)$
c_2, c_5	$(u - 1)(u^{19} - u^{18} + \dots - u + 1)(u^{34} - u^{33} + \dots - 6u^2 + 1)$
c_3, c_8	$u(u^{17} + u^{16} + \dots + u + 1)^2(u^{19} - 3u^{18} + \dots - 2u + 2)$
c_4, c_{12}	$(u + 1)(u^{19} - u^{18} + \dots - u + 1)(u^{34} - u^{33} + \dots - 6u^2 + 1)$
c_6, c_7, c_9 c_{10}	$u(u^{17} - 3u^{16} + \dots - 3u + 1)^2(u^{19} - 3u^{18} + \dots - 11u^2 + 4)$

V. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_{11}	$(y - 1)(y^{19} - 3y^{18} + \dots + 11y - 1)(y^{34} - 17y^{33} + \dots - 140y + 1)$
c_2, c_4, c_5 c_{12}	$(y - 1)(y^{19} - 11y^{18} + \dots + 3y - 1)(y^{34} - 21y^{33} + \dots - 12y + 1)$
c_3, c_8	$y(y^{17} + 3y^{16} + \dots - 3y - 1)^2(y^{19} + 3y^{18} + \dots + 11y^2 - 4)$
c_6, c_7, c_9 c_{10}	$y(y^{17} + 23y^{16} + \dots + 9y - 1)^2(y^{19} + 23y^{18} + \dots + 88y - 16)$