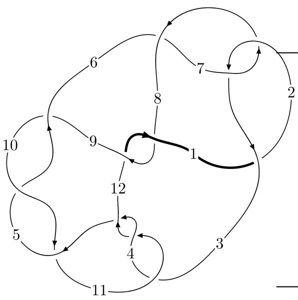
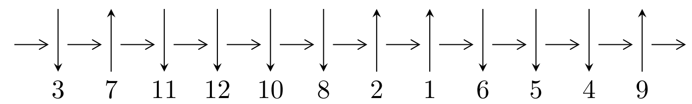
# $12a_{0684}$ $(K12a_{0684})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle u^{67} + u^{66} + \cdots + 3u^2 + 1 \rangle$$

* 1 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 67 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. $I_1^u = \langle u^{67} + u^{66} + \cdots + 3u^2 + 1 \rangle$

**(i) Arc colorings**

$$a_2 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^3 \\ u^5 + u^3 + u \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^8 - u^6 - u^4 + 1 \\ -u^{10} - 2u^8 - 3u^6 - 2u^4 - u^2 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} u^2 + 1 \\ u^2 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} u^{14} + 3u^{12} + 6u^{10} + 7u^8 + 6u^6 + 4u^4 + 2u^2 + 1 \\ u^{14} + 2u^{12} + 3u^{10} + 2u^8 - u^2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} u^{26} + 5u^{24} + \cdots + 3u^2 + 1 \\ u^{26} + 4u^{24} + \cdots - 2u^4 + u^2 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} u^{38} + 7u^{36} + \cdots + 4u^2 + 1 \\ u^{38} + 6u^{36} + \cdots + 2u^4 - u^2 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} u^{13} + 2u^{11} + 3u^9 + 2u^7 - u \\ u^{15} + 3u^{13} + 6u^{11} + 7u^9 + 6u^7 + 4u^5 + 2u^3 + u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u^{54} - 9u^{52} + \cdots + 4u^2 + 1 \\ -u^{56} - 10u^{54} + \cdots - 34u^6 - 10u^4 \end{pmatrix}$$

**(ii) Obstruction class** $= -1$

**(iii) Cusp Shapes** $= -4u^{65} - 4u^{64} + \cdots - 16u - 6$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_6$ | $u^{67} + 23u^{66} + \cdots - 6u - 1$ |
| $c_2, c_7$ | $u^{67} + u^{66} + \cdots + 3u^2 + 1$ |
| $c_3, c_4, c_{11}$ | $u^{67} + u^{66} + \cdots + 2u + 1$ |
| $c_5, c_9, c_{10}$ | $u^{67} - 3u^{66} + \cdots + 11u - 16$ |
| $c_8, c_{12}$ | $u^{67} - 5u^{66} + \cdots - 32u + 16$ |

**(v) Riley Polynomials at the component**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_6$ | $y^{67} + 43y^{66} + \cdots - 14y - 1$ |
| $c_2, c_7$ | $y^{67} + 23y^{66} + \cdots - 6y - 1$ |
| $c_3, c_4, c_{11}$ | $y^{67} - 53y^{66} + \cdots - 6y - 1$ |
| $c_5, c_9, c_{10}$ | $y^{67} + 63y^{66} + \cdots - 1383y - 256$ |
| $c_8, c_{12}$ | $y^{67} + 35y^{66} + \cdots - 12512y - 256$ |

**(vi) Complex Volumes and Cusp Shapes**

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.803360+0.638492I$ | $2.78379+9.20045I$ | $-4.00000-5.04305I$ |
| $u=-0.803360-0.638492I$ | $2.78379-9.20045I$ | $-4.00000+5.04305I$ |
| $u=\ \ 0.800124+0.647068I$ | $7.09459-4.72698I$ | $0.+2.48714I$ |
| $u=\ \ 0.800124-0.647068I$ | $7.09459+4.72698I$ | $0.-2.48714I$ |
| $u=-0.794421+0.657199I$ | $3.54889+0.19967I$ | $0$ |
| $u=-0.794421-0.657199I$ | $3.54889-0.19967I$ | $0$ |
| $u=-0.729773+0.636528I$ | $0.83498+2.07700I$ | $-1.30731-4.65040I$ |
| $u=-0.729773-0.636528I$ | $0.83498-2.07700I$ | $-1.30731+4.65040I$ |
| $u=\ \ 0.701441+0.764368I$ | $0.332471-0.137935I$ | $-4.00000+0.I$ |
| $u=\ \ 0.701441-0.764368I$ | $0.332471+0.137935I$ | $-4.00000+0.I$ |
| $u=\ \ 0.751806+0.599939I$ | $-4.30064-4.22428I$ | $-7.11593+3.82963I$ |
| $u=\ \ 0.751806-0.599939I$ | $-4.30064+4.22428I$ | $-7.11593-3.82963I$ |
| $u=\ \ 0.022057+1.053290I$ | $-4.58704+1.51218I$ | $-9.45944-4.55261I$ |
| $u=\ \ 0.022057-1.053290I$ | $-4.58704-1.51218I$ | $-9.45944+4.55261I$ |
| $u=\ \ 0.096493+1.057100I$ | $-2.57943-0.08281I$ | $-8.50549+0.I$ |
| $u=\ \ 0.096493-1.057100I$ | $-2.57943+0.08281I$ | $-8.50549+0.I$ |
| $u=-0.669102+0.844952I$ | $3.28932-2.58275I$ | $0$ |
| $u=-0.669102-0.844952I$ | $3.28932+2.58275I$ | $0$ |
| $u=\ \ 0.529127+0.939240I$ | $-0.06741+5.98627I$ | $0$ |
| $u=\ \ 0.529127-0.939240I$ | $-0.06741-5.98627I$ | $0$ |
| $u=\ \ 0.647786+0.655651I$ | $0.241433+0.748431I$ | $-4.13794-3.90803I$ |
| $u=\ \ 0.647786-0.655651I$ | $0.241433-0.748431I$ | $-4.13794+3.90803I$ |
| $u=-0.092376+1.074670I$ | $0.91363-4.29574I$ | $0$ |
| $u=-0.092376-1.074670I$ | $0.91363+4.29574I$ | $0$ |
| $u=-0.028914+1.086230I$ | $-9.95694-3.35433I$ | $-14.2561+0.I$ |
| $u=-0.028914-1.086230I$ | $-9.95694+3.35433I$ | $-14.2561+0.I$ |
| $u=\ \ 0.087961+1.086010I$ | $-3.41796+8.65689I$ | $0$ |
| $u=\ \ 0.087961-1.086010I$ | $-3.41796-8.65689I$ | $0$ |
| $u=-0.558836+0.972282I$ | $3.64416-1.88415I$ | $0$ |
| $u=-0.558836-0.972282I$ | $3.64416+1.88415I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \phantom{-}0.567085 + 0.994839I$ | $-0.56916 - 2.29584I$ | 0 |
| $u = \phantom{-}0.567085 - 0.994839I$ | $-0.56916 + 2.29584I$ | 0 |
| $u = \phantom{-}0.672545 + 0.927735I$ | $-0.16758 + 5.42739I$ | 0 |
| $u = \phantom{-}0.672545 - 0.927735I$ | $-0.16758 - 5.42739I$ | 0 |
| $u = -0.762268 + 0.857726I$ | $6.75974 + 1.69859I$ | 0 |
| $u = -0.762268 - 0.857726I$ | $6.75974 - 1.69859I$ | 0 |
| $u = \phantom{-}0.760734 + 0.867270I$ | $10.68380 + 2.86836I$ | 0 |
| $u = \phantom{-}0.760734 - 0.867270I$ | $10.68380 - 2.86836I$ | 0 |
| $u = -0.757930 + 0.876228I$ | $6.70343 - 7.43134I$ | 0 |
| $u = -0.757930 - 0.876228I$ | $6.70343 + 7.43134I$ | 0 |
| $u = -0.650192 + 0.524941I$ | $-4.92057 - 2.05889I$ | $-8.44124 + 3.45168I$ |
| $u = -0.650192 - 0.524941I$ | $-4.92057 + 2.05889I$ | $-8.44124 - 3.45168I$ |
| $u = -0.271313 + 0.769915I$ | $-4.53163 - 2.07205I$ | $-11.22172 + 5.13585I$ |
| $u = -0.271313 - 0.769915I$ | $-4.53163 + 2.07205I$ | $-11.22172 - 5.13585I$ |
| $u = \phantom{-}0.649976 + 0.994312I$ | $-0.77232 + 4.37126I$ | 0 |
| $u = \phantom{-}0.649976 - 0.994312I$ | $-0.77232 - 4.37126I$ | 0 |
| $u = -0.631035 + 1.015860I$ | $-6.25413 - 2.96400I$ | 0 |
| $u = -0.631035 - 1.015860I$ | $-6.25413 + 2.96400I$ | 0 |
| $u = -0.671448 + 1.010100I$ | $-0.27092 - 7.45199I$ | 0 |
| $u = -0.671448 - 1.010100I$ | $-0.27092 + 7.45199I$ | 0 |
| $u = \phantom{-}0.669526 + 1.027320I$ | $-5.55831 + 9.64000I$ | 0 |
| $u = \phantom{-}0.669526 - 1.027320I$ | $-5.55831 - 9.64000I$ | 0 |
| $u = -0.701809 + 1.019670I$ | $2.45618 - 5.84517I$ | 0 |
| $u = -0.701809 - 1.019670I$ | $2.45618 + 5.84517I$ | 0 |
| $u = \phantom{-}0.701023 + 1.026000I$ | $5.95293 + 10.38420I$ | 0 |
| $u = \phantom{-}0.701023 - 1.026000I$ | $5.95293 - 10.38420I$ | 0 |
| $u = -0.699473 + 1.030620I$ | $1.6032 - 14.8599I$ | 0 |
| $u = -0.699473 - 1.030620I$ | $1.6032 + 14.8599I$ | 0 |
| $u = \phantom{-}0.634928 + 0.324518I$ | $1.12766 + 6.71660I$ | $-2.59886 - 5.83457I$ |
| $u = \phantom{-}0.634928 - 0.324518I$ | $1.12766 - 6.71660I$ | $-2.59886 + 5.83457I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.616892 + 0.299152I$ | $5.31573 - 2.35989I$ | $1.86076 + 3.06293I$ |
| $u = -0.616892 - 0.299152I$ | $5.31573 + 2.35989I$ | $1.86076 - 3.06293I$ |
| $u = \quad 0.597047 + 0.266295I$ | $1.62809 - 2.00771I$ | $-1.45361 + 0.46558I$ |
| $u = \quad 0.597047 - 0.266295I$ | $1.62809 + 2.00771I$ | $-1.45361 - 0.46558I$ |
| $u = \quad 0.255920 + 0.412745I$ | $-0.118014 + 0.819285I$ | $-3.06015 - 8.28989I$ |
| $u = \quad 0.255920 - 0.412745I$ | $-0.118014 - 0.819285I$ | $-3.06015 + 8.28989I$ |
| $u = -0.412874$ | $-2.43012$ | $-1.69860$ |

## II. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_6$ | $u^{67} + 23u^{66} + \cdots - 6u - 1$ |
| $c_2, c_7$ | $u^{67} + u^{66} + \cdots + 3u^2 + 1$ |
| $c_3, c_4, c_{11}$ | $u^{67} + u^{66} + \cdots + 2u + 1$ |
| $c_5, c_9, c_{10}$ | $u^{67} - 3u^{66} + \cdots + 11u - 16$ |
| $c_8, c_{12}$ | $u^{67} - 5u^{66} + \cdots - 32u + 16$ |

**III. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_6$ | $y^{67} + 43y^{66} + \cdots - 14y - 1$ |
| $c_2, c_7$ | $y^{67} + 23y^{66} + \cdots - 6y - 1$ |
| $c_3, c_4, c_{11}$ | $y^{67} - 53y^{66} + \cdots - 6y - 1$ |
| $c_5, c_9, c_{10}$ | $y^{67} + 63y^{66} + \cdots - 1383y - 256$ |
| $c_8, c_{12}$ | $y^{67} + 35y^{66} + \cdots - 12512y - 256$ |