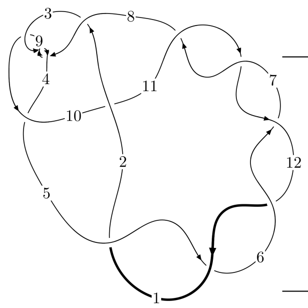
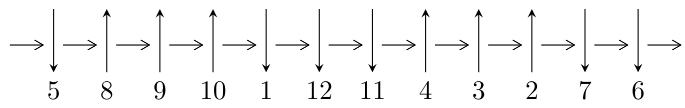
# $12a_{1279}$ $(K12a_{1279})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle u^{33} - u^{32} + \cdots - 3u + 1 \rangle$$

* 1 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 33 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. $I_1^u = \langle u^{33} - u^{32} + \cdots - 3u + 1\rangle$

**(i) Arc colorings**

$$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -u \\ u \end{pmatrix}$$
$$a_5 = \begin{pmatrix} u^2+1 \\ -u^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -u^3-2u \\ u^3+u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} u \\ u^3+u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u^2+1 \\ u^4+2u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u^9+6u^7+11u^5+6u^3-u \\ u^{11}+7u^9+16u^7+13u^5+3u^3+u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -u^9-6u^7-11u^5-6u^3+u \\ u^9+5u^7+7u^5+4u^3+u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u^{16}-11u^{14}-47u^{12}-98u^{10}-101u^8-42u^6+2u^2+1 \\ u^{16}+10u^{14}+38u^{12}+70u^{10}+68u^8+36u^6+10u^4 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^{29}-20u^{27}+\cdots-8u^3+u \\ -u^{31}-21u^{29}+\cdots+6u^3+u \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 4u^{32} - 4u^{31} + 96u^{30} - 92u^{29} + 1028u^{28} - 940u^{27} + 6476u^{26} - 5620u^{25} + 26640u^{24} - 21796u^{23} + 75088u^{22} - 57436u^{21} + 147988u^{20} - 104688u^{19} + 204332u^{18} - 131772u^{17} + 194992u^{16} - 112484u^{15} + 124944u^{14} - 63068u^{13} + 51396u^{12} - 22528u^{11} + 12652u^{10} - 5244u^9 + 1388u^8 - 800u^7 - 208u^6 - 28u^5 - 52u^4 - 16u^2 + 32u - 6$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_5, c_6$<br>$c_7, c_{11}, c_{12}$ | $u^{33} + u^{32} + \cdots - 3u - 1$ |
| $c_2, c_4$ | $u^{33} - u^{32} + \cdots + 33u - 13$ |
| $c_3, c_8, c_9$ | $u^{33} + u^{32} + \cdots + u - 1$ |
| $c_{10}$ | $u^{33} - 7u^{32} + \cdots - 815u + 215$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_5, c_6$<br>$c_7, c_{11}, c_{12}$ | $y^{33} + 47y^{32} + \cdots - 7y - 1$ |
| $c_2, c_4$ | $y^{33} - 25y^{32} + \cdots - 1667y - 169$ |
| $c_3, c_8, c_9$ | $y^{33} + 27y^{32} + \cdots - 7y - 1$ |
| $c_{10}$ | $y^{33} - 17y^{32} + \cdots + 161125y - 46225$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.135727+1.095360I$ | $-0.48317+3.12381I$ | $1.00988-3.98406I$ |
| $u=-0.135727-1.095360I$ | $-0.48317-3.12381I$ | $1.00988+3.98406I$ |
| $u=\ \ 0.052755+1.165150I$ | $4.90112-1.50724I$ | $6.17291+4.51787I$ |
| $u=\ \ 0.052755-1.165150I$ | $4.90112+1.50724I$ | $6.17291-4.51787I$ |
| $u=\ \ 0.196867+1.245830I$ | $5.44294-8.78065I$ | $5.04263+6.34982I$ |
| $u=\ \ 0.196867-1.245830I$ | $5.44294+8.78065I$ | $5.04263-6.34982I$ |
| $u=-0.171980+1.258180I$ | $9.88543+4.54966I$ | $9.59844-3.96601I$ |
| $u=-0.171980-1.258180I$ | $9.88543-4.54966I$ | $9.59844+3.96601I$ |
| $u=\ \ 0.135455+1.270780I$ | $6.58142-0.29302I$ | $6.45164+0.I$ |
| $u=\ \ 0.135455-1.270780I$ | $6.58142+0.29302I$ | $6.45164+0.I$ |
| $u=\ \ 0.302742+0.624808I$ | $0.419041+1.219680I$ | $4.08889+1.47779I$ |
| $u=\ \ 0.302742-0.624808I$ | $0.419041-1.219680I$ | $4.08889-1.47779I$ |
| $u=\ \ 0.407807+0.544208I$ | $-0.34703-6.67794I$ | $2.10309+8.18225I$ |
| $u=\ \ 0.407807-0.544208I$ | $-0.34703+6.67794I$ | $2.10309-8.18225I$ |
| $u=-0.363092+0.571858I$ | $3.94486+2.68460I$ | $7.39182-5.68857I$ |
| $u=-0.363092-0.571858I$ | $3.94486-2.68460I$ | $7.39182+5.68857I$ |
| $u=-0.398537+0.320533I$ | $-4.91358+1.35189I$ | $-4.51051-4.98155I$ |
| $u=-0.398537-0.320533I$ | $-4.91358-1.35189I$ | $-4.51051+4.98155I$ |
| $u=\ \ 0.476175+0.072408I$ | $-1.74287+3.75371I$ | $-2.33384-2.56391I$ |
| $u=\ \ 0.476175-0.072408I$ | $-1.74287-3.75371I$ | $-2.33384+2.56391I$ |
| $u=-0.456028$ | $2.25176$ | $2.33330$ |
| $u=\ \ 0.199415+0.334719I$ | $0.030917-0.754138I$ | $1.01682+9.21232I$ |
| $u=\ \ 0.199415-0.334719I$ | $0.030917+0.754138I$ | $1.01682-9.21232I$ |
| $u=-0.02509+1.76282I$ | $9.92457+3.73698I$ | $0$ |
| $u=-0.02509-1.76282I$ | $9.92457-3.73698I$ | $0$ |
| $u=\ \ 0.01058+1.78001I$ | $15.7033-1.7647I$ | $0$ |
| $u=\ \ 0.01058-1.78001I$ | $15.7033+1.7647I$ | $0$ |
| $u=\ \ 0.04994+1.79686I$ | $16.5996-9.9002I$ | $0$ |
| $u=\ \ 0.04994-1.79686I$ | $16.5996+9.9002I$ | $0$ |
| $u=-0.04337+1.80000I$ | $-18.3520+5.5330I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.04337 - 1.80000I$ | $-18.3520 - 5.5330I$ | 0 |
| $u = \quad 0.03408 + 1.80212I$ | $17.8994 - 1.0723I$ | 0 |
| $u = \quad 0.03408 - 1.80212I$ | $17.8994 + 1.0723I$ | 0 |

**II. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_5, c_6$<br>$c_7, c_{11}, c_{12}$ | $u^{33} + u^{32} + \cdots - 3u - 1$ |
| $c_2, c_4$ | $u^{33} - u^{32} + \cdots + 33u - 13$ |
| $c_3, c_8, c_9$ | $u^{33} + u^{32} + \cdots + u - 1$ |
| $c_{10}$ | $u^{33} - 7u^{32} + \cdots - 815u + 215$ |

### III. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_5, c_6$ $c_7, c_{11}, c_{12}$ | $y^{33} + 47y^{32} + \cdots - 7y - 1$ |
| $c_2, c_4$ | $y^{33} - 25y^{32} + \cdots - 1667y - 169$ |
| $c_3, c_8, c_9$ | $y^{33} + 27y^{32} + \cdots - 7y - 1$ |
| $c_{10}$ | $y^{33} - 17y^{32} + \cdots + 161125y - 46225$ |