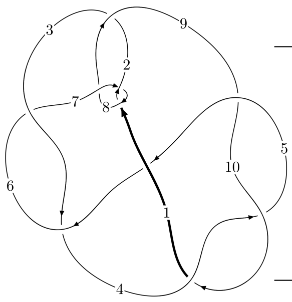
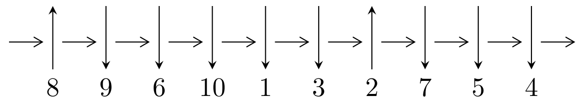
# $10_{30}$ $(K10a_{34})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

**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**

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

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

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

$$a_5 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u^3 - 2u \\ u^3 + u \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} -u^{11} - 6u^9 - 12u^7 - 8u^5 - u^3 - 2u \\ u^{11} + 5u^9 + 8u^7 + 3u^5 - u^3 + u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u^2 + 1 \\ -u^4 - 2u^2 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} u^{13} + 6u^{11} + 13u^9 + 12u^7 + 6u^5 + 4u^3 + u \\ -u^{15} - 7u^{13} - 18u^{11} - 19u^9 - 6u^7 - 2u^5 - 4u^3 + u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u^{26} - 13u^{24} + \cdots + 3u^2 + 1 \\ u^{26} + 12u^{24} + \cdots + 4u^4 - 3u^2 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -4u^{32} + 4u^{31} - 64u^{30} + 56u^{29} - 448u^{28} + 340u^{27} - 1788u^{26} + 1156u^{25} - 4432u^{24} + 2356u^{23} - 6940u^{22} + 2804u^{21} - 6652u^{20} + 1616u^{19} - 3660u^{18} + 8u^{17} - 1380u^{16} - 364u^{15} - 932u^{14} - 156u^{13} - 380u^{12} - 360u^{11} + 224u^{10} - 328u^9 + 40u^8 - 4u^7 - 56u^6 + 4u^5 + 48u^4 - 32u^3 - 12u^2 + 20u - 14$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_7$ | $u^{33} - u^{32} + \cdots - u + 1$ |
| $c_2$ | $u^{33} + u^{32} + \cdots + u + 1$ |
| $c_3, c_6$ | $u^{33} - 5u^{32} + \cdots - 31u + 3$ |
| $c_4, c_9, c_{10}$ | $u^{33} + u^{32} + \cdots + 3u + 1$ |
| $c_5$ | $u^{33} - u^{32} + \cdots + 61u + 17$ |
| $c_8$ | $u^{33} + 15u^{32} + \cdots + u - 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_7$ | $y^{33} + 15y^{32} + \cdots + y - 1$ |
| $c_2$ | $y^{33} - y^{32} + \cdots + 33y - 1$ |
| $c_3, c_6$ | $y^{33} + 27y^{32} + \cdots + y - 9$ |
| $c_4, c_9, c_{10}$ | $y^{33} + 31y^{32} + \cdots + y - 1$ |
| $c_5$ | $y^{33} + 11y^{32} + \cdots - 3011y - 289$ |
| $c_8$ | $y^{33} + 7y^{32} + \cdots + 17y - 1$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.138722 + 1.178260I$ | $-0.390154 - 0.572456I$ | $-8.31906 + 0.48605I$ |
| $u = -0.138722 - 1.178260I$ | $-0.390154 + 0.572456I$ | $-8.31906 - 0.48605I$ |
| $u = 0.679432 + 0.391507I$ | $1.46905 - 8.41845I$ | $-5.65597 + 8.08731I$ |
| $u = 0.679432 - 0.391507I$ | $1.46905 + 8.41845I$ | $-5.65597 - 8.08731I$ |
| $u = -0.649750 + 0.407780I$ | $3.38108 + 3.30675I$ | $-2.44424 - 3.71770I$ |
| $u = -0.649750 - 0.407780I$ | $3.38108 - 3.30675I$ | $-2.44424 + 3.71770I$ |
| $u = 0.552937 + 0.519363I$ | $1.99857 + 4.30723I$ | $-4.15179 - 2.03529I$ |
| $u = 0.552937 - 0.519363I$ | $1.99857 - 4.30723I$ | $-4.15179 + 2.03529I$ |
| $u = -0.578988 + 0.474023I$ | $3.67259 + 0.72831I$ | $-1.49015 - 3.12560I$ |
| $u = -0.578988 - 0.474023I$ | $3.67259 - 0.72831I$ | $-1.49015 + 3.12560I$ |
| $u = -0.214004 + 1.270020I$ | $0.50606 + 6.56196I$ | $-6.35976 - 7.19745I$ |
| $u = -0.214004 - 1.270020I$ | $0.50606 - 6.56196I$ | $-6.35976 + 7.19745I$ |
| $u = 0.150986 + 1.283520I$ | $2.96939 - 2.39560I$ | $-2.36922 + 3.31266I$ |
| $u = 0.150986 - 1.283520I$ | $2.96939 + 2.39560I$ | $-2.36922 - 3.31266I$ |
| $u = 0.596688 + 0.315979I$ | $-1.43040 - 1.50384I$ | $-9.59059 + 3.60616I$ |
| $u = 0.596688 - 0.315979I$ | $-1.43040 + 1.50384I$ | $-9.59059 - 3.60616I$ |
| $u = -0.632184 + 0.066503I$ | $-3.60742 + 3.47782I$ | $-12.61515 - 4.95314I$ |
| $u = -0.632184 - 0.066503I$ | $-3.60742 - 3.47782I$ | $-12.61515 + 4.95314I$ |
| $u = 0.036115 + 1.379920I$ | $4.95997 - 2.19825I$ | $0.55384 + 3.61625I$ |
| $u = 0.036115 - 1.379920I$ | $4.95997 + 2.19825I$ | $0.55384 - 3.61625I$ |
| $u = 0.22801 + 1.42935I$ | $4.19152 - 4.53523I$ | $-6.00000 + 3.09222I$ |
| $u = 0.22801 - 1.42935I$ | $4.19152 + 4.53523I$ | $-6.00000 - 3.09222I$ |
| $u = -0.24113 + 1.46019I$ | $9.39642 + 6.56751I$ | $0. - 3.41838I$ |
| $u = -0.24113 - 1.46019I$ | $9.39642 - 6.56751I$ | $0. + 3.41838I$ |
| $u = 0.25408 + 1.45840I$ | $7.42465 - 11.82880I$ | $0. + 7.75337I$ |
| $u = 0.25408 - 1.45840I$ | $7.42465 + 11.82880I$ | $0. - 7.75337I$ |
| $u = -0.20598 + 1.46844I$ | $9.92249 + 3.59396I$ | $0. - 3.03909I$ |
| $u = -0.20598 - 1.46844I$ | $9.92249 - 3.59396I$ | $0. + 3.03909I$ |
| $u = 0.18821 + 1.47294I$ | $8.40124 + 1.63491I$ | $0$ |
| $u = 0.18821 - 1.47294I$ | $8.40124 - 1.63491I$ | $0$ |

| Solutions to $I_1^u$ | | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|---|
| $u =$ | $0.514867$ | $-1.00604$ | $-9.72740$ |
| $u =$ | $0.216864 + 0.450093I$ | $-0.54661 - 1.45331I$ | $-5.02647 + 4.36257I$ |
| $u =$ | $0.216864 - 0.450093I$ | $-0.54661 + 1.45331I$ | $-5.02647 - 4.36257I$ |

## II. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_7$ | $u^{33} - u^{32} + \cdots - u + 1$ |
| $c_2$ | $u^{33} + u^{32} + \cdots + u + 1$ |
| $c_3, c_6$ | $u^{33} - 5u^{32} + \cdots - 31u + 3$ |
| $c_4, c_9, c_{10}$ | $u^{33} + u^{32} + \cdots + 3u + 1$ |
| $c_5$ | $u^{33} - u^{32} + \cdots + 61u + 17$ |
| $c_8$ | $u^{33} + 15u^{32} + \cdots + u - 1$ |

## III. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_7$ | $y^{33} + 15y^{32} + \cdots + y - 1$ |
| $c_2$ | $y^{33} - y^{32} + \cdots + 33y - 1$ |
| $c_3, c_6$ | $y^{33} + 27y^{32} + \cdots + y - 9$ |
| $c_4, c_9, c_{10}$ | $y^{33} + 31y^{32} + \cdots + y - 1$ |
| $c_5$ | $y^{33} + 11y^{32} + \cdots - 3011y - 289$ |
| $c_8$ | $y^{33} + 7y^{32} + \cdots + 17y - 1$ |