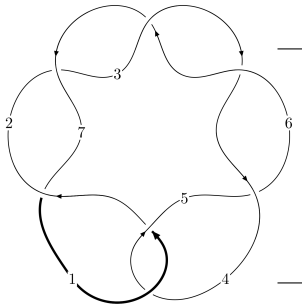
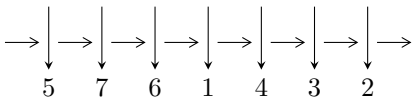
## $7_2$ $(K7a_4)$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

$$1,5 \xrightarrow[c_1]{} 2 \xrightarrow[c_4]{} 4 \xrightarrow[c_5]{} 6 \xrightarrow[c_3]{} 3 \xrightarrow[c_7]{} 7 \twoheadrightarrow c_2, c_6$$

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

$$I_1^u = \langle u^5 - u^4 + u^2 + u - 1 \rangle$$

* 1 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 5 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. $I_1^u = \langle u^5 - u^4 + u^2 + u - 1 \rangle$**

**(i) Arc colorings**

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

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

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

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

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

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

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

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

**(iii) Cusp Shapes** $= -4u^4 + 4u^2 - 4u - 10$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $u^5 + u^4 - u^2 + u + 1$ |
| $c_2, c_3, c_5$ $c_6, c_7$ | $u^5 + u^4 + 4u^3 + 3u^2 + 3u + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $y^5 - y^4 + 4y^3 - 3y^2 + 3y - 1$ |
| $c_2, c_3, c_5$ $c_6, c_7$ | $y^5 + 7y^4 + 16y^3 + 13y^2 + 3y - 1$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.758138+0.584034I$ | $1.81981+2.21397I$ | $-3.11432-4.22289I$ |
| $u=-0.758138-0.584034I$ | $1.81981-2.21397I$ | $-3.11432+4.22289I$ |
| $u=\ \ 0.935538+0.903908I$ | $10.95830-3.33174I$ | $-2.08126+2.36228I$ |
| $u=\ \ 0.935538-0.903908I$ | $10.95830+3.33174I$ | $-2.08126-2.36228I$ |
| $u=\ \ 0.645200$ | $-0.882183$ | $-11.6090$ |

**II. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $u^5 + u^4 - u^2 + u + 1$ |
| $c_2, c_3, c_5$ $c_6, c_7$ | $u^5 + u^4 + 4u^3 + 3u^2 + 3u + 1$ |

**III. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $y^5 - y^4 + 4y^3 - 3y^2 + 3y - 1$ |
| $c_2, c_3, c_5$ $c_6, c_7$ | $y^5 + 7y^4 + 16y^3 + 13y^2 + 3y - 1$ |