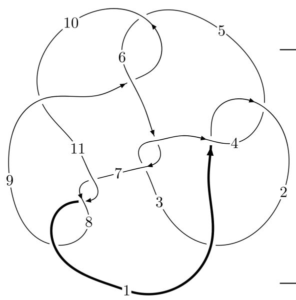
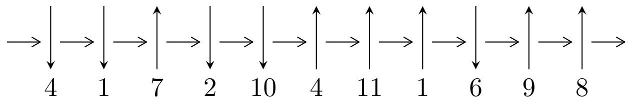
# $11n_{37}$ ($K11n_{37}$)




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$\begin{aligned} I_1^u &= \langle 675u^{16} - 1175u^{15} + \cdots + 6869b - 641,\ -101u^{16} - 333u^{15} + \cdots + 6869a + 12165, \\ &\quad u^{17} - 2u^{16} + \cdots - u + 1\rangle \\ I_2^u &= \langle b,\ u^2 + a - u - 1,\ u^5 - u^4 - 2u^3 + u^2 + u + 1\rangle \end{aligned}$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 22 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.** $\boldsymbol{I_1^u = \langle 675u^{16} - 1175u^{15} + \cdots + 6869b - 641,\ -101u^{16} - 333u^{15} + \cdots + 6869a + 12165,\ u^{17} - 2u^{16} + \cdots - u + 1\rangle}$

**(i) Arc colorings**

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

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

$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0.0147037u^{16} + 0.0484787u^{15} + \cdots + 0.511428u - 1.77100 \\ -0.0982676u^{16} + 0.171058u^{15} + \cdots + 1.55234u + 0.0933178 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} 0.112971u^{16} - 0.122580u^{15} + \cdots - 1.04091u - 1.86432 \\ -0.0982676u^{16} + 0.171058u^{15} + \cdots + 1.55234u + 0.0933178 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.0244577u^{16} - 0.179648u^{15} + \cdots - 0.444752u - 1.90566 \\ 0.294803u^{16} - 0.513175u^{15} + \cdots + 2.34299u - 0.279953 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -0.0439656u^{16} + 0.558014u^{15} + \cdots + 2.68860u + 0.741010 \\ -1.31213u^{16} + 1.80259u^{15} + \cdots - 0.866356u + 1.34678 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 0.0199447u^{16} - 0.627311u^{15} + \cdots - 2.46470u - 0.362644 \\ 0.896637u^{16} - 1.44970u^{15} + \cdots + 0.751347u - 0.887029 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -u^5 + 2u^3 - u \\ u^7 - 3u^5 + 2u^3 + u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -u^5 + 2u^3 - u \\ u^7 - 3u^5 + 2u^3 + u \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -\frac{12279}{6869}u^{16} + \frac{9163}{6869}u^{15} + \cdots + \frac{1304}{6869}u - \frac{3665}{6869}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $u^{17} - 6u^{16} + \cdots + 11u - 1$ |
| $c_2$ | $u^{17} + 28u^{16} + \cdots + 47u + 1$ |
| $c_3, c_6$ | $u^{17} + 3u^{16} + \cdots - 64u + 32$ |
| $c_5, c_9$ | $u^{17} + 2u^{16} + \cdots - u - 1$ |
| $c_7, c_8, c_{11}$ | $u^{17} + 2u^{16} + \cdots - u - 1$ |
| $c_{10}$ | $u^{17} + 18u^{15} + \cdots + u + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $y^{17} - 28y^{16} + \cdots + 47y - 1$ |
| $c_2$ | $y^{17} - 72y^{16} + \cdots + 4879y - 1$ |
| $c_3, c_6$ | $y^{17} + 33y^{16} + \cdots + 8704y - 1024$ |
| $c_5, c_9$ | $y^{17} + 18y^{15} + \cdots + y - 1$ |
| $c_7, c_8, c_{11}$ | $y^{17} - 12y^{16} + \cdots + y - 1$ |
| $c_{10}$ | $y^{17} + 36y^{16} + \cdots - 3y - 1$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.956766 + 0.158240I$<br>$a = 0.07861 - 2.13628I$<br>$b = -0.242885 - 0.548785I$ | $0.038126 - 0.592997I$ | $0.78481 - 8.54994I$ |
| $u = -0.956766 - 0.158240I$<br>$a = 0.07861 + 2.13628I$<br>$b = -0.242885 + 0.548785I$ | $0.038126 + 0.592997I$ | $0.78481 + 8.54994I$ |
| $u = 0.963468 + 0.398041I$<br>$a = 0.625623 - 0.407887I$<br>$b = 0.41757 - 1.92272I$ | $-1.44161 + 3.67092I$ | $-1.52651 - 6.25757I$ |
| $u = 0.963468 - 0.398041I$<br>$a = 0.625623 + 0.407887I$<br>$b = 0.41757 + 1.92272I$ | $-1.44161 - 3.67092I$ | $-1.52651 + 6.25757I$ |
| $u = 0.007712 + 1.101910I$<br>$a = 0.27109 - 1.90196I$<br>$b = 0.39516 - 2.41394I$ | $-15.6320 - 4.0811I$ | $-2.46162 + 2.01591I$ |
| $u = 0.007712 - 1.101910I$<br>$a = 0.27109 + 1.90196I$<br>$b = 0.39516 + 2.41394I$ | $-15.6320 + 4.0811I$ | $-2.46162 - 2.01591I$ |
| $u = -1.15751$<br>$a = -0.708872$<br>$b = 0.345658$ | $2.21135$ | $4.09400$ |
| $u = 1.350160 + 0.231434I$<br>$a = 0.187422 - 0.381800I$<br>$b = -0.837282 - 0.065616I$ | $5.02190 + 3.68629I$ | $8.19295 - 2.17087I$ |
| $u = 1.350160 - 0.231434I$<br>$a = 0.187422 + 0.381800I$<br>$b = -0.837282 + 0.065616I$ | $5.02190 - 3.68629I$ | $8.19295 + 2.17087I$ |
| $u = 0.453853 + 0.367356I$<br>$a = -1.56221 + 1.37475I$<br>$b = 1.27983 + 0.63381I$ | $-2.81840 - 0.19128I$ | $-4.55331 - 1.19314I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.453853 - 0.367356I$<br>$a = -1.56221 - 1.37475I$<br>$b = 1.27983 - 0.63381I$ | $-2.81840 + 0.19128I$ | $-4.55331 + 1.19314I$ |
| $u = 1.36830 + 0.55869I$<br>$a = -1.25567 + 0.81024I$<br>$b = 0.85212 + 2.19396I$ | $-11.4002 + 9.9652I$ | $0.22842 - 4.86766I$ |
| $u = 1.36830 - 0.55869I$<br>$a = -1.25567 - 0.81024I$<br>$b = 0.85212 - 2.19396I$ | $-11.4002 - 9.9652I$ | $0.22842 + 4.86766I$ |
| $u = -1.38445 + 0.55616I$<br>$a = 1.263420 + 0.342784I$<br>$b = -0.12095 + 2.24868I$ | $-11.30070 - 1.80882I$ | $0.020166 + 0.772832I$ |
| $u = -1.38445 - 0.55616I$<br>$a = 1.263420 - 0.342784I$<br>$b = -0.12095 - 2.24868I$ | $-11.30070 + 1.80882I$ | $0.020166 - 0.772832I$ |
| $u = -0.223522 + 0.416926I$<br>$a = -0.753851 + 0.530995I$<br>$b = -0.416389 + 0.318127I$ | $0.238681 - 1.150370I$ | $3.26808 + 5.49780I$ |
| $u = -0.223522 - 0.416926I$<br>$a = -0.753851 - 0.530995I$<br>$b = -0.416389 - 0.318127I$ | $0.238681 + 1.150370I$ | $3.26808 - 5.49780I$ |

**II.** $\boldsymbol{I_2^u = \langle b,\ u^2 + a - u - 1,\ u^5 - u^4 - 2u^3 + u^2 + u + 1\rangle}$

**(i) Arc colorings**

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u^2 + u + 1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^2 + 1 \\ u^4 - 2u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u^2 + u + 1 \\ 0 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -u^2 + 2u + 1 \\ -u^3 + u \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u \\ u^3 - u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -u^4 + u^2 + 1 \\ u^4 - 2u^2 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -u^4 + u^2 + 1 \\ u^4 - 2u^2 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -2u^4 - 3u^3 + 2u^2 + 8u + 2$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u-1)^5$ |
| $c_2, c_4$ | $(u+1)^5$ |
| $c_3, c_6$ | $u^5$ |
| $c_5$ | $u^5 + u^4 + 2u^3 + u^2 + u + 1$ |
| $c_7, c_8$ | $u^5 - u^4 - 2u^3 + u^2 + u + 1$ |
| $c_9$ | $u^5 - u^4 + 2u^3 - u^2 + u - 1$ |
| $c_{10}$ | $u^5 - 3u^4 + 4u^3 - u^2 - u + 1$ |
| $c_{11}$ | $u^5 + u^4 - 2u^3 - u^2 + u - 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_4$ | $(y-1)^5$ |
| $c_3, c_6$ | $y^5$ |
| $c_5, c_9$ | $y^5+3y^4+4y^3+y^2-y-1$ |
| $c_7, c_8, c_{11}$ | $y^5-5y^4+8y^3-3y^2-y-1$ |
| $c_{10}$ | $y^5-y^4+8y^3-3y^2+3y-1$ |

## (vi) Complex Volumes and Cusp Shapes

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -1.21774$<br>$a = -1.70062$<br>$b = 0$ | $0.756147$ | $-3.75670$ |
| $u = -0.309916 + 0.549911I$<br>$a = 0.896438 + 0.890762I$<br>$b = 0$ | $-1.31583 - 1.53058I$ | $-1.49901 + 3.45976I$ |
| $u = -0.309916 - 0.549911I$<br>$a = 0.896438 - 0.890762I$<br>$b = 0$ | $-1.31583 + 1.53058I$ | $-1.49901 - 3.45976I$ |
| $u = 1.41878 + 0.21917I$<br>$a = 0.453870 - 0.402731I$<br>$b = 0$ | $4.22763 + 4.40083I$ | $2.37737 - 5.82971I$ |
| $u = 1.41878 - 0.21917I$<br>$a = 0.453870 + 0.402731I$<br>$b = 0$ | $4.22763 - 4.40083I$ | $2.37737 + 5.82971I$ |

**III. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $((u-1)^5)(u^{17}-6u^{16}+\cdots+11u-1)$ |
| $c_2$ | $((u+1)^5)(u^{17}+28u^{16}+\cdots+47u+1)$ |
| $c_3, c_6$ | $u^5(u^{17}+3u^{16}+\cdots-64u+32)$ |
| $c_4$ | $((u+1)^5)(u^{17}-6u^{16}+\cdots+11u-1)$ |
| $c_5$ | $(u^5+u^4+2u^3+u^2+u+1)(u^{17}+2u^{16}+\cdots-u-1)$ |
| $c_7, c_8$ | $(u^5-u^4-2u^3+u^2+u+1)(u^{17}+2u^{16}+\cdots-u-1)$ |
| $c_9$ | $(u^5-u^4+2u^3-u^2+u-1)(u^{17}+2u^{16}+\cdots-u-1)$ |
| $c_{10}$ | $(u^5-3u^4+4u^3-u^2-u+1)(u^{17}+18u^{15}+\cdots+u+1)$ |
| $c_{11}$ | $(u^5+u^4-2u^3-u^2+u-1)(u^{17}+2u^{16}+\cdots-u-1)$ |

## IV. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $((y-1)^5)(y^{17} - 28y^{16} + \cdots + 47y - 1)$ |
| $c_2$ | $((y-1)^5)(y^{17} - 72y^{16} + \cdots + 4879y - 1)$ |
| $c_3, c_6$ | $y^5(y^{17} + 33y^{16} + \cdots + 8704y - 1024)$ |
| $c_5, c_9$ | $(y^5 + 3y^4 + 4y^3 + y^2 - y - 1)(y^{17} + 18y^{15} + \cdots + y - 1)$ |
| $c_7, c_8, c_{11}$ | $(y^5 - 5y^4 + 8y^3 - 3y^2 - y - 1)(y^{17} - 12y^{16} + \cdots + y - 1)$ |
| $c_{10}$ | $(y^5 - y^4 + 8y^3 - 3y^2 + 3y - 1)(y^{17} + 36y^{16} + \cdots - 3y - 1)$ |