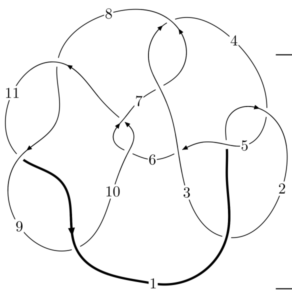
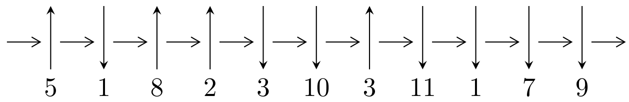
# $11n_{11}$ $(K11n_{11})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$
\begin{aligned}
I_1^u = \langle & -1.47912\times 10^{16}u^{30} - 9.15523\times 10^{16}u^{29} + \cdots + 4.49053\times 10^{16}b - 7.04624\times 10^{16}, \\
& 9.09026\times 10^{16}u^{30} + 2.68470\times 10^{17}u^{29} + \cdots + 8.98106\times 10^{16}a - 6.04967\times 10^{16},\ u^{31} + 3u^{30} + \cdots - 2u - 1\rangle \\
I_2^u = \langle & au + b,\ a^2 + au + a + u + 2,\ u^2 + u - 1\rangle
\end{aligned}
$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 35 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.**

$$I^u_1 = \langle -1.48\times10^{16}u^{30} - 9.16\times10^{16}u^{29} + \cdots + 4.49\times10^{16}b - 7.05\times10^{16},\ 9.09\times10^{16}u^{30} + 2.68\times10^{17}u^{29} + \cdots + 8.98\times10^{16}a - 6.05\times10^{16},\ u^{31} + 3u^{30} + \cdots - 2u - 1\rangle$$

**(i) Arc colorings**

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

$$a_9 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -1.01216u^{30} - 2.98929u^{29} + \cdots + 1.56951u + 0.673603 \\ 0.329386u^{30} + 2.03879u^{29} + \cdots + 4.20243u + 1.56913 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} -1.01216u^{30} - 2.98929u^{29} + \cdots + 1.56951u + 0.673603 \\ 0.286170u^{30} + 2.18539u^{29} + \cdots + 5.12021u + 1.52195 \end{pmatrix}$$

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

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

$$a_4 = \begin{pmatrix} -1.10717u^{30} - 3.23912u^{29} + \cdots + 2.61916u + 1.31094 \\ 0.286732u^{30} + 2.01767u^{29} + \cdots + 4.39808u + 1.64078 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -0.337359u^{30} - 1.17932u^{29} + \cdots - 1.54516u - 1.51176 \\ 0.771351u^{30} + 3.37765u^{29} + \cdots + 4.57039u + 1.23084 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 0.366419u^{30} + 0.837409u^{29} + \cdots - 2.16675u + 1.16374 \\ 0.563901u^{30} + 2.05823u^{29} + \cdots - 0.204628u + 0.0803200 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0.0898867u^{30} + 0.521942u^{29} + \cdots + 2.11940u - 0.821574 \\ -0.252282u^{30} - 0.960869u^{29} + \cdots + 0.641800u - 0.0898867 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0.0898867u^{30} + 0.521942u^{29} + \cdots + 2.11940u - 0.821574 \\ -0.252282u^{30} - 0.960869u^{29} + \cdots + 0.641800u - 0.0898867 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $=$
$\frac{395916855656835617}{89810629950487196}u^{30} + \frac{295100668624657463}{22452657487621799}u^{29} + \cdots + \frac{1130836942834652079}{89810629950487196}u + \frac{259777290233574227}{44905314975243598}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $u^{31} + 3u^{30} + \cdots + 8u - 1$ |
| $c_2$ | $u^{31} + 9u^{30} + \cdots + 60u - 1$ |
| $c_3, c_7$ | $u^{31} + 3u^{30} + \cdots + 112u + 16$ |
| $c_5$ | $u^{31} - 3u^{30} + \cdots + 4454u - 977$ |
| $c_6, c_{10}$ | $u^{31} + 3u^{30} + \cdots - 2u^2 + 1$ |
| $c_8, c_9, c_{11}$ | $u^{31} - 3u^{30} + \cdots - 2u + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $y^{31} + 9y^{30} + \cdots + 60y - 1$ |
| $c_2$ | $y^{31} + 29y^{30} + \cdots + 5084y - 1$ |
| $c_3, c_7$ | $y^{31} - 25y^{30} + \cdots + 1152y - 256$ |
| $c_5$ | $y^{31} + 49y^{30} + \cdots + 44552308y - 954529$ |
| $c_6, c_{10}$ | $y^{31} - 3y^{30} + \cdots + 4y - 1$ |
| $c_8, c_9, c_{11}$ | $y^{31} - 23y^{30} + \cdots + 4y - 1$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.931324 + 0.285581I$<br>$a = 0.99198 - 1.54847I$<br>$b = 0.81708 - 1.15583I$ | $0.02246 + 4.44381I$ | $-1.53825 - 8.61147I$ |
| $u = -0.931324 - 0.285581I$<br>$a = 0.99198 + 1.54847I$<br>$b = 0.81708 + 1.15583I$ | $0.02246 - 4.44381I$ | $-1.53825 + 8.61147I$ |
| $u = -0.094951 + 1.070970I$<br>$a = 1.345330 - 0.258911I$<br>$b = 0.0113180 + 0.1250270I$ | $7.95570 - 0.85651I$ | $0.056335 - 0.135364I$ |
| $u = -0.094951 - 1.070970I$<br>$a = 1.345330 + 0.258911I$<br>$b = 0.0113180 - 0.1250270I$ | $7.95570 + 0.85651I$ | $0.056335 + 0.135364I$ |
| $u = 0.912773 + 0.075536I$<br>$a = -0.542493 - 0.971836I$<br>$b = -0.20963 + 2.46157I$ | $-1.30863 - 2.18648I$ | $-32.4747 - 4.2586I$ |
| $u = 0.912773 - 0.075536I$<br>$a = -0.542493 + 0.971836I$<br>$b = -0.20963 - 2.46157I$ | $-1.30863 + 2.18648I$ | $-32.4747 + 4.2586I$ |
| $u = 0.039656 + 1.102600I$<br>$a = -1.49064 + 0.23083I$<br>$b = -0.1140800 - 0.0213786I$ | $7.38206 - 7.22461I$ | $-1.02588 + 4.93399I$ |
| $u = 0.039656 - 1.102600I$<br>$a = -1.49064 - 0.23083I$<br>$b = -0.1140800 + 0.0213786I$ | $7.38206 + 7.22461I$ | $-1.02588 - 4.93399I$ |
| $u = 1.193910 + 0.091335I$<br>$a = -0.565824 - 0.262901I$<br>$b = -1.10325 - 1.58386I$ | $-2.79337 - 1.66318I$ | $-5.72575 + 2.19283I$ |
| $u = 1.193910 - 0.091335I$<br>$a = -0.565824 + 0.262901I$<br>$b = -1.10325 + 1.58386I$ | $-2.79337 + 1.66318I$ | $-5.72575 - 2.19283I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -1.168090 + 0.283606I$<br>$a = 1.41177 - 0.15034I$<br>$b = 2.29367 - 0.71716I$ | $-4.01618 + 5.37811I$ | $-8.38800 - 7.62748I$ |
| $u = -1.168090 - 0.283606I$<br>$a = 1.41177 + 0.15034I$<br>$b = 2.29367 + 0.71716I$ | $-4.01618 - 5.37811I$ | $-8.38800 + 7.62748I$ |
| $u = 0.779230$<br>$a = 0.0180125$<br>$b = 0.854641$ | $-1.12597$ | $-9.35890$ |
| $u = 0.623364 + 0.404541I$<br>$a = -0.331674 + 0.339809I$<br>$b = 0.348918 + 0.935748I$ | $-1.47821 - 0.10102I$ | $-8.24537 + 0.31125I$ |
| $u = 0.623364 - 0.404541I$<br>$a = -0.331674 - 0.339809I$<br>$b = 0.348918 - 0.935748I$ | $-1.47821 + 0.10102I$ | $-8.24537 - 0.31125I$ |
| $u = -0.679882 + 0.287551I$<br>$a = -0.567508 - 1.103750I$<br>$b = -1.142870 - 0.115620I$ | $1.58742 + 1.54591I$ | $2.94722 - 4.18501I$ |
| $u = -0.679882 - 0.287551I$<br>$a = -0.567508 + 1.103750I$<br>$b = -1.142870 + 0.115620I$ | $1.58742 - 1.54591I$ | $2.94722 + 4.18501I$ |
| $u = -1.287250 + 0.574250I$<br>$a = -0.687751 + 0.701116I$<br>$b = -1.54338 + 1.46018I$ | $4.28029 + 6.65397I$ | $-2.65676 - 3.57953I$ |
| $u = -1.287250 - 0.574250I$<br>$a = -0.687751 - 0.701116I$<br>$b = -1.54338 - 1.46018I$ | $4.28029 - 6.65397I$ | $-2.65676 + 3.57953I$ |
| $u = 1.33715 + 0.61035I$<br>$a = 0.347578 + 0.887087I$<br>$b = 0.72674 + 1.60463I$ | $3.39903 + 1.19447I$ | $-2.39419 - 1.64836I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=1.33715-0.61035I$<br>$a=0.347578-0.887087I$<br>$b=0.72674-1.60463I$ | $3.39903-1.19447I$ | $-2.39419+1.64836I$ |
| $u=-1.37851+0.54460I$<br>$a=0.783190-0.923039I$<br>$b=1.65294-1.72229I$ | $2.96987+13.05180I$ | $-4.52638-7.60952I$ |
| $u=-1.37851-0.54460I$<br>$a=0.783190+0.923039I$<br>$b=1.65294+1.72229I$ | $2.96987-13.05180I$ | $-4.52638+7.60952I$ |
| $u=1.42534+0.52079I$<br>$a=-0.471444-0.858825I$<br>$b=-0.80212-1.62813I$ | $3.19514-4.83034I$ | $-3.00000+3.70838I$ |
| $u=1.42534-0.52079I$<br>$a=-0.471444+0.858825I$<br>$b=-0.80212+1.62813I$ | $3.19514+4.83034I$ | $-3.00000-3.70838I$ |
| $u=-0.391432+0.273361I$<br>$a=-1.45745+1.61435I$<br>$b=-0.617930+0.788394I$ | $1.30059-1.62044I$ | $1.54713+2.13328I$ |
| $u=-0.391432-0.273361I$<br>$a=-1.45745-1.61435I$<br>$b=-0.617930-0.788394I$ | $1.30059+1.62044I$ | $1.54713-2.13328I$ |
| $u=-1.60218+0.05522I$<br>$a=0.288465-0.371859I$<br>$b=0.245136-0.318071I$ | $-9.04764+1.61419I$ | $-11.37069+6.82904I$ |
| $u=-1.60218-0.05522I$<br>$a=0.288465+0.371859I$<br>$b=0.245136+0.318071I$ | $-9.04764-1.61419I$ | $-11.37069-6.82904I$ |
| $u=0.111818+0.363270I$<br>$a=-2.56254+1.50290I$<br>$b=0.510148+0.337379I$ | $-0.54852-2.74241I$ | $-0.76165+6.33975I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \quad 0.111818 - 0.363270I$ | | |
| $a = -2.56254 - 1.50290I$ | $-0.54852 + 2.74241I$ | $-0.76165 - 6.33975I$ |
| $b = \quad 0.510148 - 0.337379I$ | | |

### II. $I_2^u = \langle au + b,\ a^2 + au + a + u + 2,\ u^2 + u - 1 \rangle$

**(i) Arc colorings**

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

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

**(iii) Cusp Shapes** $= -7au + 6a + 3u - 5$

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

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

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

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

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.618034$<br>$a = -0.80902 + 1.40126I$<br>$b = 0.500000 - 0.866025I$ | $-0.98696 + 2.02988I$ | $-4.50000 + 2.34537I$ |
| $u = 0.618034$<br>$a = -0.80902 - 1.40126I$<br>$b = 0.500000 + 0.866025I$ | $-0.98696 - 2.02988I$ | $-4.50000 - 2.34537I$ |
| $u = -1.61803$<br>$a = 0.309017 + 0.535233I$<br>$b = 0.500000 + 0.866025I$ | $-8.88264 - 2.02988I$ | $-4.50000 + 9.27358I$ |
| $u = -1.61803$<br>$a = 0.309017 - 0.535233I$<br>$b = 0.500000 - 0.866025I$ | $-8.88264 + 2.02988I$ | $-4.50000 - 9.27358I$ |

**III. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $((u^2+u+1)^2)(u^{31}+3u^{30}+\cdots+8u-1)$ |
| $c_2$ | $((u^2+u+1)^2)(u^{31}+9u^{30}+\cdots+60u-1)$ |
| $c_3, c_7$ | $u^4(u^{31}+3u^{30}+\cdots+112u+16)$ |
| $c_4$ | $((u^2-u+1)^2)(u^{31}+3u^{30}+\cdots+8u-1)$ |
| $c_5$ | $((u^2+u+1)^2)(u^{31}-3u^{30}+\cdots+4454u-977)$ |
| $c_6$ | $((u^2+u-1)^2)(u^{31}+3u^{30}+\cdots-2u^2+1)$ |
| $c_8, c_9$ | $((u^2+u-1)^2)(u^{31}-3u^{30}+\cdots-2u+1)$ |
| $c_{10}$ | $((u^2-u-1)^2)(u^{31}+3u^{30}+\cdots-2u^2+1)$ |
| $c_{11}$ | $((u^2-u-1)^2)(u^{31}-3u^{30}+\cdots-2u+1)$ |

**IV. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
| --- | --- |
| $c_1, c_4$ | $((y^2+y+1)^2)(y^{31}+9y^{30}+\cdots+60y-1)$ |
| $c_2$ | $((y^2+y+1)^2)(y^{31}+29y^{30}+\cdots+5084y-1)$ |
| $c_3, c_7$ | $y^4(y^{31}-25y^{30}+\cdots+1152y-256)$ |
| $c_5$ | $((y^2+y+1)^2)(y^{31}+49y^{30}+\cdots+4.45523\times 10^7 y-954529)$ |
| $c_6, c_{10}$ | $((y^2-3y+1)^2)(y^{31}-3y^{30}+\cdots+4y-1)$ |
| $c_8, c_9, c_{11}$ | $((y^2-3y+1)^2)(y^{31}-23y^{30}+\cdots+4y-1)$ |