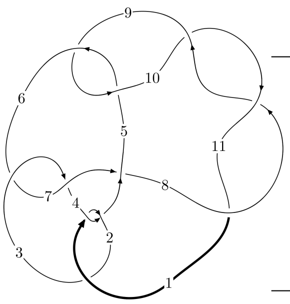
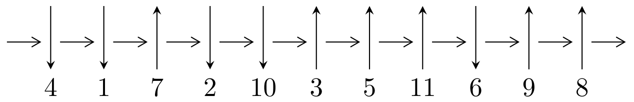
# $11a_{16}$ $(K11a_{16})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle u^{53} + u^{52} + \cdots + 5u^4 + b,\ -u^{33} - 4u^{31} + \cdots + a - u,\ u^{56} + 2u^{55} + \cdots + 2u^2 + 1\rangle$$
$$I_2^u = \langle u^2 + b,\ a + u,\ u^4 - u^3 + u^2 + 1\rangle$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 60 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.**

$\boldsymbol{I_1^u = \langle u^{53}+u^{52}+\cdots+5u^4+b,\ -u^{33}-4u^{31}+\cdots+a-u,\ u^{56}+2u^{55}+\cdots+2u^2+1\rangle}$

**(i) Arc colorings**

$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

$$a_{11} = \begin{pmatrix} u^2+1 \\ u^2 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} u^{33}+4u^{31}+\cdots+8u^3+u \\ -u^{53}-u^{52}+\cdots+5u^5-5u^4 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} u^{55}+u^{54}+\cdots+2u^2+1 \\ u^{55}+2u^{54}+\cdots+3u^2+1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^6+u^4+2u^2+1 \\ u^6+u^2 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} u^4+u^2+1 \\ u^4 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u^8+u^6+3u^4+2u^2+1 \\ u^{10}+2u^8+3u^6+4u^4+u^2 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^{55}-u^{54}+\cdots-9u^5-5u^3 \\ -u^{55}-2u^{54}+\cdots+u-1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^{55}-u^{54}+\cdots-9u^5-5u^3 \\ -u^{55}-2u^{54}+\cdots+u-1 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -4u^{55}-25u^{53}+\cdots-11u+3$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $u^{56} - 5u^{55} + \cdots - 2u + 1$ |
| $c_2$ | $u^{56} + 27u^{55} + \cdots - 30u + 1$ |
| $c_3, c_6$ | $u^{56} - u^{55} + \cdots - 56u + 16$ |
| $c_5, c_9$ | $u^{56} + 2u^{55} + \cdots + 2u^2 + 1$ |
| $c_7$ | $u^{56} + 2u^{55} + \cdots - 140u + 200$ |
| $c_8, c_{10}, c_{11}$ | $u^{56} - 14u^{55} + \cdots - 4u + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $y^{56} - 27y^{55} + \cdots + 30y + 1$ |
| $c_2$ | $y^{56} + 9y^{55} + \cdots - 730y + 1$ |
| $c_3, c_6$ | $y^{56} - 27y^{55} + \cdots - 2624y + 256$ |
| $c_5, c_9$ | $y^{56} + 14y^{55} + \cdots + 4y + 1$ |
| $c_7$ | $y^{56} - 2y^{55} + \cdots + 62800y + 40000$ |
| $c_8, c_{10}, c_{11}$ | $y^{56} + 58y^{55} + \cdots + 28y + 1$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.607473 + 0.783881I$<br>$a = -0.002331 - 0.683957I$<br>$b = -0.598837 + 0.456874I$ | $-0.0338562 + 0.1100990I$ | $1.75833 - 0.05075I$ |
| $u = -0.607473 - 0.783881I$<br>$a = -0.002331 + 0.683957I$<br>$b = -0.598837 - 0.456874I$ | $-0.0338562 - 0.1100990I$ | $1.75833 + 0.05075I$ |
| $u = 0.197770 + 0.968662I$<br>$a = -1.174190 + 0.456988I$<br>$b = -1.195730 - 0.002117I$ | $5.73525 - 1.07098I$ | $8.88776 + 3.00045I$ |
| $u = 0.197770 - 0.968662I$<br>$a = -1.174190 - 0.456988I$<br>$b = -1.195730 + 0.002117I$ | $5.73525 + 1.07098I$ | $8.88776 - 3.00045I$ |
| $u = 0.134977 + 0.977631I$<br>$a = 1.153010 + 0.242929I$<br>$b = 0.51633 + 1.44724I$ | $4.33416 + 4.34991I$ | $6.75272 - 2.91610I$ |
| $u = 0.134977 - 0.977631I$<br>$a = 1.153010 - 0.242929I$<br>$b = 0.51633 - 1.44724I$ | $4.33416 - 4.34991I$ | $6.75272 + 2.91610I$ |
| $u = -0.336798 + 0.920797I$<br>$a = -1.96894 - 0.80256I$<br>$b = -1.82104 + 0.28973I$ | $0.23022 + 4.40037I$ | $2.37312 - 7.37153I$ |
| $u = -0.336798 - 0.920797I$<br>$a = -1.96894 + 0.80256I$<br>$b = -1.82104 - 0.28973I$ | $0.23022 - 4.40037I$ | $2.37312 + 7.37153I$ |
| $u = 0.332306 + 0.976151I$<br>$a = 0.935169 + 0.500138I$<br>$b = 0.46182 + 1.35862I$ | $4.96310 - 4.62849I$ | $7.03327 + 5.15784I$ |
| $u = 0.332306 - 0.976151I$<br>$a = 0.935169 - 0.500138I$<br>$b = 0.46182 - 1.35862I$ | $4.96310 + 4.62849I$ | $7.03327 - 5.15784I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.374376 + 0.988459I$<br>$a = -1.88884 + 0.26158I$<br>$b = -1.43993 - 0.58440I$ | $2.95830 - 10.14670I$ | $3.62258 + 9.49522I$ |
| $u = 0.374376 - 0.988459I$<br>$a = -1.88884 - 0.26158I$<br>$b = -1.43993 + 0.58440I$ | $2.95830 + 10.14670I$ | $3.62258 - 9.49522I$ |
| $u = 0.316154 + 0.867764I$<br>$a = 0.481267 + 0.459650I$<br>$b = 0.272900 - 0.852680I$ | $-0.79958 - 2.18057I$ | $4.75108 + 6.92304I$ |
| $u = 0.316154 - 0.867764I$<br>$a = 0.481267 - 0.459650I$<br>$b = 0.272900 + 0.852680I$ | $-0.79958 + 2.18057I$ | $4.75108 - 6.92304I$ |
| $u = -0.698952 + 0.836112I$<br>$a = -0.335932 - 0.700898I$<br>$b = -1.068380 + 0.795592I$ | $-0.0629739 + 0.1237040I$ | $2.10228 + 0.I$ |
| $u = -0.698952 - 0.836112I$<br>$a = -0.335932 + 0.700898I$<br>$b = -1.068380 - 0.795592I$ | $-0.0629739 - 0.1237040I$ | $2.10228 + 0.I$ |
| $u = -0.226190 + 0.873692I$<br>$a = 1.35876 - 0.68991I$<br>$b = 0.37876 - 1.64298I$ | $0.899368 + 0.464839I$ | $4.81093 - 1.16758I$ |
| $u = -0.226190 - 0.873692I$<br>$a = 1.35876 + 0.68991I$<br>$b = 0.37876 + 1.64298I$ | $0.899368 - 0.464839I$ | $4.81093 + 1.16758I$ |
| $u = -0.642289 + 0.536924I$<br>$a = -0.272696 - 0.336147I$<br>$b = 0.767444 + 0.080263I$ | $-0.84678 + 4.37124I$ | $-1.57903 - 6.34104I$ |
| $u = -0.642289 - 0.536924I$<br>$a = -0.272696 + 0.336147I$<br>$b = 0.767444 - 0.080263I$ | $-0.84678 - 4.37124I$ | $-1.57903 + 6.34104I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.739754 + 0.929885I$<br>$a = 0.982797 + 0.454600I$<br>$b = 2.17782 - 0.94804I$ | $0.25420 + 5.44548I$ | 0 |
| $u = -0.739754 - 0.929885I$<br>$a = 0.982797 - 0.454600I$<br>$b = 2.17782 + 0.94804I$ | $0.25420 - 5.44548I$ | 0 |
| $u = -0.863121 + 0.817193I$<br>$a = -0.319367 + 0.570837I$<br>$b = 1.166920 + 0.719296I$ | $-2.72661 - 2.68562I$ | 0 |
| $u = -0.863121 - 0.817193I$<br>$a = -0.319367 - 0.570837I$<br>$b = 1.166920 - 0.719296I$ | $-2.72661 + 2.68562I$ | 0 |
| $u = 0.826658 + 0.867184I$<br>$a = -0.143454 - 0.975542I$<br>$b = 1.83509 - 1.02941I$ | $-5.44180 - 2.46519I$ | 0 |
| $u = 0.826658 - 0.867184I$<br>$a = -0.143454 + 0.975542I$<br>$b = 1.83509 + 1.02941I$ | $-5.44180 + 2.46519I$ | 0 |
| $u = 0.857567 + 0.839377I$<br>$a = -0.74269 + 2.21222I$<br>$b = -3.62706 + 0.28882I$ | $-7.29705 + 1.90076I$ | 0 |
| $u = 0.857567 - 0.839377I$<br>$a = -0.74269 - 2.21222I$<br>$b = -3.62706 - 0.28882I$ | $-7.29705 - 1.90076I$ | 0 |
| $u = -0.849620 + 0.854105I$<br>$a = -0.792263 + 1.139890I$<br>$b = -0.00621 + 1.65871I$ | $-8.01940 + 0.73257I$ | 0 |
| $u = -0.849620 - 0.854105I$<br>$a = -0.792263 - 1.139890I$<br>$b = -0.00621 - 1.65871I$ | $-8.01940 - 0.73257I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.885456 + 0.821796I$<br>$a = -0.17654 - 2.19494I$<br>$b = -3.02543 - 1.15202I$ | $-5.23615 - 8.13965I$ | 0 |
| $u = -0.885456 - 0.821796I$<br>$a = -0.17654 + 2.19494I$<br>$b = -3.02543 + 1.15202I$ | $-5.23615 + 8.13965I$ | 0 |
| $u = 0.806000 + 0.927194I$<br>$a = -1.071000 - 0.159961I$<br>$b = -0.71417 - 2.31552I$ | $-5.25339 - 3.63777I$ | 0 |
| $u = 0.806000 - 0.927194I$<br>$a = -1.071000 + 0.159961I$<br>$b = -0.71417 + 2.31552I$ | $-5.25339 + 3.63777I$ | 0 |
| $u = -0.815993 + 0.946530I$<br>$a = -1.036900 + 0.852297I$<br>$b = -0.033804 + 1.372620I$ | $-7.72972 + 5.47011I$ | 0 |
| $u = -0.815993 - 0.946530I$<br>$a = -1.036900 - 0.852297I$<br>$b = -0.033804 - 1.372620I$ | $-7.72972 - 5.47011I$ | 0 |
| $u = 0.878810 + 0.896198I$<br>$a = -0.711275 - 0.954669I$<br>$b = 0.07035 - 1.68065I$ | $-8.57446 - 4.40882I$ | 0 |
| $u = 0.878810 - 0.896198I$<br>$a = -0.711275 + 0.954669I$<br>$b = 0.07035 + 1.68065I$ | $-8.57446 + 4.40882I$ | 0 |
| $u = 0.813621 + 0.959611I$<br>$a = 2.19976 - 0.71809I$<br>$b = 3.61245 + 2.54974I$ | $-6.92091 - 8.11870I$ | 0 |
| $u = 0.813621 - 0.959611I$<br>$a = 2.19976 + 0.71809I$<br>$b = 3.61245 - 2.54974I$ | $-6.92091 + 8.11870I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.805941 + 0.974641I$<br>$a = -0.652089 + 0.274125I$<br>$b = -0.40013 + 1.87733I$ | $-2.23567 + 8.89297I$ | $0$ |
| $u = -0.805941 - 0.974641I$<br>$a = -0.652089 - 0.274125I$<br>$b = -0.40013 - 1.87733I$ | $-2.23567 - 8.89297I$ | $0$ |
| $u = 0.861222 + 0.936822I$<br>$a = -0.884065 - 0.792933I$<br>$b = 0.195344 - 1.380390I$ | $-8.44550 - 2.02974I$ | $0$ |
| $u = 0.861222 - 0.936822I$<br>$a = -0.884065 + 0.792933I$<br>$b = 0.195344 + 1.380390I$ | $-8.44550 + 2.02974I$ | $0$ |
| $u = -0.819387 + 0.983775I$<br>$a = 2.17573 + 0.14098I$<br>$b = 2.71437 - 3.01653I$ | $-4.7257 + 14.4579I$ | $0$ |
| $u = -0.819387 - 0.983775I$<br>$a = 2.17573 - 0.14098I$<br>$b = 2.71437 + 3.01653I$ | $-4.7257 - 14.4579I$ | $0$ |
| $u = -0.281383 + 0.637058I$<br>$a = 0.264556 - 0.604336I$<br>$b = -0.341113 - 0.409388I$ | $0.260433 + 1.109870I$ | $3.40522 - 6.21684I$ |
| $u = -0.281383 - 0.637058I$<br>$a = 0.264556 + 0.604336I$<br>$b = -0.341113 + 0.409388I$ | $0.260433 - 1.109870I$ | $3.40522 + 6.21684I$ |
| $u = 0.660025 + 0.212760I$<br>$a = 0.82341 - 1.92825I$<br>$b = 0.462433 - 1.144870I$ | $0.50522 + 6.42800I$ | $-1.79832 - 5.15907I$ |
| $u = 0.660025 - 0.212760I$<br>$a = 0.82341 + 1.92825I$<br>$b = 0.462433 + 1.144870I$ | $0.50522 - 6.42800I$ | $-1.79832 + 5.15907I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.605642 + 0.131913I$<br>$a = 0.88096 + 1.17599I$<br>$b = 0.032323 + 0.705281I$ | $2.38315 + 1.29675I$ | $1.42442 - 0.64044I$ |
| $u = 0.605642 - 0.131913I$<br>$a = 0.88096 - 1.17599I$<br>$b = 0.032323 - 0.705281I$ | $2.38315 - 1.29675I$ | $1.42442 + 0.64044I$ |
| $u = 0.384124 + 0.388656I$<br>$a = -0.517188 + 1.130980I$<br>$b = 0.805658 - 0.181951I$ | $-2.27622 - 0.63522I$ | $-5.14216 - 1.49241I$ |
| $u = 0.384124 - 0.388656I$<br>$a = -0.517188 - 1.130980I$<br>$b = 0.805658 + 0.181951I$ | $-2.27622 + 0.63522I$ | $-5.14216 + 1.49241I$ |
| $u = -0.476893 + 0.223440I$<br>$a = 1.43434 + 2.19416I$<br>$b = 0.801838 + 0.868626I$ | $-1.82537 - 1.28944I$ | $-5.03333 + 1.67156I$ |
| $u = -0.476893 - 0.223440I$<br>$a = 1.43434 - 2.19416I$<br>$b = 0.801838 - 0.868626I$ | $-1.82537 + 1.28944I$ | $-5.03333 - 1.67156I$ |

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

**(i) Arc colorings**

$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

$$a_{11} = \begin{pmatrix} u^2 + 1 \\ u^2 \end{pmatrix}$$

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

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

$$a_4 = \begin{pmatrix} 0 \\ u^3 - u^2 + u \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} u^3 \\ u^3 - u^2 - 1 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} 0 \\ u^3 - u^2 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0 \\ u^3 - u^2 + u \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 3u^2 - 2u - 1$

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

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

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_4$ | $(y-1)^4$ |
| $c_3, c_6$ | $y^4$ |
| $c_5, c_9$ | $y^4 + y^3 + 3y^2 + 2y + 1$ |
| $c_7, c_8, c_{10}$ $c_{11}$ | $y^4 + 5y^3 + 7y^2 + 2y + 1$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.351808 + 0.720342I$<br>$a = 0.351808 - 0.720342I$<br>$b = 0.395123 + 0.506844I$ | $-1.43393 + 1.41510I$ | $-1.48175 - 2.96122I$ |
| $u = -0.351808 - 0.720342I$<br>$a = 0.351808 + 0.720342I$<br>$b = 0.395123 - 0.506844I$ | $-1.43393 - 1.41510I$ | $-1.48175 + 2.96122I$ |
| $u = 0.851808 + 0.911292I$<br>$a = -0.851808 - 0.911292I$<br>$b = 0.10488 - 1.55249I$ | $-8.43568 - 3.16396I$ | $-3.01825 + 2.83489I$ |
| $u = 0.851808 - 0.911292I$<br>$a = -0.851808 + 0.911292I$<br>$b = 0.10488 + 1.55249I$ | $-8.43568 + 3.16396I$ | $-3.01825 - 2.83489I$ |

### III. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $((u-1)^4)(u^{56}-5u^{55}+\cdots-2u+1)$ |
| $c_2$ | $((u+1)^4)(u^{56}+27u^{55}+\cdots-30u+1)$ |
| $c_3, c_6$ | $u^4(u^{56}-u^{55}+\cdots-56u+16)$ |
| $c_4$ | $((u+1)^4)(u^{56}-5u^{55}+\cdots-2u+1)$ |
| $c_5$ | $(u^4+u^3+u^2+1)(u^{56}+2u^{55}+\cdots+2u^2+1)$ |
| $c_7$ | $(u^4-u^3+3u^2-2u+1)(u^{56}+2u^{55}+\cdots-140u+200)$ |
| $c_8$ | $(u^4+u^3+3u^2+2u+1)(u^{56}-14u^{55}+\cdots-4u+1)$ |
| $c_9$ | $(u^4-u^3+u^2+1)(u^{56}+2u^{55}+\cdots+2u^2+1)$ |
| $c_{10}, c_{11}$ | $(u^4-u^3+3u^2-2u+1)(u^{56}-14u^{55}+\cdots-4u+1)$ |

**IV. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_4$ | $((y-1)^4)(y^{56} - 27y^{55} + \cdots + 30y + 1)$ |
| $c_2$ | $((y-1)^4)(y^{56} + 9y^{55} + \cdots - 730y + 1)$ |
| $c_3, c_6$ | $y^4(y^{56} - 27y^{55} + \cdots - 2624y + 256)$ |
| $c_5, c_9$ | $(y^4 + y^3 + 3y^2 + 2y + 1)(y^{56} + 14y^{55} + \cdots + 4y + 1)$ |
| $c_7$ | $(y^4 + 5y^3 + 7y^2 + 2y + 1)(y^{56} - 2y^{55} + \cdots + 62800y + 40000)$ |
| $c_8, c_{10}, c_{11}$ | $(y^4 + 5y^3 + 7y^2 + 2y + 1)(y^{56} + 58y^{55} + \cdots + 28y + 1)$ |