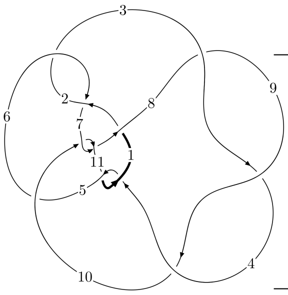
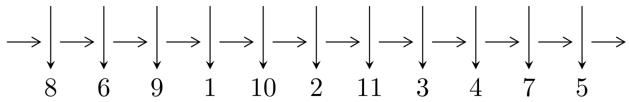
# $11a_{353}$ ($K11a_{353}$)




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$\begin{aligned}
I_1^u = \langle & 69111097161u^{27} + 244636080010u^{26} + \cdots + 9522584936696b + 221044616913, \\
& 1298199346297u^{27} + 505498875842u^{26} + \cdots + 1904516987392a - 5516498326615, \\
& u^{28} + u^{27} + \cdots - 2u - 1\rangle \\
I_2^u = \langle & 8.06418 \times 10^{31}u^{39} - 4.28071 \times 10^{32}u^{38} + \cdots + 1.02068 \times 10^{33}b - 2.55200 \times 10^{33}, \\
& 1.25131 \times 10^{34}u^{39} - 4.24308 \times 10^{34}u^{38} + \cdots + 1.32688 \times 10^{34}a - 8.48739 \times 10^{34},\ u^{40} - 3u^{39} + \cdots - 16u + \\
I_3^u = \langle & 3au + 26b + 15a + 6u + 4,\ 3a^2 + 3au - 3a - 4u + 6,\ u^2 + 1\rangle \\
I_4^u = \langle & b - 1,\ 4a^2 - 4a - 1,\ u + 1\rangle \\
I_5^u = \langle & b + 1,\ 2a + 1,\ u - 1\rangle
\end{aligned}$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 75 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.**
$\boldsymbol{I_1^u = \langle 6.91 \times 10^{10} u^{27} + 2.45 \times 10^{11} u^{26} + \cdots + 9.52 \times 10^{11} b + 2.21 \times 10^{11},\ 1.30 \times 10^{12} u^{27} + 5.05 \times 10^{11} u^{26} + \cdots + 1.90 \times 10^{12} a - 5.52 \times 10^{12},\ u^{28} + u^{27} + \cdots - 2u - 1 \rangle}$

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -0.681642u^{27} - 0.265421u^{26} + \cdots - 8.40509u + 2.89653 \\ -0.0725760u^{27} - 0.256901u^{26} + \cdots + 1.97317u - 0.232127 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1.00409u^{27} + 0.785997u^{26} + \cdots + 7.89767u - 2.87424 \\ -0.231896u^{27} - 0.203248u^{26} + \cdots - 1.15597u + 0.754218 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -0.754218u^{27} - 0.522322u^{26} + \cdots - 6.43192u + 2.66441 \\ -0.0725760u^{27} - 0.256901u^{26} + \cdots + 1.97317u - 0.232127 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -0.648348u^{27} - 0.423262u^{26} + \cdots - 4.84322u + 3.11906 \\ 0.482066u^{27} + 0.675821u^{26} + \cdots + 0.0882181u - 0.722887 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -0.972307u^{27} - 0.800001u^{26} + \cdots - 7.29799u + 3.66849 \\ -0.0439280u^{27} - 0.179789u^{26} + \cdots + 2.26359u - 0.464023 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -0.792144u^{27} - 0.721116u^{26} + \cdots - 3.87937u + 3.04143 \\ 0.393556u^{27} + 0.597667u^{26} + \cdots + 0.600150u - 0.954582 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1.17639u^{27} + 0.886244u^{26} + \cdots + 9.62155u - 3.84654 \\ -0.367757u^{27} - 0.177799u^{26} + \cdots - 1.70785u + 0.710290 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 1.17639u^{27} + 0.886244u^{26} + \cdots + 9.62155u - 3.84654 \\ -0.367757u^{27} - 0.177799u^{26} + \cdots - 1.70785u + 0.710290 \end{pmatrix}$$

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

**(iii) Cusp Shapes**
$= -\frac{35588886371}{59516155856}u^{27} - \frac{299228759547}{238064623424}u^{26} + \cdots - \frac{368522604615}{59516155856}u - \frac{3433039175621}{238064623424}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $8(8u^{28} - 4u^{27} + \cdots + 13u - 1)$ |
| $c_2, c_4, c_6$ $c_{11}$ | $u^{28} - u^{27} + \cdots + 2u - 1$ |
| $c_3, c_8, c_9$ | $u^{28} + 3u^{27} + \cdots + 18u^2 - 8$ |
| $c_7, c_{10}$ | $u^{28} + 2u^{27} + \cdots + 7u + 8$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $64(64y^{28} - 752y^{27} + \cdots - 97y + 1)$ |
| $c_2, c_4, c_6$ $c_{11}$ | $y^{28} + 9y^{27} + \cdots - 22y + 1$ |
| $c_3, c_8, c_9$ | $y^{28} - 25y^{27} + \cdots - 288y + 64$ |
| $c_7, c_{10}$ | $y^{28} - 12y^{27} + \cdots - 2657y + 64$ |

### (vi) Complex Volumes and Cusp Shapes

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.296911 + 0.949247I$<br>$a = -0.96640 + 1.46558I$<br>$b = 0.704207 - 1.129850I$ | $2.99004 + 0.45030I$ | $-10.69982 + 4.65118I$ |
| $u = 0.296911 - 0.949247I$<br>$a = -0.96640 - 1.46558I$<br>$b = 0.704207 + 1.129850I$ | $2.99004 - 0.45030I$ | $-10.69982 - 4.65118I$ |
| $u = -0.565343 + 0.834957I$<br>$a = 0.34126 - 2.13613I$<br>$b = -0.958692 + 0.629682I$ | $-7.22525 + 3.79352I$ | $-14.6297 - 6.8044I$ |
| $u = -0.565343 - 0.834957I$<br>$a = 0.34126 + 2.13613I$<br>$b = -0.958692 - 0.629682I$ | $-7.22525 - 3.79352I$ | $-14.6297 + 6.8044I$ |
| $u = 0.569801 + 0.943146I$<br>$a = 0.319047 + 0.157096I$<br>$b = -1.44195 + 0.24008I$ | $-6.49386 - 5.21032I$ | $-14.7449 + 6.2628I$ |
| $u = 0.569801 - 0.943146I$<br>$a = 0.319047 - 0.157096I$<br>$b = -1.44195 - 0.24008I$ | $-6.49386 + 5.21032I$ | $-14.7449 - 6.2628I$ |
| $u = 1.084120 + 0.332892I$<br>$a = -0.376217 + 0.052666I$<br>$b = -1.023200 + 0.176678I$ | $-3.53318 + 0.46316I$ | $-13.8889 - 10.1726I$ |
| $u = 1.084120 - 0.332892I$<br>$a = -0.376217 - 0.052666I$<br>$b = -1.023200 - 0.176678I$ | $-3.53318 - 0.46316I$ | $-13.8889 + 10.1726I$ |
| $u = -0.413566 + 1.107250I$<br>$a = 0.70776 + 1.31080I$<br>$b = -0.399769 - 1.157150I$ | $5.21251 + 5.27743I$ | $-6.65035 - 6.45030I$ |
| $u = -0.413566 - 1.107250I$<br>$a = 0.70776 - 1.31080I$<br>$b = -0.399769 + 1.157150I$ | $5.21251 - 5.27743I$ | $-6.65035 + 6.45030I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.487268 + 1.106840I$<br>$a = -0.24485 - 1.78265I$<br>$b = 1.182220 + 0.759370I$ | $1.23650 - 6.41971I$ | $-10.13891 + 5.40596I$ |
| $u = 0.487268 - 1.106840I$<br>$a = -0.24485 + 1.78265I$<br>$b = 1.182220 - 0.759370I$ | $1.23650 + 6.41971I$ | $-10.13891 - 5.40596I$ |
| $u = 0.125014 + 0.759051I$<br>$a = -0.26909 - 1.95210I$<br>$b = 0.364417 + 1.088690I$ | $2.21675 - 2.65344I$ | $-14.3737 + 6.7757I$ |
| $u = 0.125014 - 0.759051I$<br>$a = -0.26909 + 1.95210I$<br>$b = 0.364417 - 1.088690I$ | $2.21675 + 2.65344I$ | $-14.3737 - 6.7757I$ |
| $u = -0.443360 + 0.614385I$<br>$a = -0.110599 + 0.746253I$<br>$b = 1.324740 + 0.017239I$ | $-2.17233 + 1.46597I$ | $-11.44165 - 4.82002I$ |
| $u = -0.443360 - 0.614385I$<br>$a = -0.110599 - 0.746253I$<br>$b = 1.324740 - 0.017239I$ | $-2.17233 - 1.46597I$ | $-11.44165 + 4.82002I$ |
| $u = -0.739750$<br>$a = 1.24980$<br>$b = -0.228388$ | $-6.49503$ | $-15.0760$ |
| $u = 0.555730 + 1.199460I$<br>$a = -0.619404 + 1.141470I$<br>$b = 0.252799 - 1.095220I$ | $-0.48195 - 10.01540I$ | $-10.05091 + 6.46543I$ |
| $u = 0.555730 - 1.199460I$<br>$a = -0.619404 - 1.141470I$<br>$b = 0.252799 + 1.095220I$ | $-0.48195 + 10.01540I$ | $-10.05091 - 6.46543I$ |
| $u = -1.33082$<br>$a = 0.528817$<br>$b = 0.666845$ | $-6.93788$ | $-10.0440$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.576628 + 1.229500I$<br>$a = \ \ 0.07988 - 1.67005I$<br>$b = -1.25864 + 0.68359I$ | $2.41139 + 11.80860I$ | $-9.11501 - 8.63273I$ |
| $u = -0.576628 - 1.229500I$<br>$a = \ \ 0.07988 + 1.67005I$<br>$b = -1.25864 - 0.68359I$ | $2.41139 - 11.80860I$ | $-9.11501 + 8.63273I$ |
| $u = -1.27260 + 0.62076I$<br>$a = \ \ 0.246074 - 0.052570I$<br>$b = \ \ 1.061760 + 0.348290I$ | $-8.94292 - 2.37104I$ | $-16.4575 + 4.6309I$ |
| $u = -1.27260 - 0.62076I$<br>$a = \ \ 0.246074 + 0.052570I$<br>$b = \ \ 1.061760 - 0.348290I$ | $-8.94292 + 2.37104I$ | $-16.4575 - 4.6309I$ |
| $u = \ \ 0.67592 + 1.27886I$<br>$a = \ \ 0.05910 - 1.64694I$<br>$b = \ \ 1.27791 + 0.62904I$ | $-3.7021 - 16.1510I$ | $-12.8937 + 8.8766I$ |
| $u = \ \ 0.67592 - 1.27886I$<br>$a = \ \ 0.05910 + 1.64694I$<br>$b = \ \ 1.27791 - 0.62904I$ | $-3.7021 + 16.1510I$ | $-12.8937 - 8.8766I$ |
| $u = \ \ 0.274821$<br>$a = -0.815209$<br>$b = \ \ 0.252280$ | $-0.508062$ | $-19.5920$ |
| $u = -0.250785$<br>$a = \ \ 5.20342$<br>$b = -0.862317$ | $-6.66293$ | $-13.6170$ |

**II.** $\boldsymbol{I_2^u =}$
$\boldsymbol{\langle 8.06\times 10^{31}u^{39}-4.28\times 10^{32}u^{38}+\cdots+1.02\times 10^{33}b-2.55\times 10^{33},\ 1.25\times 10^{34}u^{39}-4.24\times 10^{34}u^{38}+\cdots+1.33\times 10^{34}a-8.49\times 10^{34},\ u^{40}-3u^{39}+\cdots-16u+13\rangle}$

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -0.943051u^{39} + 3.19779u^{38} + \cdots - 19.6208u + 6.39651 \\ -0.0790083u^{39} + 0.419400u^{38} + \cdots - 0.209068u + 2.50031 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 11.7005u^{39} - 33.4368u^{38} + \cdots + 142.585u + 2.45039 \\ 0.555148u^{39} - 2.34820u^{38} + \cdots + 18.1223u - 8.20329 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} u \\ u^3 + u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -1.02206u^{39} + 3.61719u^{38} + \cdots - 19.8299u + 8.89682 \\ -0.0790083u^{39} + 0.419400u^{38} + \cdots - 0.209068u + 2.50031 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -0.482674u^{39} + 2.13009u^{38} + \cdots - 12.5233u + 7.32471 \\ -0.0389140u^{39} + 0.110695u^{38} + \cdots - 1.34364u - 0.742144 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -0.984515u^{39} + 15.5078u^{38} + \cdots - 183.199u + 159.124 \\ 0.692717u^{39} - 1.33169u^{38} + \cdots + 1.41679u + 8.33951 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -0.307007u^{39} + 1.68682u^{38} + \cdots - 11.7608u + 8.03870 \\ 0.00580630u^{39} - 0.0556998u^{38} + \cdots - 1.52504u - 1.11673 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -1.00713u^{39} + 3.70631u^{38} + \cdots - 27.7037u + 12.4566 \\ 0.0249322u^{39} + 0.0795189u^{38} + \cdots - 1.22395u + 1.61735 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -1.00713u^{39} + 3.70631u^{38} + \cdots - 27.7037u + 12.4566 \\ 0.0249322u^{39} + 0.0795189u^{38} + \cdots - 1.22395u + 1.61735 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -0.612855u^{39} + 1.79290u^{38} + \cdots - 0.230525u - 14.6778$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $u^{40} - 21u^{39} + \cdots + 1158u + 199$ |
| $c_2, c_4, c_6$<br>$c_{11}$ | $u^{40} + 3u^{39} + \cdots + 16u + 13$ |
| $c_3, c_8, c_9$ | $(u^{20} - u^{19} + \cdots + 2u - 1)^2$ |
| $c_7, c_{10}$ | $(u^{20} + u^{19} + \cdots - 2u - 1)^2$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $y^{40} + 11y^{39} + \cdots + 1102756y + 39601$ |
| $c_2, c_4, c_6$ $c_{11}$ | $y^{40} + 23y^{39} + \cdots - 724y + 169$ |
| $c_3, c_8, c_9$ | $(y^{20} - 19y^{19} + \cdots - 2y + 1)^2$ |
| $c_7, c_{10}$ | $(y^{20} - 11y^{19} + \cdots - 2y + 1)^2$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.067663 + 1.006840I$<br>$a = -8.85268 + 7.75794I$<br>$b = -1.06181$ | $-3.24334$ | $-17.8998 + 0.I$ |
| $u = 0.067663 - 1.006840I$<br>$a = -8.85268 - 7.75794I$<br>$b = -1.06181$ | $-3.24334$ | $-17.8998 + 0.I$ |
| $u = -0.966472 + 0.204987I$<br>$a = -0.256846 + 0.129583I$<br>$b = -1.174860 - 0.481002I$ | $-0.72067 - 6.27316I$ | $-12.10015 + 6.54347I$ |
| $u = -0.966472 - 0.204987I$<br>$a = -0.256846 - 0.129583I$<br>$b = -1.174860 + 0.481002I$ | $-0.72067 + 6.27316I$ | $-12.10015 - 6.54347I$ |
| $u = -0.402724 + 0.973230I$<br>$a = -0.15139 + 1.58308I$<br>$b = 1.170970 - 0.421653I$ | $-1.14846 + 2.14390I$ | $-13.45592 - 0.24308I$ |
| $u = -0.402724 - 0.973230I$<br>$a = -0.15139 - 1.58308I$<br>$b = 1.170970 + 0.421653I$ | $-1.14846 - 2.14390I$ | $-13.45592 + 0.24308I$ |
| $u = 0.169382 + 1.042150I$<br>$a = -1.25981 - 2.02462I$<br>$b = 0.733657$ | $2.31303$ | $-14.9388 + 0.I$ |
| $u = 0.169382 - 1.042150I$<br>$a = -1.25981 + 2.02462I$<br>$b = 0.733657$ | $2.31303$ | $-14.9388 + 0.I$ |
| $u = -0.531514 + 0.736461I$<br>$a = 0.267570 + 0.697869I$<br>$b = -1.224930 - 0.393654I$ | $-7.52808 + 0.63661I$ | $-16.9604 + 0.1699I$ |
| $u = -0.531514 - 0.736461I$<br>$a = 0.267570 - 0.697869I$<br>$b = -1.224930 + 0.393654I$ | $-7.52808 - 0.63661I$ | $-16.9604 - 0.1699I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.880675 + 0.188465I$<br>$a = 0.647845 - 0.561612I$<br>$b = 0.113113 + 0.821783I$ | $-3.49387 + 4.79919I$ | $-12.69810 - 3.09464I$ |
| $u = 0.880675 - 0.188465I$<br>$a = 0.647845 + 0.561612I$<br>$b = 0.113113 - 0.821783I$ | $-3.49387 - 4.79919I$ | $-12.69810 + 3.09464I$ |
| $u = 0.222487 + 1.085200I$<br>$a = 0.087467 - 1.071580I$<br>$b = -0.092790 + 0.716473I$ | $2.37392 - 1.80448I$ | $-8.82463 + 3.70058I$ |
| $u = 0.222487 - 1.085200I$<br>$a = 0.087467 + 1.071580I$<br>$b = -0.092790 - 0.716473I$ | $2.37392 + 1.80448I$ | $-8.82463 - 3.70058I$ |
| $u = 0.792130 + 0.867615I$<br>$a = 0.866838 - 0.759884I$<br>$b = 0.912041 + 0.514968I$ | $0.30488 - 4.84109I$ | $-11.63163 + 6.37981I$ |
| $u = 0.792130 - 0.867615I$<br>$a = 0.866838 + 0.759884I$<br>$b = 0.912041 - 0.514968I$ | $0.30488 + 4.84109I$ | $-11.63163 - 6.37981I$ |
| $u = 0.575083 + 0.580865I$<br>$a = -0.24945 + 2.07330I$<br>$b = -1.224930 - 0.393654I$ | $-7.52808 + 0.63661I$ | $-16.9604 + 0.1699I$ |
| $u = 0.575083 - 0.580865I$<br>$a = -0.24945 - 2.07330I$<br>$b = -1.224930 + 0.393654I$ | $-7.52808 - 0.63661I$ | $-16.9604 - 0.1699I$ |
| $u = -0.536847 + 1.066780I$<br>$a = -0.700413 - 1.158910I$<br>$b = -0.774874 + 0.460321I$ | $4.54605 + 1.94645I$ | $-5.05320 - 4.81876I$ |
| $u = -0.536847 - 1.066780I$<br>$a = -0.700413 + 1.158910I$<br>$b = -0.774874 - 0.460321I$ | $4.54605 - 1.94645I$ | $-5.05320 + 4.81876I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.164960 + 0.329003I$<br>$a = 0.277968 + 0.291634I$<br>$b = 1.205800 - 0.505812I$ | $-6.73027 + 9.64430I$ | $-15.6547 - 6.2054I$ |
| $u = 1.164960 - 0.329003I$<br>$a = 0.277968 - 0.291634I$<br>$b = 1.205800 + 0.505812I$ | $-6.73027 - 9.64430I$ | $-15.6547 + 6.2054I$ |
| $u = 0.541181 + 1.104510I$<br>$a = -0.212099 - 0.073365I$<br>$b = 0.529602 - 0.535861I$ | $1.34713 - 0.58469I$ | $-9.20205 + 0.I$ |
| $u = 0.541181 - 1.104510I$<br>$a = -0.212099 + 0.073365I$<br>$b = 0.529602 + 0.535861I$ | $1.34713 + 0.58469I$ | $-9.20205 + 0.I$ |
| $u = -0.539846 + 1.156750I$<br>$a = -0.162259 - 0.939426I$<br>$b = 0.113113 + 0.821783I$ | $-3.49387 + 4.79919I$ | $-12.69810 - 3.09464I$ |
| $u = -0.539846 - 1.156750I$<br>$a = -0.162259 + 0.939426I$<br>$b = 0.113113 - 0.821783I$ | $-3.49387 - 4.79919I$ | $-12.69810 + 3.09464I$ |
| $u = 0.597799 + 1.194490I$<br>$a = -0.009099 + 1.334750I$<br>$b = -1.174860 - 0.481002I$ | $-0.72067 - 6.27316I$ | $-11.00000 + 6.54347I$ |
| $u = 0.597799 - 1.194490I$<br>$a = -0.009099 - 1.334750I$<br>$b = -1.174860 + 0.481002I$ | $-0.72067 + 6.27316I$ | $-11.00000 - 6.54347I$ |
| $u = 0.592656 + 0.264629I$<br>$a = -0.246458 - 0.190586I$<br>$b = 1.170970 - 0.421653I$ | $-1.14846 + 2.14390I$ | $-13.45592 - 0.24308I$ |
| $u = 0.592656 - 0.264629I$<br>$a = -0.246458 + 0.190586I$<br>$b = 1.170970 + 0.421653I$ | $-1.14846 - 2.14390I$ | $-13.45592 + 0.24308I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.265345 + 1.338090I$<br>$a = 0.647027 + 0.331729I$<br>$b = -0.774874 - 0.460321I$ | $4.54605 - 1.94645I$ | $-5.05320 + 4.81876I$ |
| $u = -0.265345 - 1.338090I$<br>$a = 0.647027 - 0.331729I$<br>$b = -0.774874 + 0.460321I$ | $4.54605 + 1.94645I$ | $-5.05320 - 4.81876I$ |
| $u = 0.296099 + 1.343350I$<br>$a = 0.248195 - 1.097590I$<br>$b = 0.529602 + 0.535861I$ | $1.34713 + 0.58469I$ | $-11.00000 + 0.I$ |
| $u = 0.296099 - 1.343350I$<br>$a = 0.248195 + 1.097590I$<br>$b = 0.529602 - 0.535861I$ | $1.34713 - 0.58469I$ | $-11.00000 + 0.I$ |
| $u = -0.78685 + 1.24207I$<br>$a = 0.148743 + 1.262730I$<br>$b = 1.205800 - 0.505812I$ | $-6.73027 + 9.64430I$ | 0 |
| $u = -0.78685 - 1.24207I$<br>$a = 0.148743 - 1.262730I$<br>$b = 1.205800 + 0.505812I$ | $-6.73027 - 9.64430I$ | 0 |
| $u = 0.08686 + 1.50116I$<br>$a = -0.484527 + 0.706500I$<br>$b = 0.912041 - 0.514968I$ | $0.30488 + 4.84109I$ | 0 |
| $u = 0.08686 - 1.50116I$<br>$a = -0.484527 - 0.706500I$<br>$b = 0.912041 + 0.514968I$ | $0.30488 - 4.84109I$ | 0 |
| $u = -0.457374 + 0.019438I$<br>$a = -1.41432 + 0.28953I$<br>$b = -0.092790 - 0.716473I$ | $2.37392 + 1.80448I$ | $-8.82463 - 3.70058I$ |
| $u = -0.457374 - 0.019438I$<br>$a = -1.41432 - 0.28953I$<br>$b = -0.092790 + 0.716473I$ | $2.37392 - 1.80448I$ | $-8.82463 + 3.70058I$ |

**III.** $\boldsymbol{I_3^u = \langle 3au + 26b + 15a + 6u + 4,\ 3a^2 + 3au - 3a - 4u + 6,\ u^2 + 1\rangle}$

**(i) Arc colorings**

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

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} a \\ -0.115385au - 0.576923a - 0.230769u - 0.153846 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.769231au + 0.153846a + 0.794872u + 0.307692 \\ 0.346154au - 0.269231a - 0.307692u - 0.538462 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} -0.115385au + 0.423077a - 0.230769u - 0.153846 \\ -0.115385au - 0.576923a - 0.230769u - 0.153846 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -0.346154au + 0.269231a + 0.307692u + 0.538462 \\ -0.115385au - 0.576923a - 0.230769u + 0.846154 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -0.269231au - 0.346154a - 0.538462u + 0.641026 \\ 0.153846au - 0.230769a + 0.307692u - 0.461538 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.230769au + 0.846154a + 0.538462u - 0.307692 \\ -0.115385au - 0.576923a - 0.230769u + 0.846154 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -0.423077au - 0.115385a + 0.153846u - 0.230769 \\ 0.576923au - 0.115385a + 0.153846u - 0.230769 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -0.423077au - 0.115385a + 0.153846u - 0.230769 \\ 0.576923au - 0.115385a + 0.153846u - 0.230769 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= \frac{6}{13}au + \frac{30}{13}a + \frac{12}{13}u - \frac{96}{13}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $9(9u^4 + 9u^2 - 6u + 1)$ |
| $c_2, c_4, c_6$ $c_{11}$ | $(u^2 + 1)^2$ |
| $c_3, c_8, c_9$ | $u^4 - u^2 + 1$ |
| $c_5$ | $9(9u^4 + 9u^2 + 6u + 1)$ |
| $c_7$ | $(u^2 - u + 1)^2$ |
| $c_{10}$ | $(u^2 + u + 1)^2$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $81(81y^4 + 162y^3 + 99y^2 - 18y + 1)$ |
| $c_2, c_4, c_6$ $c_{11}$ | $(y + 1)^4$ |
| $c_3, c_8, c_9$ | $(y^2 - y + 1)^2$ |
| $c_7, c_{10}$ | $(y^2 + y + 1)^2$ |

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

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.000000I$<br>$a = 0.788675 + 0.943376I$<br>$b = -0.500000 - 0.866025I$ | $3.28987 - 2.02988I$ | $-6.00000 + 3.46410I$ |
| $u = 1.000000I$<br>$a = 0.21132 - 1.94338I$<br>$b = -0.500000 + 0.866025I$ | $3.28987 + 2.02988I$ | $-6.00000 - 3.46410I$ |
| $u = -1.000000I$<br>$a = 0.788675 - 0.943376I$<br>$b = -0.500000 + 0.866025I$ | $3.28987 + 2.02988I$ | $-6.00000 - 3.46410I$ |
| $u = -1.000000I$<br>$a = 0.21132 + 1.94338I$<br>$b = -0.500000 - 0.866025I$ | $3.28987 - 2.02988I$ | $-6.00000 + 3.46410I$ |

### IV. $I_4^u = \langle b-1,\ 4a^2-4a-1,\ u+1\rangle$

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} a \\ 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 0.75 \\ -a+2 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -1 \\ -2 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} a+1 \\ 1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -a \\ -1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} a+\frac{1}{4} \\ a-1 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} a-1 \\ 4a-3 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -a+\frac{1}{2} \\ -2a+3 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -a+\frac{1}{2} \\ -2a+3 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -20$

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

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

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $16(16y^2 - 24y + 1)$ |
| $c_2, c_4, c_6$ $c_7, c_{10}, c_{11}$ | $(y-1)^2$ |
| $c_3, c_8, c_9$ | $(y-2)^2$ |

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

| Solutions to $I_4^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -1.00000$<br>$a = 1.20711$<br>$b = 1.00000$ | $-8.22467$ | $-20.0000$ |
| $u = -1.00000$<br>$a = -0.207107$<br>$b = 1.00000$ | $-8.22467$ | $-20.0000$ |

### V. $I_5^u = \langle b+1,\ 2a+1,\ u-1 \rangle$

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} -0.5 \\ -1 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 1.25 \\ 1.5 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -1.5 \\ -1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -0.5 \\ -1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -0.25 \\ 0.5 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.5 \\ -1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -7.5$

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

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

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

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

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

| Solutions to $I_5^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = \phantom{-}1.00000$<br>$a = -0.500000$<br>$b = -1.00000$ | $-3.28987$ | $-7.50000$ |

## VI. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $576(2u+1)(4u^2-4u-1)(9u^4+9u^2-6u+1)$ <br> $\cdot(8u^{28}-4u^{27}+\cdots+13u-1)(u^{40}-21u^{39}+\cdots+1158u+199)$ |
| $c_2, c_{11}$ | $(u-1)(u+1)^2(u^2+1)^2(u^{28}-u^{27}+\cdots+2u-1)$ <br> $\cdot(u^{40}+3u^{39}+\cdots+16u+13)$ |
| $c_3, c_8, c_9$ | $u(u^2-2)(u^4-u^2+1)(u^{20}-u^{19}+\cdots+2u-1)^2$ <br> $\cdot(u^{28}+3u^{27}+\cdots+18u^2-8)$ |
| $c_4, c_6$ | $((u-1)^2)(u+1)(u^2+1)^2(u^{28}-u^{27}+\cdots+2u-1)$ <br> $\cdot(u^{40}+3u^{39}+\cdots+16u+13)$ |
| $c_5$ | $576(2u-1)(4u^2+4u-1)(9u^4+9u^2+6u+1)$ <br> $\cdot(8u^{28}-4u^{27}+\cdots+13u-1)(u^{40}-21u^{39}+\cdots+1158u+199)$ |
| $c_7$ | $(u-1)(u+1)^2(u^2-u+1)^2(u^{20}+u^{19}+\cdots-2u-1)^2$ <br> $\cdot(u^{28}+2u^{27}+\cdots+7u+8)$ |
| $c_{10}$ | $((u-1)^2)(u+1)(u^2+u+1)^2(u^{20}+u^{19}+\cdots-2u-1)^2$ <br> $\cdot(u^{28}+2u^{27}+\cdots+7u+8)$ |

## VII. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_5$ | $331776(4y-1)(16y^2-24y+1)(81y^4+162y^3+\cdots-18y+1)$ <br> $\cdot\,(64y^{28}-752y^{27}+\cdots-97y+1)$ <br> $\cdot\,(y^{40}+11y^{39}+\cdots+1102756y+39601)$ |
| $c_2, c_4, c_6$ <br> $c_{11}$ | $((y-1)^3)(y+1)^4(y^{28}+9y^{27}+\cdots-22y+1)$ <br> $\cdot\,(y^{40}+23y^{39}+\cdots-724y+169)$ |
| $c_3, c_8, c_9$ | $y(y-2)^2(y^2-y+1)^2(y^{20}-19y^{19}+\cdots-2y+1)^2$ <br> $\cdot\,(y^{28}-25y^{27}+\cdots-288y+64)$ |
| $c_7, c_{10}$ | $((y-1)^3)(y^2+y+1)^2(y^{20}-11y^{19}+\cdots-2y+1)^2$ <br> $\cdot\,(y^{28}-12y^{27}+\cdots-2657y+64)$ |