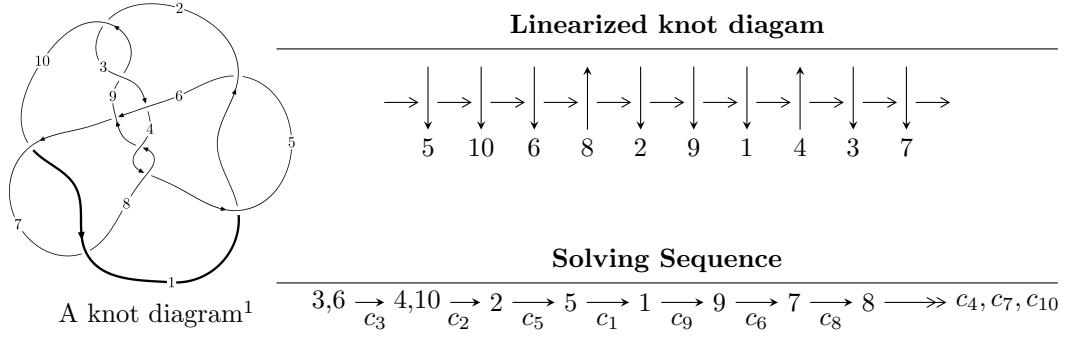


## 10<sub>111</sub> ( $K_{10a98}$ )



### Ideals for irreducible components<sup>2</sup> of $X_{\text{par}}$

$$\begin{aligned}
 I_1^u &= \langle 39480u^{13} - 1274u^{12} + \dots + 154933b - 318297, -39480u^{13} + 1274u^{12} + \dots + 154933a + 163364, \\
 &\quad u^{14} + u^{13} + u^{12} + u^{11} + 9u^{10} + 5u^9 + 5u^8 + 5u^7 + 17u^6 + 5u^5 + 7u^4 - 4u^3 + 8u^2 - u + 1 \rangle \\
 I_2^u &= \langle -8.27934 \times 10^{37}u^{29} - 3.87934 \times 10^{38}u^{28} + \dots + 1.76638 \times 10^{35}b + 2.60429 \times 10^{38}, \\
 &\quad -2.70329 \times 10^{43}u^{29} - 1.27006 \times 10^{44}u^{28} + \dots + 1.82589 \times 10^{40}a + 8.84680 \times 10^{43}, \\
 &\quad u^{30} + 5u^{29} + \dots - 14u - 1 \rangle \\
 I_3^u &= \langle 4u^5 - 2u^4 - u^3 + b + 16u - 8, -4u^5 + 2u^4 + u^3 + a - 16u + 9, u^6 - u^5 + 4u^2 - 4u + 1 \rangle
 \end{aligned}$$

\* 3 irreducible components of  $\dim_{\mathbb{C}} = 0$ , with total 50 representations.

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<sup>1</sup>The image of knot diagram is generated by the software “**Draw programme**” developed by Andrew Bartholomew(<http://www.layer8.co.uk/math/draw/index.htm#Running-draw>), where we modified some parts for our purpose(<https://github.com/CATsTAILs/LinksPainter>).

<sup>2</sup>All coefficients of polynomials are rational numbers. But the coefficients are sometimes approximated in decimal forms when there is not enough margin.

$$\text{I. } I_1^u = \langle 39480u^{13} - 1274u^{12} + \cdots + 154933b - 318297, -3.95 \times 10^4 u^{13} + 1274u^{12} + \cdots + 1.55 \times 10^5 a + 1.63 \times 10^5, u^{14} + u^{13} + \cdots - u + 1 \rangle$$

(i) **Arc colorings**

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_{10} = \begin{pmatrix} 0.254820u^{13} - 0.00822291u^{12} + \cdots + 3.57261u - 1.05442 \\ -0.254820u^{13} + 0.00822291u^{12} + \cdots - 3.57261u + 2.05442 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -1.23639u^{13} - 1.16081u^{12} + \cdots - 8.80020u + 1.50958 \\ 1.49121u^{13} + 1.15259u^{12} + \cdots + 12.3728u - 2.56399 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -1.23092u^{13} - 1.01347u^{12} + \cdots - 9.83592u + 2.03566 \\ 1.69744u^{13} + 1.28920u^{12} + \cdots + 14.8569u - 3.30753 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0.116528u^{13} - 0.0612071u^{12} + \cdots + 2.26064u - 0.978836 \\ -0.445618u^{13} - 0.321436u^{12} + \cdots - 4.37795u + 1.58789 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 1 \\ -0.254820u^{13} + 0.00822291u^{12} + \cdots - 3.57261u + 2.05442 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u \\ -0.263043u^{13} - 0.260306u^{12} + \cdots - 0.799597u - 0.254820 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 0.254820u^{13} - 0.00822291u^{12} + \cdots + 3.57261u - 1.05442 \\ -0.252083u^{13} + 0.0818935u^{12} + \cdots - 4.09047u + 2.31746 \end{pmatrix}$$

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

(iii) **Cusp Shapes** =  $\frac{319153}{154933}u^{13} + \frac{874852}{154933}u^{12} + \cdots + \frac{171234}{154933}u + \frac{3427848}{154933}$

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

| Crossings                   | u-Polynomials at each crossing  |
|-----------------------------|---|
| $c_1, c_5, c_7$<br>$c_{10}$ | $u^{14} - 6u^{12} + 15u^{10} - u^9 - 15u^8 + 2u^7 + 3u^6 - u^3 + 4u^2 + 2u + 1$ |
| $c_2, c_9$                  | $u^{14} - 10u^{13} + \cdots - 60u + 8$  |
| $c_3, c_6$                  | $u^{14} - u^{13} + \cdots + u + 1$  |
| $c_4, c_8$                  | $u^{14} - 11u^{13} + \cdots - 224u + 32$  |

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

| Crossings                   | Riley Polynomials at each crossing        |
|-----------------------------|---|
| $c_1, c_5, c_7$<br>$c_{10}$ | $y^{14} - 12y^{13} + \cdots + 4y + 1$     |
| $c_2, c_9$                  | $y^{14} + 4y^{13} + \cdots + 240y + 64$   |
| $c_3, c_6$                  | $y^{14} + y^{13} + \cdots + 15y + 1$      |
| $c_4, c_8$                  | $y^{14} + 5y^{13} + \cdots + 512y + 1024$ |

(vi) Complex Volumes and Cusp Shapes

| Solutions to $I_1^u$        | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape             |
|-----------------------------|---------------------------------------|------------------------|
| $u = -0.480433 + 0.861641I$ |                                       |                        |
| $a = 0.839666 + 1.114140I$  | $3.38735 - 0.25005I$                  | $-0.72285 + 2.46287I$  |
| $b = 0.160334 - 1.114140I$  |                                       |                        |
| $u = -0.480433 - 0.861641I$ |                                       |                        |
| $a = 0.839666 - 1.114140I$  | $3.38735 + 0.25005I$                  | $-0.72285 - 2.46287I$  |
| $b = 0.160334 + 1.114140I$  |                                       |                        |
| $u = -1.048940 + 0.652179I$ |                                       |                        |
| $a = -0.187430 - 0.232557I$ | $-10.88730 + 7.87015I$                | $-12.80126 - 5.10311I$ |
| $b = 1.187430 + 0.232557I$  |                                       |                        |
| $u = -1.048940 - 0.652179I$ |                                       |                        |
| $a = -0.187430 + 0.232557I$ | $-10.88730 - 7.87015I$                | $-12.80126 + 5.10311I$ |
| $b = 1.187430 - 0.232557I$  |                                       |                        |
| $u = 0.486006 + 0.497659I$  |                                       |                        |
| $a = 0.703941 + 0.328567I$  | $-0.46723 - 1.34385I$                 | $-4.53324 + 5.44435I$  |
| $b = 0.296059 - 0.328567I$  |                                       |                        |
| $u = 0.486006 - 0.497659I$  |                                       |                        |
| $a = 0.703941 - 0.328567I$  | $-0.46723 + 1.34385I$                 | $-4.53324 - 5.44435I$  |
| $b = 0.296059 + 0.328567I$  |                                       |                        |
| $u = 0.775295 + 1.049040I$  |                                       |                        |
| $a = 0.248822 - 1.259320I$  | $-1.57595 - 8.21733I$                 | $-8.00559 + 6.90533I$  |
| $b = 0.75118 + 1.25932I$    |                                       |                        |
| $u = 0.775295 - 1.049040I$  |                                       |                        |
| $a = 0.248822 + 1.259320I$  | $-1.57595 + 8.21733I$                 | $-8.00559 - 6.90533I$  |
| $b = 0.75118 - 1.25932I$    |                                       |                        |
| $u = 0.96587 + 1.05626I$    |                                       |                        |
| $a = 0.706527 - 1.007890I$  | $1.24241 - 4.01184I$                  | $-4.00908 + 1.51637I$  |
| $b = 0.293473 + 1.007890I$  |                                       |                        |
| $u = 0.96587 - 1.05626I$    |                                       |                        |
| $a = 0.706527 + 1.007890I$  | $1.24241 + 4.01184I$                  | $-4.00908 - 1.51637I$  |
| $b = 0.293473 - 1.007890I$  |                                       |                        |

| Solutions to $I_1^u$       | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape            |
|----------------------------|---------------------------------------|-----------------------|
| $u = 0.025861 + 0.375115I$ |                                       |                       |
| $a = -0.66482 + 1.30083I$  | $-3.88016 - 0.30866I$                 | $21.1851 - 1.2071I$   |
| $b = 1.66482 - 1.30083I$   |                                       |                       |
| $u = 0.025861 - 0.375115I$ |                                       |                       |
| $a = -0.66482 - 1.30083I$  | $-3.88016 + 0.30866I$                 | $21.1851 + 1.2071I$   |
| $b = 1.66482 + 1.30083I$   |                                       |                       |
| $u = -1.22366 + 1.15195I$  |                                       |                       |
| $a = 0.353292 + 1.290880I$ | $-7.5584 + 14.2650I$                  | $-9.61306 - 7.45903I$ |
| $b = 0.64671 - 1.29088I$   |                                       |                       |
| $u = -1.22366 - 1.15195I$  |                                       |                       |
| $a = 0.353292 - 1.290880I$ | $-7.5584 - 14.2650I$                  | $-9.61306 + 7.45903I$ |
| $b = 0.64671 + 1.29088I$   |                                       |                       |

$$\text{II. } I_2^u = \langle -8.28 \times 10^{37}u^{29} - 3.88 \times 10^{38}u^{28} + \dots + 1.77 \times 10^{35}b + 2.60 \times 10^{38}, -2.70 \times 10^{43}u^{29} - 1.27 \times 10^{44}u^{28} + \dots + 1.83 \times 10^{40}a + 8.85 \times 10^{43}, u^{30} + 5u^{29} + \dots - 14u - 1 \rangle$$

(i) **Arc colorings**

$$\begin{aligned} a_3 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_6 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\ a_4 &= \begin{pmatrix} 1 \\ u^2 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} 1480.53u^{29} + 6955.82u^{28} + \dots - 52108.0u - 4845.20 \\ 468.718u^{29} + 2196.21u^{28} + \dots - 16062.1u - 1474.36 \end{pmatrix} \\ a_2 &= \begin{pmatrix} -1085.37u^{29} - 5070.52u^{28} + \dots + 36285.0u + 3322.75 \\ 350.689u^{29} + 1665.42u^{28} + \dots - 13806.5u - 1340.83 \end{pmatrix} \\ a_5 &= \begin{pmatrix} -991.168u^{29} - 4565.91u^{28} + \dots + 28334.6u + 2429.77 \\ 398.530u^{29} + 1884.97u^{28} + \dots - 15091.1u - 1445.96 \end{pmatrix} \\ a_1 &= \begin{pmatrix} -1780.35u^{29} - 8495.89u^{28} + \dots + 72515.7u + 7062.23 \\ -181.114u^{29} - 833.946u^{28} + \dots + 5098.47u + 429.698 \end{pmatrix} \\ a_9 &= \begin{pmatrix} 1949.25u^{29} + 9152.03u^{28} + \dots - 68170.1u - 6319.56 \\ 468.718u^{29} + 2196.21u^{28} + \dots - 16062.1u - 1474.36 \end{pmatrix} \\ a_7 &= \begin{pmatrix} 1388.04u^{29} + 6649.23u^{28} + \dots - 58366.7u - 5729.66 \\ 268.310u^{29} + 1245.03u^{28} + \dots - 8303.63u - 734.682 \end{pmatrix} \\ a_8 &= \begin{pmatrix} 1659.04u^{29} + 7795.68u^{28} + \dots - 58477.9u - 5439.43 \\ 437.990u^{29} + 2052.51u^{28} + \dots - 15026.1u - 1379.63 \end{pmatrix} \end{aligned}$$

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

(iii) **Cusp Shapes** =  $-1720.55u^{29} - 8153.31u^{28} + \dots + 66031.6u + 6330.33$

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

| Crossings                   | u-Polynomials at each crossing         |
|-----------------------------|--|
| $c_1, c_5, c_7$<br>$c_{10}$ | $u^{30} + u^{29} + \cdots + 212u + 11$ |
| $c_2, c_9$                  | $(u^5 + u^4 + 2u^3 + u^2 + u + 1)^6$   |
| $c_3, c_6$                  | $u^{30} - 5u^{29} + \cdots + 14u - 1$  |
| $c_4, c_8$                  | $(u^3 + u^2 + 2u + 1)^{10}$            |

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

| Crossings                   | Riley Polynomials at each crossing          |
|-----------------------------|---|
| $c_1, c_5, c_7$<br>$c_{10}$ | $y^{30} - 25y^{29} + \cdots - 32360y + 121$ |
| $c_2, c_9$                  | $(y^5 + 3y^4 + 4y^3 + y^2 - y - 1)^6$       |
| $c_3, c_6$                  | $y^{30} - 5y^{29} + \cdots - 56y + 1$       |
| $c_4, c_8$                  | $(y^3 + 3y^2 + 2y - 1)^{10}$                |

(vi) Complex Volumes and Cusp Shapes

| Solutions to $I_2^u$  | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape             |
|---|---------------------------------------|------------------------|
| $u = -0.711013 + 0.598106I$<br>$a = -0.891374 - 0.831846I$<br>$b = -0.455697 + 1.200150I$ | $2.05122 + 4.40083I$                  | $-2.23618 - 3.49859I$  |
| $u = -0.711013 - 0.598106I$<br>$a = -0.891374 + 0.831846I$<br>$b = -0.455697 - 1.200150I$ | $2.05122 - 4.40083I$                  | $-2.23618 + 3.49859I$  |
| $u = -1.108120 + 0.043065I$<br>$a = 0.244564 - 0.869058I$<br>$b = 0.339110 - 0.822375I$   | $-7.62983 - 1.29754I$                 | $-12.99464 - 1.45120I$ |
| $u = -1.108120 - 0.043065I$<br>$a = 0.244564 + 0.869058I$<br>$b = 0.339110 + 0.822375I$   | $-7.62983 + 1.29754I$                 | $-12.99464 + 1.45120I$ |
| $u = 0.750590 + 0.816532I$<br>$a = -0.254359 + 0.536218I$<br>$b = -0.766826$              | $-5.55785 - 2.82812I$                 | $-12.02861 + 2.97945I$ |
| $u = 0.750590 - 0.816532I$<br>$a = -0.254359 - 0.536218I$<br>$b = -0.766826$              | $-5.55785 + 2.82812I$                 | $-12.02861 - 2.97945I$ |
| $u = 0.723473 + 0.513234I$<br>$a = 0.226305 - 0.956455I$<br>$b = -0.455697 + 1.200150I$   | $-2.08637 + 1.57271I$                 | $-8.76544 - 0.51914I$  |
| $u = 0.723473 - 0.513234I$<br>$a = 0.226305 + 0.956455I$<br>$b = -0.455697 - 1.200150I$   | $-2.08637 - 1.57271I$                 | $-8.76544 + 0.51914I$  |
| $u = 0.375132 + 0.793055I$<br>$a = -0.26221 - 2.41312I$<br>$b = 0.339110 + 0.822375I$     | $-3.49225 - 1.53058I$                 | $-6.46537 + 4.43065I$  |
| $u = 0.375132 - 0.793055I$<br>$a = -0.26221 + 2.41312I$<br>$b = 0.339110 - 0.822375I$     | $-3.49225 + 1.53058I$                 | $-6.46537 - 4.43065I$  |

| Solutions to $I_2^u$        | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape           |
|-----------------------------|---------------------------------------|----------------------|
| $u = 0.953025 + 0.838377I$  | $-2.08637 - 7.22895I$                 | 0                    |
| $a = -1.10687 + 1.14990I$   |                                       |                      |
| $b = -0.455697 - 1.200150I$ |                                       |                      |
| $u = 0.953025 - 0.838377I$  | $-2.08637 + 7.22895I$                 | 0                    |
| $a = -1.10687 - 1.14990I$   |                                       |                      |
| $b = -0.455697 + 1.200150I$ |                                       |                      |
| $u = -1.204330 + 0.431350I$ | $-5.55785 + 2.82812I$                 | 0                    |
| $a = -0.000782 + 0.403066I$ |                                       |                      |
| $b = -0.766826$             |                                       |                      |
| $u = -1.204330 - 0.431350I$ | $-5.55785 - 2.82812I$                 | 0                    |
| $a = -0.000782 - 0.403066I$ |                                       |                      |
| $b = -0.766826$             |                                       |                      |
| $u = 0.737499 + 1.067560I$  | $2.05122 - 4.40083I$                  | 0                    |
| $a = -0.235020 + 1.389000I$ |                                       |                      |
| $b = -0.455697 - 1.200150I$ |                                       |                      |
| $u = 0.737499 - 1.067560I$  | $2.05122 + 4.40083I$                  | 0                    |
| $a = -0.235020 - 1.389000I$ |                                       |                      |
| $b = -0.455697 + 1.200150I$ |                                       |                      |
| $u = 0.680032$              |                                       |                      |
| $a = 0.340860$              | $-1.42027$                            | $-5.49930$           |
| $b = -0.766826$             |                                       |                      |
| $u = 1.290400 + 0.535753I$  | $-3.49225 + 1.53058I$                 | 0                    |
| $a = -0.308791 + 0.195205I$ |                                       |                      |
| $b = 0.339110 - 0.822375I$  |                                       |                      |
| $u = 1.290400 - 0.535753I$  | $-3.49225 - 1.53058I$                 | 0                    |
| $a = -0.308791 - 0.195205I$ |                                       |                      |
| $b = 0.339110 + 0.822375I$  |                                       |                      |
| $u = -0.320748 + 0.034597I$ | $-7.62983 - 4.35870I$                 | $-12.9946 + 7.4101I$ |
| $a = 5.85652 - 4.23753I$    |                                       |                      |
| $b = 0.339110 + 0.822375I$  |                                       |                      |

| Solutions to $I_2^u$        | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape            |
|-----------------------------|---------------------------------------|-----------------------|
| $u = -0.320748 - 0.034597I$ |                                       |                       |
| $a = 5.85652 + 4.23753I$    | $-7.62983 + 4.35870I$                 | $-12.9946 - 7.4101I$  |
| $b = 0.339110 - 0.822375I$  |                                       |                       |
| $u = -0.291032 + 0.058576I$ |                                       |                       |
| $a = -1.59228 - 3.37585I$   | $-2.08637 + 1.57271I$                 | $-8.76544 - 0.51914I$ |
| $b = -0.455697 + 1.200150I$ |                                       |                       |
| $u = -0.291032 - 0.058576I$ |                                       |                       |
| $a = -1.59228 + 3.37585I$   | $-2.08637 - 1.57271I$                 | $-8.76544 + 0.51914I$ |
| $b = -0.455697 - 1.200150I$ |                                       |                       |
| $u = -0.289671$             |                                       |                       |
| $a = -1.58078$              | $-1.42027$                            | $-5.49930$            |
| $b = -0.766826$             |                                       |                       |
| $u = -0.57394 + 1.89944I$   |                                       |                       |
| $a = -0.156804 + 1.350680I$ | $-7.62983 - 1.29754I$                 | $0$                   |
| $b = 0.339110 - 0.822375I$  |                                       |                       |
| $u = -0.57394 - 1.89944I$   |                                       |                       |
| $a = -0.156804 - 1.350680I$ | $-7.62983 + 1.29754I$                 | $0$                   |
| $b = 0.339110 + 0.822375I$  |                                       |                       |
| $u = -1.44704 + 1.35792I$   |                                       |                       |
| $a = -0.183612 - 1.220710I$ | $-2.08637 + 7.22895I$                 | $0$                   |
| $b = -0.455697 + 1.200150I$ |                                       |                       |
| $u = -1.44704 - 1.35792I$   |                                       |                       |
| $a = -0.183612 + 1.220710I$ | $-2.08637 - 7.22895I$                 | $0$                   |
| $b = -0.455697 - 1.200150I$ |                                       |                       |
| $u = -1.86908 + 1.30976I$   |                                       |                       |
| $a = -0.215319 - 0.754139I$ | $-7.62983 - 4.35870I$                 | $0$                   |
| $b = 0.339110 + 0.822375I$  |                                       |                       |
| $u = -1.86908 - 1.30976I$   |                                       |                       |
| $a = -0.215319 + 0.754139I$ | $-7.62983 + 4.35870I$                 | $0$                   |
| $b = 0.339110 - 0.822375I$  |                                       |                       |

$$\text{III. } I_3^u = \langle 4u^5 - 2u^4 - u^3 + b + 16u - 8, -4u^5 + 2u^4 + u^3 + a - 16u + 9, u^6 - u^5 + 4u^2 - 4u + 1 \rangle$$

(i) **Arc colorings**

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

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

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

$$a_{10} = \begin{pmatrix} 4u^5 - 2u^4 - u^3 + 16u - 9 \\ -4u^5 + 2u^4 + u^3 - 16u + 8 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -3u^5 + 2u^4 + u^3 - 12u + 8 \\ -u^5 - 4u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -5u^5 + 3u^4 + u^3 + u^2 - 20u + 12 \\ u - 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 4u^5 - 2u^4 - u^3 + 15u - 8 \\ -2u^5 + u^4 - 7u + 3 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -1 \\ -4u^5 + 2u^4 + u^3 - 16u + 8 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u \\ -2u^5 + u^4 - 7u + 4 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 4u^5 - 2u^4 - u^3 - u^2 + 16u - 9 \\ -3u^5 + u^4 + u^3 - 12u + 6 \end{pmatrix}$$

(ii) **Obstruction class = 1**

(iii) **Cusp Shapes** =  $-25u^5 + 10u^4 + 7u^3 + 5u^2 - 96u + 32$

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

| Crossings     | u-Polynomials at each crossing          |
|---------------|---|
| $c_1, c_7$    | $u^6 + 2u^5 - u^4 - 4u^3 - u^2 + u + 1$ |
| $c_2$         | $u^6 + u^5 + u^4 - u^2 - 1$             |
| $c_3, c_6$    | $u^6 - u^5 + 4u^2 - 4u + 1$             |
| $c_4$         | $u^6 + u^4 - u^2 - u - 1$               |
| $c_5, c_{10}$ | $u^6 - 2u^5 - u^4 + 4u^3 - u^2 - u + 1$ |
| $c_8$         | $u^6 + u^4 - u^2 + u - 1$               |
| $c_9$         | $u^6 - u^5 + u^4 - u^2 - 1$             |

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

| Crossings                   | Riley Polynomials at each crossing           |
|-----------------------------|--|
| $c_1, c_5, c_7$<br>$c_{10}$ | $y^6 - 6y^5 + 15y^4 - 16y^3 + 7y^2 - 3y + 1$ |
| $c_2, c_9$                  | $y^6 + y^5 - y^4 - 4y^3 - y^2 + 2y + 1$      |
| $c_3, c_6$                  | $y^6 - y^5 + 8y^4 - 6y^3 + 16y^2 - 8y + 1$   |
| $c_4, c_8$                  | $y^6 + 2y^5 - y^4 - 4y^3 - y^2 + y + 1$      |

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

| Solutions to $I_3^u$        | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape            |
|-----------------------------|---------------------------------------|-----------------------|
| $u = 1.008100 + 0.927438I$  |                                       |                       |
| $a = -0.516513 + 1.114980I$ | $0.45357 - 5.18068I$                  | $-8.71093 + 6.15331I$ |
| $b = -0.483487 - 1.114980I$ |                                       |                       |
| $u = 1.008100 - 0.927438I$  |                                       |                       |
| $a = -0.516513 - 1.114980I$ | $0.45357 + 5.18068I$                  | $-8.71093 - 6.15331I$ |
| $b = -0.483487 + 1.114980I$ |                                       |                       |
| $u = 0.584070$              |                                       |                       |
| $a = 0.185012$              | $-2.13209$                            | $-21.5060$            |
| $b = -1.18501$              |                                       |                       |
| $u = -1.02499 + 0.98915I$   |                                       |                       |
| $a = -1.124000 - 0.785288I$ | $-7.16447 - 3.17324I$                 | $-9.24905 + 1.07022I$ |
| $b = 0.124001 + 0.785288I$  |                                       |                       |
| $u = -1.02499 - 0.98915I$   |                                       |                       |
| $a = -1.124000 + 0.785288I$ | $-7.16447 + 3.17324I$                 | $-9.24905 - 1.07022I$ |
| $b = 0.124001 - 0.785288I$  |                                       |                       |
| $u = 0.449699$              |                                       |                       |
| $a = -1.90398$              | $-4.18532$                            | $-9.57420$            |
| $b = 0.903984$              |                                       |                       |

#### IV. u-Polynomials

| Crossings     | u-Polynomials at each crossing  |
|---------------|---|
| $c_1, c_7$    | $(u^6 + 2u^5 - u^4 - 4u^3 - u^2 + u + 1)$ $\cdot (u^{14} - 6u^{12} + 15u^{10} - u^9 - 15u^8 + 2u^7 + 3u^6 - u^3 + 4u^2 + 2u + 1)$ $\cdot (u^{30} + u^{29} + \dots + 212u + 11)$ |
| $c_2$         | $(u^5 + u^4 + 2u^3 + u^2 + u + 1)^6(u^6 + u^5 + u^4 - u^2 - 1)$ $\cdot (u^{14} - 10u^{13} + \dots - 60u + 8)$   |
| $c_3, c_6$    | $(u^6 - u^5 + 4u^2 - 4u + 1)(u^{14} - u^{13} + \dots + u + 1)$ $\cdot (u^{30} - 5u^{29} + \dots + 14u - 1)$   |
| $c_4$         | $(u^3 + u^2 + 2u + 1)^{10}(u^6 + u^4 - u^2 - u - 1)$ $\cdot (u^{14} - 11u^{13} + \dots - 224u + 32)$  |
| $c_5, c_{10}$ | $(u^6 - 2u^5 - u^4 + 4u^3 - u^2 - u + 1)$ $\cdot (u^{14} - 6u^{12} + 15u^{10} - u^9 - 15u^8 + 2u^7 + 3u^6 - u^3 + 4u^2 + 2u + 1)$ $\cdot (u^{30} + u^{29} + \dots + 212u + 11)$ |
| $c_8$         | $(u^3 + u^2 + 2u + 1)^{10}(u^6 + u^4 - u^2 + u - 1)$ $\cdot (u^{14} - 11u^{13} + \dots - 224u + 32)$  |
| $c_9$         | $(u^5 + u^4 + 2u^3 + u^2 + u + 1)^6(u^6 - u^5 + u^4 - u^2 - 1)$ $\cdot (u^{14} - 10u^{13} + \dots - 60u + 8)$   |

## V. Riley Polynomials

| Crossings                   | Riley Polynomials at each crossing  |
|-----------------------------|---|
| $c_1, c_5, c_7$<br>$c_{10}$ | $(y^6 - 6y^5 + \dots - 3y + 1)(y^{14} - 12y^{13} + \dots + 4y + 1)$ $\cdot (y^{30} - 25y^{29} + \dots - 32360y + 121)$      |
| $c_2, c_9$                  | $(y^5 + 3y^4 + 4y^3 + y^2 - y - 1)^6(y^6 + y^5 - y^4 - 4y^3 - y^2 + 2y + 1)$ $\cdot (y^{14} + 4y^{13} + \dots + 240y + 64)$ |
| $c_3, c_6$                  | $(y^6 - y^5 + \dots - 8y + 1)(y^{14} + y^{13} + \dots + 15y + 1)$ $\cdot (y^{30} - 5y^{29} + \dots - 56y + 1)$              |
| $c_4, c_8$                  | $(y^3 + 3y^2 + 2y - 1)^{10}(y^6 + 2y^5 - y^4 - 4y^3 - y^2 + y + 1)$ $\cdot (y^{14} + 5y^{13} + \dots + 512y + 1024)$        |