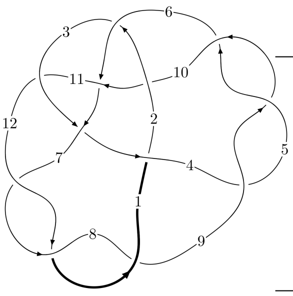
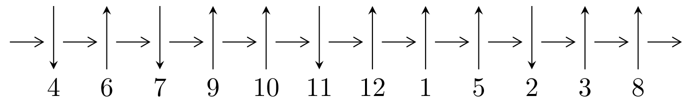
# $12a_{0869}$ ($K12a_{0869}$)




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

$$7,12 \xrightarrow[c_7]{} 8 \xrightarrow[c_{12}]{} 1,4 \xrightarrow[c_1]{} 2 \xrightarrow[c_8]{} 9 \xrightarrow[c_4]{} 5 \xrightarrow[c_3]{} 3 \xrightarrow[c_{11}]{} 11 \xrightarrow[c_6]{} 6 \xrightarrow[c_{10}]{} 10 \twoheadrightarrow c_2, c_5, c_9$$

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

$$I_1^u = \langle -959u^{21} + 8u^{20} + \cdots + 6991b - 10004,\ 12718u^{21} + 1556u^{20} + \cdots + 6991a + 39666,\\ u^{22} - 14u^{20} + \cdots + 2u - 1\rangle$$

$$I_2^u = \langle -1.39235 \times 10^{140}u^{77} + 6.32801 \times 10^{139}u^{76} + \cdots + 1.95985 \times 10^{140}b - 2.88234 \times 10^{142},\\ 6.63657 \times 10^{141}u^{77} - 2.91804 \times 10^{141}u^{76} + \cdots + 8.42734 \times 10^{141}a + 1.55560 \times 10^{144},\\ u^{78} - 2u^{77} + \cdots + 136u - 43\rangle$$

$$I_3^u = \langle -u^7 + 4u^5 - 5u^3 - u^2 + b + u + 1,\ u^7 - u^6 - 4u^5 + 4u^4 + 5u^3 - 4u^2 + a - u,\\ u^8 - 5u^6 + 8u^4 + u^3 - 3u^2 - 2u - 1\rangle$$

$$I_4^u = \langle 2u^7 - 4u^6 - 5u^5 + 11u^4 - u^3 - 3u^2 + b + 5u - 3,\ -3u^7 + 6u^6 + 8u^5 - 18u^4 + u^3 + 8u^2 + a - 8u + 4,\\ u^8 - 3u^7 - u^6 + 9u^5 - 5u^4 - 3u^3 + 4u^2 - 4u + 1\rangle$$

$$I_5^u = \langle -u^3 + b + 2u - 2,\ 2u^3 + 2u^2 + a - 3u - 1,\ u^4 + 2u^3 - u^2 - 2u + 1\rangle$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 120 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.** $I_1^u = \langle -959u^{21} + 8u^{20} + \cdots + 6991b - 10004,\ 12718u^{21} + 1556u^{20} + \cdots + 6991a + 39666,\ u^{22} - 14u^{20} + \cdots + 2u - 1\rangle$

**(i) Arc colorings**

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -1.81920u^{21} - 0.222572u^{20} + \cdots - 0.747533u - 5.67387 \\ 0.137176u^{21} - 0.00114433u^{20} + \cdots + 2.09898u + 1.43098 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -1.06737u^{21} - 1.55314u^{20} + \cdots + 1.34659u - 1.79874 \\ 0.447575u^{21} + 0.521814u^{20} + \cdots - 0.136890u + 2.47189 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^2 + 1 \\ u^4 - 2u^2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -1.81920u^{21} - 0.222572u^{20} + \cdots + 0.252467u - 5.67387 \\ 0.137176u^{21} - 0.00114433u^{20} + \cdots + 2.09898u + 1.43098 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -1.68202u^{21} - 0.223716u^{20} + \cdots + 1.35145u - 4.24288 \\ 0.137176u^{21} - 0.00114433u^{20} + \cdots + 2.09898u + 1.43098 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 1.25819u^{21} + 0.476470u^{20} + \cdots - 0.714633u + 2.67458 \\ 0.733085u^{21} - 0.0321842u^{20} + \cdots + 1.28394u + 0.746388 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 2.00458u^{21} + 1.20956u^{20} + \cdots - 2.62652u + 5.45129 \\ -0.439565u^{21} - 0.405092u^{20} + \cdots - 1.95952u - 1.43213 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 0.222572u^{21} - 0.185381u^{20} + \cdots + 2.03547u + 2.81920 \\ 0.00114433u^{21} + 0.302389u^{20} + \cdots - 1.15663u - 0.137176 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -\frac{44709}{6991}u^{21} - \frac{15293}{6991}u^{20} + \cdots - \frac{71860}{6991}u - \frac{27948}{6991}$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{22} - 18u^{21} + \cdots - 1136u + 64$ |
| $c_2, c_{11}$ | $u^{22} + u^{21} + \cdots - 5u + 1$ |
| $c_3, c_{10}$ | $u^{22} + u^{21} + \cdots - 6u^2 + 1$ |
| $c_4, c_5, c_7$ <br> $c_8, c_9, c_{12}$ | $u^{22} - 14u^{20} + \cdots - 2u - 1$ |
| $c_6$ | $u^{22} - 11u^{21} + \cdots - 60u + 8$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{22} + 94y^{20} + \cdots - 435456y + 4096$ |
| $c_2, c_{11}$ | $y^{22} - 17y^{21} + \cdots - 21y + 1$ |
| $c_3, c_{10}$ | $y^{22} + 3y^{21} + \cdots - 12y + 1$ |
| $c_4, c_5, c_7$ $c_8, c_9, c_{12}$ | $y^{22} - 28y^{21} + \cdots - 26y + 1$ |
| $c_6$ | $y^{22} - 5y^{21} + \cdots - 1168y + 64$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.620777 + 0.699897I$<br>$a = -0.444548 - 0.589843I$<br>$b = -0.975241 + 0.924812I$ | $0.28538 + 9.52077I$ | $5.54038 - 10.18443I$ |
| $u = 0.620777 - 0.699897I$<br>$a = -0.444548 + 0.589843I$<br>$b = -0.975241 - 0.924812I$ | $0.28538 - 9.52077I$ | $5.54038 + 10.18443I$ |
| $u = -0.543470 + 0.600696I$<br>$a = 0.287139 - 0.161144I$<br>$b = 0.162955 + 0.882903I$ | $2.06715 - 1.71752I$ | $11.74245 + 5.24817I$ |
| $u = -0.543470 - 0.600696I$<br>$a = 0.287139 + 0.161144I$<br>$b = 0.162955 - 0.882903I$ | $2.06715 + 1.71752I$ | $11.74245 - 5.24817I$ |
| $u = -0.616708 + 0.440990I$<br>$a = -1.099990 - 0.644526I$<br>$b = 0.481328 - 0.475392I$ | $0.165742 + 1.104130I$ | $7.76898 - 0.48945I$ |
| $u = -0.616708 - 0.440990I$<br>$a = -1.099990 + 0.644526I$<br>$b = 0.481328 + 0.475392I$ | $0.165742 - 1.104130I$ | $7.76898 + 0.48945I$ |
| $u = -0.688001$<br>$a = -0.0816056$<br>$b = -1.19439$ | $0.164932$ | $13.5940$ |
| $u = 1.47278 + 0.24907I$<br>$a = 0.639561 + 0.759382I$<br>$b = -0.461601 - 0.642988I$ | $8.63753 + 2.31951I$ | $6.80409 + 2.73514I$ |
| $u = 1.47278 - 0.24907I$<br>$a = 0.639561 - 0.759382I$<br>$b = -0.461601 + 0.642988I$ | $8.63753 - 2.31951I$ | $6.80409 - 2.73514I$ |
| $u = -0.479173$<br>$a = -0.636420$<br>$b = -0.286181$ | $0.816563$ | $11.9280$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.52797 + 0.02574I$<br>$a = -0.26700 + 1.87402I$<br>$b = -0.755859 - 1.019260I$ | $14.2021 - 4.2069I$ | $12.43580 + 5.16700I$ |
| $u = 1.52797 - 0.02574I$<br>$a = -0.26700 - 1.87402I$<br>$b = -0.755859 + 1.019260I$ | $14.2021 + 4.2069I$ | $12.43580 - 5.16700I$ |
| $u = 0.357972 + 0.207376I$<br>$a = 2.77142 + 1.51494I$<br>$b = 0.416028 - 0.835216I$ | $1.27965 + 3.66433I$ | $15.0331 - 10.2324I$ |
| $u = 0.357972 - 0.207376I$<br>$a = 2.77142 - 1.51494I$<br>$b = 0.416028 + 0.835216I$ | $1.27965 - 3.66433I$ | $15.0331 + 10.2324I$ |
| $u = -1.59329 + 0.06074I$<br>$a = -0.215693 + 0.896227I$<br>$b = 0.973496 - 0.770109I$ | $15.7122 - 0.5131I$ | $13.84357 - 0.14086I$ |
| $u = -1.59329 - 0.06074I$<br>$a = -0.215693 - 0.896227I$<br>$b = 0.973496 + 0.770109I$ | $15.7122 + 0.5131I$ | $13.84357 + 0.14086I$ |
| $u = -1.60156$<br>$a = 0.521347$<br>$b = 0.540591$ | $15.7785$ | $15.7070$ |
| $u = 1.63321 + 0.25925I$<br>$a = -0.25245 + 1.62291I$<br>$b = 1.21002 - 1.23023I$ | $15.4855 + 16.9496I$ | $10.93128 - 7.84709I$ |
| $u = 1.63321 - 0.25925I$<br>$a = -0.25245 - 1.62291I$<br>$b = 1.21002 + 1.23023I$ | $15.4855 - 16.9496I$ | $10.93128 + 7.84709I$ |
| $u = -1.64240 + 0.25438I$<br>$a = -0.026921 + 1.355890I$<br>$b = -0.57852 - 1.30048I$ | $17.0516 - 8.7183I$ | $13.8836 + 4.8126I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -1.64240 - 0.25438I$<br>$a = -0.026921 - 1.355890I$<br>$b = -0.57852 + 1.30048I$ | $17.0516 + 8.7183I$ | $13.8836 - 4.8126I$ |
| $u = \quad 0.335041$<br>$a = -2.58634$<br>$b = \quad 0.994760$ | $-2.04032$ | $-5.19480$ |

**II.** $\boldsymbol{I_2^u = \langle -1.39 \times 10^{140}u^{77} + 6.33 \times 10^{139}u^{76} + \cdots + 1.96 \times 10^{140}b - 2.88 \times 10^{142},\ 6.64 \times 10^{141}u^{77} - 2.92 \times 10^{141}u^{76} + \cdots + 8.43 \times 10^{141}a + 1.56 \times 10^{144},\ u^{78} - 2u^{77} + \cdots + 136u - 43\rangle}$

**(i) Arc colorings**

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

$$a_{12} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

$$a_4 = \begin{pmatrix} -0.787505u^{77} + 0.346259u^{76} + \cdots + 138.255u - 184.590 \\ 0.710437u^{77} - 0.322883u^{76} + \cdots - 127.381u + 147.069 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -2.36422u^{77} + 3.85705u^{76} + \cdots + 112.872u - 279.876 \\ -0.790784u^{77} + 0.595382u^{76} + \cdots + 100.423u - 123.684 \end{pmatrix}$$

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

$$a_5 = \begin{pmatrix} -0.510367u^{77} + 0.427296u^{76} + \cdots + 63.1806u - 113.051 \\ 0.677512u^{77} - 0.534118u^{76} + \cdots - 97.2276u + 120.573 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -0.0770682u^{77} + 0.0233760u^{76} + \cdots + 10.8743u - 37.5207 \\ 0.710437u^{77} - 0.322883u^{76} + \cdots - 127.381u + 147.069 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -1.01566u^{77} + 2.13882u^{76} + \cdots - 56.8939u - 95.6811 \\ 1.96720u^{77} - 4.01917u^{76} + \cdots - 55.8889u + 149.806 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 4.21314u^{77} - 6.18031u^{76} + \cdots - 353.473u + 453.881 \\ 1.88902u^{77} - 0.366972u^{76} + \cdots - 387.504u + 407.067 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.555335u^{77} - 0.588323u^{76} + \cdots - 78.0022u + 39.3661 \\ 3.00021u^{77} - 6.16888u^{76} + \cdots - 82.8724u + 226.957 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 15.0721u^{77} - 15.2353u^{76} + \cdots - 1631.33u + 2376.87$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u^{39} + 9u^{38} + \cdots + 1162u + 266)^2$ |
| $c_2, c_{11}$ | $u^{78} - u^{77} + \cdots - 7654u + 739$ |
| $c_3, c_{10}$ | $u^{78} - 4u^{77} + \cdots - 41u - 113$ |
| $c_4, c_5, c_7$<br>$c_8, c_9, c_{12}$ | $u^{78} + 2u^{77} + \cdots - 136u - 43$ |
| $c_6$ | $(u^{39} + 6u^{38} + \cdots - 3u - 1)^2$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $(y^{39} + 31y^{38} + \cdots - 924056y - 70756)^2$ |
| $c_2, c_{11}$ | $y^{78} - 19y^{77} + \cdots - 160648484y + 546121$ |
| $c_3, c_{10}$ | $y^{78} + 2y^{77} + \cdots + 263643y + 12769$ |
| $c_4, c_5, c_7$<br>$c_8, c_9, c_{12}$ | $y^{78} - 86y^{77} + \cdots - 86350y + 1849$ |
| $c_6$ | $(y^{39} - 8y^{38} + \cdots + 11y - 1)^2$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.878599 + 0.472127I$<br>$a = 0.761236 + 0.006801I$<br>$b = 0.799415 + 0.070464I$ | $7.26602 - 0.78546I$ | 0 |
| $u = 0.878599 - 0.472127I$<br>$a = 0.761236 - 0.006801I$<br>$b = 0.799415 - 0.070464I$ | $7.26602 + 0.78546I$ | 0 |
| $u = 0.400608 + 0.847774I$<br>$a = 0.265006 - 0.493852I$<br>$b = -0.524818 - 0.571018I$ | $-0.41212 - 4.48592I$ | 0 |
| $u = 0.400608 - 0.847774I$<br>$a = 0.265006 + 0.493852I$<br>$b = -0.524818 + 0.571018I$ | $-0.41212 + 4.48592I$ | 0 |
| $u = -0.937174$<br>$a = 1.51645$<br>$b = -1.58228$ | $1.61912$ | 0 |
| $u = -0.499526 + 0.717695I$<br>$a = -0.754574 + 0.328335I$<br>$b = -0.554095 - 0.691522I$ | $1.72667 - 2.76108I$ | 0 |
| $u = -0.499526 - 0.717695I$<br>$a = -0.754574 - 0.328335I$<br>$b = -0.554095 + 0.691522I$ | $1.72667 + 2.76108I$ | 0 |
| $u = -0.783766 + 0.812694I$<br>$a = 0.329548 - 0.719810I$<br>$b = 0.973644 + 0.916548I$ | $7.4945 - 12.9029I$ | 0 |
| $u = -0.783766 - 0.812694I$<br>$a = 0.329548 + 0.719810I$<br>$b = 0.973644 - 0.916548I$ | $7.4945 + 12.9029I$ | 0 |
| $u = -0.620809 + 0.562611I$<br>$a = -0.41860 + 1.38503I$<br>$b = -0.861580 - 0.980365I$ | $3.93141 - 5.03531I$ | 0 |

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.620809 - 0.562611I$<br>$a = -0.41860 - 1.38503I$<br>$b = -0.861580 + 0.980365I$ | $3.93141 + 5.03531I$ | $0$ |
| $u = -0.317001 + 1.163500I$<br>$a = -0.118895 - 0.184699I$<br>$b = 0.561708 - 0.589908I$ | $5.97998 + 6.68209I$ | $0$ |
| $u = -0.317001 - 1.163500I$<br>$a = -0.118895 + 0.184699I$<br>$b = 0.561708 + 0.589908I$ | $5.97998 - 6.68209I$ | $0$ |
| $u = 0.677706 + 1.009700I$<br>$a = 0.401326 + 0.381179I$<br>$b = 0.565142 - 0.694366I$ | $8.39691 + 2.42469I$ | $0$ |
| $u = 0.677706 - 1.009700I$<br>$a = 0.401326 - 0.381179I$<br>$b = 0.565142 + 0.694366I$ | $8.39691 - 2.42469I$ | $0$ |
| $u = 0.841597 + 0.916305I$<br>$a = -0.126486 - 0.257887I$<br>$b = -0.211832 + 0.732575I$ | $8.85565 + 4.48611I$ | $0$ |
| $u = 0.841597 - 0.916305I$<br>$a = -0.126486 + 0.257887I$<br>$b = -0.211832 - 0.732575I$ | $8.85565 - 4.48611I$ | $0$ |
| $u = -0.322712 + 0.643423I$<br>$a = 0.350653 + 0.136104I$<br>$b = -0.829719 + 0.618378I$ | $3.04287 + 0.97727I$ | $4.00000 + 0.I$ |
| $u = -0.322712 - 0.643423I$<br>$a = 0.350653 - 0.136104I$<br>$b = -0.829719 - 0.618378I$ | $3.04287 - 0.97727I$ | $4.00000 + 0.I$ |
| $u = 0.292751 + 0.656074I$<br>$a = 1.13118 + 1.51679I$<br>$b = 0.587768 - 0.046192I$ | $5.50541 + 4.90955I$ | $4.00000 - 6.21885I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.292751 - 0.656074I$<br>$a = 1.13118 - 1.51679I$<br>$b = 0.587768 + 0.046192I$ | $5.50541 - 4.90955I$ | $4.00000 + 6.21885I$ |
| $u = 0.697366 + 0.077892I$<br>$a = 1.98372 - 0.61577I$<br>$b = -0.080857 + 0.333280I$ | $7.69383 - 0.20004I$ | $14.04950 - 0.81267I$ |
| $u = 0.697366 - 0.077892I$<br>$a = 1.98372 + 0.61577I$<br>$b = -0.080857 - 0.333280I$ | $7.69383 + 0.20004I$ | $14.04950 + 0.81267I$ |
| $u = 1.30141$<br>$a = -0.0545808$<br>$b = 1.31020$ | $1.61912$ | $0$ |
| $u = -0.687585 + 0.025628I$<br>$a = -0.0831851 + 0.0374082I$<br>$b = -1.193040 - 0.025967I$ | $0.164937$ | $13.54531 + 0.I$ |
| $u = -0.687585 - 0.025628I$<br>$a = -0.0831851 - 0.0374082I$<br>$b = -1.193040 + 0.025967I$ | $0.164937$ | $13.54531 + 0.I$ |
| $u = 0.524261 + 0.441733I$<br>$a = 0.306573 + 1.053310I$<br>$b = 0.976668 - 0.787130I$ | $-1.42813 + 2.90883I$ | $-0.86909 - 8.81897I$ |
| $u = 0.524261 - 0.441733I$<br>$a = 0.306573 - 1.053310I$<br>$b = 0.976668 + 0.787130I$ | $-1.42813 - 2.90883I$ | $-0.86909 + 8.81897I$ |
| $u = -0.619957 + 0.241745I$<br>$a = 0.599856 + 0.984205I$<br>$b = 0.607492 - 1.169200I$ | $8.47744 - 6.16342I$ | $12.6402 + 6.3717I$ |
| $u = -0.619957 - 0.241745I$<br>$a = 0.599856 - 0.984205I$<br>$b = 0.607492 + 1.169200I$ | $8.47744 + 6.16342I$ | $12.6402 - 6.3717I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.416423 + 0.505098I$<br>$a = 0.692855 - 0.298181I$<br>$b = 0.998092 + 0.980397I$ | $-0.41212 - 4.48592I$ | $4.00000 + 9.50012I$ |
| $u = -0.416423 - 0.505098I$<br>$a = 0.692855 + 0.298181I$<br>$b = 0.998092 - 0.980397I$ | $-0.41212 + 4.48592I$ | $4.00000 - 9.50012I$ |
| $u = -1.386030 + 0.009998I$<br>$a = -0.447622 + 1.236780I$<br>$b = 0.223101 - 0.511859I$ | $3.04287 + 0.97727I$ | $0$ |
| $u = -1.386030 - 0.009998I$<br>$a = -0.447622 - 1.236780I$<br>$b = 0.223101 + 0.511859I$ | $3.04287 - 0.97727I$ | $0$ |
| $u = -0.250999 + 0.528179I$<br>$a = -0.64407 + 1.62571I$<br>$b = -0.650925 - 0.017019I$ | $-1.42813 - 2.90883I$ | $-0.86909 + 8.81897I$ |
| $u = -0.250999 - 0.528179I$<br>$a = -0.64407 - 1.62571I$<br>$b = -0.650925 + 0.017019I$ | $-1.42813 + 2.90883I$ | $-0.86909 - 8.81897I$ |
| $u = 1.42440 + 0.11009I$<br>$a = 0.21108 - 1.52515I$<br>$b = -0.212514 + 0.389730I$ | $3.93141 + 5.03531I$ | $0$ |
| $u = 1.42440 - 0.11009I$<br>$a = 0.21108 + 1.52515I$<br>$b = -0.212514 - 0.389730I$ | $3.93141 - 5.03531I$ | $0$ |
| $u = -1.47071 + 0.16976I$<br>$a = 0.02924 - 1.73933I$<br>$b = 0.208151 + 0.324331I$ | $11.26620 - 7.70313I$ | $0$ |
| $u = -1.47071 - 0.16976I$<br>$a = 0.02924 + 1.73933I$<br>$b = 0.208151 - 0.324331I$ | $11.26620 + 7.70313I$ | $0$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.50105+0.07381I$<br>$a=\ \ 0.16363-1.73769I$<br>$b=\ \ 0.831975+1.040000I$ | $7.57373-4.71354I$ | 0 |
| $u=-1.50105-0.07381I$<br>$a=\ \ 0.16363+1.73769I$<br>$b=\ \ 0.831975-1.040000I$ | $7.57373+4.71354I$ | 0 |
| $u=\ \ 1.50689+0.13292I$<br>$a=-0.57785+1.84820I$<br>$b=\ \ 1.43408-1.52823I$ | $5.97998+6.68209I$ | 0 |
| $u=\ \ 1.50689-0.13292I$<br>$a=-0.57785-1.84820I$<br>$b=\ \ 1.43408+1.52823I$ | $5.97998-6.68209I$ | 0 |
| $u=-1.52031+0.02429I$<br>$a=\ \ 0.41183+1.96209I$<br>$b=-0.92775-1.82852I$ | $8.39691+2.42469I$ | 0 |
| $u=-1.52031-0.02429I$<br>$a=\ \ 0.41183-1.96209I$<br>$b=-0.92775+1.82852I$ | $8.39691-2.42469I$ | 0 |
| $u=-1.52220+0.00111I$<br>$a=\ \ 1.033490+0.891914I$<br>$b=-2.01729-0.75252I$ | $13.10170+0.51825I$ | 0 |
| $u=-1.52220-0.00111I$<br>$a=\ \ 1.033490-0.891914I$<br>$b=-2.01729+0.75252I$ | $13.10170-0.51825I$ | 0 |
| $u=\ \ 1.52470+0.17283I$<br>$a=\ \ 0.17190+1.67399I$<br>$b=\ \ 0.42027-1.57556I$ | $8.85565+4.48611I$ | 0 |
| $u=\ \ 1.52470-0.17283I$<br>$a=\ \ 0.17190-1.67399I$<br>$b=\ \ 0.42027+1.57556I$ | $8.85565-4.48611I$ | 0 |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.53498 + 0.05067I$<br>$a = 0.031004 - 0.599115I$<br>$b = -0.664705 + 0.481914I$ | $7.69383 + 0.20004I$ | $0$ |
| $u = 1.53498 - 0.05067I$<br>$a = 0.031004 + 0.599115I$<br>$b = -0.664705 - 0.481914I$ | $7.69383 - 0.20004I$ | $0$ |
| $u = 0.456519 + 0.068241I$<br>$a = -0.935816 - 0.494654I$<br>$b = -0.349780 + 1.220370I$ | $1.72667 - 2.76108I$ | $13.6219 + 4.5455I$ |
| $u = 0.456519 - 0.068241I$<br>$a = -0.935816 + 0.494654I$<br>$b = -0.349780 - 1.220370I$ | $1.72667 + 2.76108I$ | $13.6219 - 4.5455I$ |
| $u = 0.299577 + 0.344619I$<br>$a = -0.66963 + 1.35775I$<br>$b = 0.815822 + 0.126759I$ | $-1.89357$ | $-2.70742 + 0.I$ |
| $u = 0.299577 - 0.344619I$<br>$a = -0.66963 - 1.35775I$<br>$b = 0.815822 - 0.126759I$ | $-1.89357$ | $-2.70742 + 0.I$ |
| $u = 1.54424 + 0.05173I$<br>$a = 0.99834 - 1.20923I$<br>$b = -1.54824 + 0.97543I$ | $7.26602 + 0.78546I$ | $0$ |
| $u = 1.54424 - 0.05173I$<br>$a = 0.99834 + 1.20923I$<br>$b = -1.54824 - 0.97543I$ | $7.26602 - 0.78546I$ | $0$ |
| $u = -1.54178 + 0.12147I$<br>$a = -0.53568 - 1.87198I$<br>$b = 1.09374 + 1.36438I$ | $5.50541 - 4.90955I$ | $0$ |
| $u = -1.54178 - 0.12147I$<br>$a = -0.53568 + 1.87198I$<br>$b = 1.09374 - 1.36438I$ | $5.50541 + 4.90955I$ | $0$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.53887 + 0.22306I$<br>$a = -0.02826 - 1.42027I$<br>$b = -0.950908 + 1.004730I$ | $8.47744 + 6.16342I$ | $0$ |
| $u = 1.53887 - 0.22306I$<br>$a = -0.02826 + 1.42027I$<br>$b = -0.950908 - 1.004730I$ | $8.47744 - 6.16342I$ | $0$ |
| $u = 1.57176 + 0.06808I$<br>$a = -0.67201 - 1.65866I$<br>$b = 1.13908 + 1.58816I$ | $15.9502 + 7.3009I$ | $0$ |
| $u = 1.57176 - 0.06808I$<br>$a = -0.67201 + 1.65866I$<br>$b = 1.13908 - 1.58816I$ | $15.9502 - 7.3009I$ | $0$ |
| $u = -1.56399 + 0.22067I$<br>$a = 0.33159 + 1.70584I$<br>$b = -1.25296 - 1.32410I$ | $7.4945 - 12.9029I$ | $0$ |
| $u = -1.56399 - 0.22067I$<br>$a = 0.33159 - 1.70584I$<br>$b = -1.25296 + 1.32410I$ | $7.4945 + 12.9029I$ | $0$ |
| $u = 1.57094 + 0.16644I$<br>$a = 0.20882 - 2.09117I$<br>$b = -0.79192 + 1.34950I$ | $11.26620 + 7.70313I$ | $0$ |
| $u = 1.57094 - 0.16644I$<br>$a = 0.20882 + 2.09117I$<br>$b = -0.79192 - 1.34950I$ | $11.26620 - 7.70313I$ | $0$ |
| $u = -0.390732 + 0.140644I$<br>$a = -1.45524 - 4.29333I$<br>$b = -0.234921 + 0.913111I$ | $7.57373 + 4.71354I$ | $14.3655 - 4.2774I$ |
| $u = -0.390732 - 0.140644I$<br>$a = -1.45524 + 4.29333I$<br>$b = -0.234921 - 0.913111I$ | $7.57373 - 4.71354I$ | $14.3655 + 4.2774I$ |

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.380331 + 0.011403I$<br>$a = -2.25231 + 1.00243I$<br>$b = -1.252690 - 0.561132I$ | $6.53510 + 0.50706I$ | $14.0625 - 11.2444I$ |
| $u = 0.380331 - 0.011403I$<br>$a = -2.25231 - 1.00243I$<br>$b = -1.252690 + 0.561132I$ | $6.53510 - 0.50706I$ | $14.0625 + 11.2444I$ |
| $u = -1.62932 + 0.32096I$<br>$a = 0.007896 - 1.263720I$<br>$b = 0.973599 + 0.972165I$ | $15.9502 - 7.3009I$ | 0 |
| $u = -1.62932 - 0.32096I$<br>$a = 0.007896 + 1.263720I$<br>$b = 0.973599 - 0.972165I$ | $15.9502 + 7.3009I$ | 0 |
| $u = -1.69553 + 0.23371I$<br>$a = -0.089709 - 0.529312I$<br>$b = 0.469851 + 0.558658I$ | $6.53510 - 0.50706I$ | 0 |
| $u = -1.69553 - 0.23371I$<br>$a = -0.089709 + 0.529312I$<br>$b = 0.469851 - 0.558658I$ | $6.53510 + 0.50706I$ | 0 |
| $u = 1.89223 + 0.33820I$<br>$a = 0.123352 - 0.452574I$<br>$b = -0.432999 + 0.540506I$ | $13.10170 + 0.51825I$ | 0 |
| $u = 1.89223 - 0.33820I$<br>$a = 0.123352 + 0.452574I$<br>$b = -0.432999 - 0.540506I$ | $13.10170 - 0.51825I$ | 0 |

**III.** $\boldsymbol{I_3^u = \langle -u^7 + 4u^5 - 5u^3 - u^2 + b + u + 1,\ u^7 - u^6 - 4u^5 + 4u^4 + 5u^3 - 4u^2 + a - u,\ u^8 - 5u^6 + 8u^4 + u^3 - 3u^2 - 2u - 1\rangle}$

**(i) Arc colorings**

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u^7 + u^6 + 4u^5 - 4u^4 - 5u^3 + 4u^2 + u \\ u^7 - 4u^5 + 5u^3 + u^2 - u - 1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^2 - u \\ u^7 - 4u^5 + 4u^3 + u \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^2 + 1 \\ u^4 - 2u^2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u^7 + u^6 + 4u^5 - 4u^4 - 4u^3 + 4u^2 \\ u^7 - 5u^5 + 7u^3 + u^2 - u - 1 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u^6 - 4u^4 + 5u^2 - 1 \\ u^7 - 4u^5 + 5u^3 + u^2 - u - 1 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -u^5 + u^4 + 3u^3 - 3u^2 - 2u + 1 \\ -u^6 + 4u^4 - 4u^2 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -u^4 + u^3 + 3u^2 - 2u - 1 \\ u^7 - 5u^5 + 7u^3 - 2u - 1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} u^7 - u^6 - 4u^5 + 4u^4 + 5u^3 - 4u^2 - 2u \\ u + 1 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -u^7 - 3u^6 + 7u^5 + 7u^4 - 16u^3 + 11u + 8$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^8 - 5u^7 + 17u^6 - 36u^5 + 46u^4 - 42u^3 + 28u^2 - 13u + 5$ |
| $c_2, c_{11}$ | $u^8 - u^7 + u^6 + 3u^5 - u^4 - 4u^3 + 3u - 1$ |
| $c_3, c_{10}$ | $u^8 + u^7 + u^6 + u^5 - u^4 + u^3 - 2u^2 - 1$ |
| $c_4, c_5, c_7$<br>$c_8$ | $u^8 - 5u^6 + 8u^4 + u^3 - 3u^2 - 2u - 1$ |
| $c_6$ | $u^8 - 4u^7 + 6u^6 - u^5 - 7u^4 + 9u^3 - 3u^2 - u + 1$ |
| $c_9, c_{12}$ | $u^8 - 5u^6 + 8u^4 - u^3 - 3u^2 + 2u - 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^8+9y^7+21y^6-96y^5-76y^4+46y^3+152y^2+111y+25$ |
| $c_2, c_{11}$ | $y^8+y^7+5y^6-19y^5+29y^4-36y^3+26y^2-9y+1$ |
| $c_3, c_{10}$ | $y^8+y^7-3y^6-9y^5-7y^4+y^3+6y^2+4y+1$ |
| $c_4, c_5, c_7$ <br> $c_8, c_9, c_{12}$ | $y^8-10y^7+41y^6-86y^5+92y^4-39y^3-3y^2+2y+1$ |
| $c_6$ | $y^8-4y^7+14y^6-19y^5+25y^4-29y^3+13y^2-7y+1$ |

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

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.20754$<br>$a = -0.642094$<br>$b = 1.52836$ | $2.74185$ | $12.9220$ |
| $u = -0.707725$<br>$a = 1.56906$<br>$b = -0.942535$ | $-1.25808$ | $6.11200$ |
| $u = 1.43029 + 0.31228I$<br>$a = -0.724269 - 0.732499I$<br>$b = 0.205718 + 0.735138I$ | $9.18866 + 2.66551I$ | $17.8547 - 3.7342I$ |
| $u = 1.43029 - 0.31228I$<br>$a = -0.724269 + 0.732499I$<br>$b = 0.205718 - 0.735138I$ | $9.18866 - 2.66551I$ | $17.8547 + 3.7342I$ |
| $u = -0.170510 + 0.455537I$<br>$a = -1.52393 - 0.15367I$<br>$b = -0.391872 - 0.855920I$ | $0.63948 - 3.35759I$ | $4.34775 + 6.26225I$ |
| $u = -0.170510 - 0.455537I$<br>$a = -1.52393 + 0.15367I$<br>$b = -0.391872 + 0.855920I$ | $0.63948 + 3.35759I$ | $4.34775 - 6.26225I$ |
| $u = -1.50969 + 0.16872I$<br>$a = 0.28471 - 2.07483I$<br>$b = 0.393243 + 1.090700I$ | $12.4590 - 7.8594I$ | $14.2808 + 7.0452I$ |
| $u = -1.50969 - 0.16872I$<br>$a = 0.28471 + 2.07483I$<br>$b = 0.393243 - 1.090700I$ | $12.4590 + 7.8594I$ | $14.2808 - 7.0452I$ |

**IV.**

$\boldsymbol{I^u_4 = \langle 2u^7 - 4u^6 + \cdots + b - 3,\ -3u^7 + 6u^6 + \cdots + a + 4,\ u^8 - 3u^7 + \cdots - 4u + 1\rangle}$

**(i) Arc colorings**

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 3u^7 - 6u^6 - 8u^5 + 18u^4 - u^3 - 8u^2 + 8u - 4 \\ -2u^7 + 4u^6 + 5u^5 - 11u^4 + u^3 + 3u^2 - 5u + 3 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^7 - 2u^6 - 3u^5 + 7u^4 + u^3 - 5u^2 + u - 2 \\ -2u^7 + 4u^6 + 5u^5 - 12u^4 + u^3 + 5u^2 - 4u + 3 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^2 + 1 \\ u^4 - 2u^2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} u^7 - 2u^6 - 3u^5 + 6u^4 - 2u^2 + 3u - 2 \\ -u^7 + 3u^6 + 2u^5 - 9u^4 + 2u^3 + 4u^2 - 3u + 2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u^7 - 2u^6 - 3u^5 + 7u^4 - 5u^2 + 3u - 1 \\ -2u^7 + 4u^6 + 5u^5 - 11u^4 + u^3 + 3u^2 - 5u + 3 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} u^7 - u^6 - 4u^5 + 2u^4 + 4u^3 + u^2 - u \\ -u^7 + 2u^6 + 3u^5 - 6u^4 - u^3 + 3u^2 - 2u + 1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} u^6 - u^5 - 4u^4 + 3u^3 + 3u^2 - u + 1 \\ -u^7 + u^6 + 4u^5 - 3u^4 - 3u^3 + u^2 - u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} u^6 - u^5 - 3u^4 + 2u^3 + u^2 + 2 \\ -u^7 + u^6 + 3u^5 - 2u^4 - u^3 - 2u - 1 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 13u^7 - 24u^6 - 41u^5 + 79u^4 + 10u^3 - 42u^2 + 31u - 15$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u^4 + u^2 - 3)^2$ |
| $c_2, c_{11}$ | $u^8 - 2u^7 + 2u^5 - u^4 + 3u^3 - 11u^2 + 8u - 1$ |
| $c_3, c_{10}$ | $u^8 + u^7 - 2u^6 + 4u^5 + 4u^4 - 7u^3 - 3u + 1$ |
| $c_4, c_5, c_7$ $c_8$ | $u^8 - 3u^7 - u^6 + 9u^5 - 5u^4 - 3u^3 + 4u^2 - 4u + 1$ |
| $c_6$ | $(u^4 - u^3 - u^2 - u + 1)^2$ |
| $c_9, c_{12}$ | $u^8 + 3u^7 - u^6 - 9u^5 - 5u^4 + 3u^3 + 4u^2 + 4u + 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $(y^2+y-3)^4$ |
| $c_2, c_{11}$ | $y^8-4y^7+6y^6-14y^5+19y^4-19y^3+75y^2-42y+1$ |
| $c_3, c_{10}$ | $y^8-5y^7+4y^6-18y^5+80y^4-29y^3-34y^2-9y+1$ |
| $c_4, c_5, c_7$<br>$c_8, c_9, c_{12}$ | $y^8-11y^7+45y^6-81y^5+49y^4+21y^3-18y^2-8y+1$ |
| $c_6$ | $(y^4-3y^3+y^2-3y+1)^2$ |

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

| Solutions to $I_4^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.04482$<br>$a=-0.422860$<br>$b=-1.05367$ | $-0.204105$ | $-8.34250$ |
| $u=0.148948+0.646816I$<br>$a=1.70704+0.17509I$<br>$b=0.189142-0.597506I$ | $6.57974+5.19078I$ | $8.80278-6.62004I$ |
| $u=0.148948-0.646816I$<br>$a=1.70704-0.17509I$<br>$b=0.189142+0.597506I$ | $6.57974-5.19078I$ | $8.80278+6.62004I$ |
| $u=1.50244+0.11193I$<br>$a=0.09573-1.92231I$<br>$b=-0.84053+1.35625I$ | $6.57974+5.19078I$ | $8.80278-6.62004I$ |
| $u=1.50244-0.11193I$<br>$a=0.09573+1.92231I$<br>$b=-0.84053-1.35625I$ | $6.57974-5.19078I$ | $8.80278+6.62004I$ |
| $u=-1.52514$<br>$a=-0.952048$<br>$b=2.01086$ | $13.3636$ | $18.7370$ |
| $u=0.322737$<br>$a=-2.12340$<br>$b=1.63436$ | $-0.204105$ | $-8.34250$ |
| $u=1.94445$<br>$a=-0.107239$<br>$b=-0.288778$ | $13.3636$ | $18.7370$ |

**V.** $\boldsymbol{I_5^u = \langle -u^3 + b + 2u - 2,\ 2u^3 + 2u^2 + a - 3u - 1,\ u^4 + 2u^3 - u^2 - 2u + 1\rangle}$

**(i) Arc colorings**

$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -2u^3 - 2u^2 + 3u + 1 \\ u^3 - 2u + 2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^2 + 2u - 1 \\ u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^2 + 1 \\ -2u^3 - u^2 + 2u - 1 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -2u^3 - 3u^2 + 2u + 3 \\ u^3 - u^2 - 3u + 2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u^3 - 2u^2 + u + 3 \\ u^3 - 2u + 2 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} u^3 + 2u^2 - 2u - 4 \\ u^3 + u^2 - u - 1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 2u^3 + 5u^2 - u - 5 \\ 2u^3 + 2u^2 - 2u - 1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 2u^3 + 4u^2 - u - 5 \\ 2u^2 + u - 2 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -18u^3 - 18u^2 + 18u + 8$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^4$ |
| $c_2, c_4, c_5$<br>$c_7, c_8, c_{11}$ | $(u^2 + u - 1)^2$ |
| $c_3, c_6, c_{10}$ | $(u + 1)^4$ |
| $c_9, c_{12}$ | $(u^2 - u - 1)^2$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^4$ |
| $c_2, c_4, c_5$<br>$c_7, c_8, c_9$<br>$c_{11}, c_{12}$ | $(y^2 - 3y + 1)^2$ |
| $c_3, c_6, c_{10}$ | $(y-1)^4$ |

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

| Solutions to $I^u_5$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.618034$<br>$a = 1.61803$<br>$b = 1.00000$ | 6.57974 | 8.00000 |
| $u = 0.618034$<br>$a = 1.61803$<br>$b = 1.00000$ | 6.57974 | 8.00000 |
| $u = -1.61803$<br>$a = -0.618034$<br>$b = 1.00000$ | 6.57974 | 8.00000 |
| $u = -1.61803$<br>$a = -0.618034$<br>$b = 1.00000$ | 6.57974 | 8.00000 |

## VI. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^4(u^4+u^2-3)^2$ <br> $\cdot(u^8-5u^7+17u^6-36u^5+46u^4-42u^3+28u^2-13u+5)$ <br> $\cdot(u^{22}-18u^{21}+\cdots-1136u+64)(u^{39}+9u^{38}+\cdots+1162u+266)^2$ |
| $c_2, c_{11}$ | $(u^2+u-1)^2(u^8-2u^7+2u^5-u^4+3u^3-11u^2+8u-1)$ <br> $\cdot(u^8-u^7+\cdots+3u-1)(u^{22}+u^{21}+\cdots-5u+1)$ <br> $\cdot(u^{78}-u^{77}+\cdots-7654u+739)$ |
| $c_3, c_{10}$ | $(u+1)^4(u^8+u^7-2u^6+4u^5+4u^4-7u^3-3u+1)$ <br> $\cdot(u^8+u^7+\cdots-2u^2-1)(u^{22}+u^{21}+\cdots-6u^2+1)$ <br> $\cdot(u^{78}-4u^{77}+\cdots-41u-113)$ |
| $c_4, c_5, c_7$ <br> $c_8$ | $(u^2+u-1)^2(u^8-5u^6+8u^4+u^3-3u^2-2u-1)$ <br> $\cdot(u^8-3u^7-u^6+9u^5-5u^4-3u^3+4u^2-4u+1)$ <br> $\cdot(u^{22}-14u^{20}+\cdots-2u-1)(u^{78}+2u^{77}+\cdots-136u-43)$ |
| $c_6$ | $(u+1)^4(u^4-u^3-u^2-u+1)^2$ <br> $\cdot(u^8-4u^7+6u^6-u^5-7u^4+9u^3-3u^2-u+1)$ <br> $\cdot(u^{22}-11u^{21}+\cdots-60u+8)(u^{39}+6u^{38}+\cdots-3u-1)^2$ |
| $c_9, c_{12}$ | $(u^2-u-1)^2(u^8-5u^6+8u^4-u^3-3u^2+2u-1)$ <br> $\cdot(u^8+3u^7-u^6-9u^5-5u^4+3u^3+4u^2+4u+1)$ <br> $\cdot(u^{22}-14u^{20}+\cdots-2u-1)(u^{78}+2u^{77}+\cdots-136u-43)$ |

## VII. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^4(y^2+y-3)^4$ <br> $\cdot\,(y^8+9y^7+21y^6-96y^5-76y^4+46y^3+152y^2+111y+25)$ <br> $\cdot\,(y^{22}+94y^{20}+\cdots-435456y+4096)$ <br> $\cdot\,(y^{39}+31y^{38}+\cdots-924056y-70756)^2$ |
| $c_2, c_{11}$ | $((y^2-3y+1)^2)(y^8-4y^7+\cdots-42y+1)$ <br> $\cdot\,(y^8+y^7+5y^6-19y^5+29y^4-36y^3+26y^2-9y+1)$ <br> $\cdot\,(y^{22}-17y^{21}+\cdots-21y+1)$ <br> $\cdot\,(y^{78}-19y^{77}+\cdots-160648484y+546121)$ |
| $c_3, c_{10}$ | $(y-1)^4(y^8-5y^7+4y^6-18y^5+80y^4-29y^3-34y^2-9y+1)$ <br> $\cdot\,(y^8+y^7-3y^6-9y^5-7y^4+y^3+6y^2+4y+1)$ <br> $\cdot\,(y^{22}+3y^{21}+\cdots-12y+1)(y^{78}+2y^{77}+\cdots+263643y+12769)$ |
| $c_4, c_5, c_7$ <br> $c_8, c_9, c_{12}$ | $(y^2-3y+1)^2$ <br> $\cdot\,(y^8-11y^7+45y^6-81y^5+49y^4+21y^3-18y^2-8y+1)$ <br> $\cdot\,(y^8-10y^7+41y^6-86y^5+92y^4-39y^3-3y^2+2y+1)$ <br> $\cdot\,(y^{22}-28y^{21}+\cdots-26y+1)(y^{78}-86y^{77}+\cdots-86350y+1849)$ |
| $c_6$ | $(y-1)^4(y^4-3y^3+y^2-3y+1)^2$ <br> $\cdot\,(y^8-4y^7+14y^6-19y^5+25y^4-29y^3+13y^2-7y+1)$ <br> $\cdot\,(y^{22}-5y^{21}+\cdots-1168y+64)(y^{39}-8y^{38}+\cdots+11y-1)^2$ |