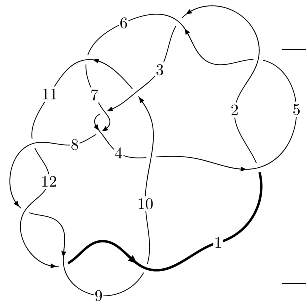
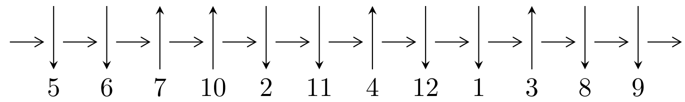
# $12a_{1215}$ $(K12a_{1215})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle 8.53148 \times 10^{61} u^{60} - 2.63560 \times 10^{62} u^{59} + \cdots + 2.09325 \times 10^{62} b - 3.25181 \times 10^{62},$$
$$- 2.51402 \times 10^{63} u^{60} + 8.62823 \times 10^{63} u^{59} + \cdots + 2.09325 \times 10^{62} a + 4.65225 \times 10^{63},\ u^{61} - 4u^{60} + \cdots - 2u -$$
$$I_2^u = \langle b + 1,\ a^2 + 2a - 1,\ u - 1 \rangle$$
$$I_3^u = \langle b - 1,\ a - 1,\ u - 1 \rangle$$

* 3 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 64 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.**

$\boldsymbol{I_1^u = \langle 8.53\times10^{61}u^{60} - 2.64\times10^{62}u^{59} + \cdots + 2.09\times10^{62}b - 3.25\times10^{62},\ -2.51\times10^{63}u^{60} + 8.63\times10^{63}u^{59} + \cdots + 2.09\times10^{62}a + 4.65\times10^{63},\ u^{61} - 4u^{60} + \cdots - 2u + 1\rangle}$

**(i) Arc colorings**

$$a_8 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_{12} = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_9 = \begin{pmatrix}1\\u^2\end{pmatrix}$$
$$a_1 = \begin{pmatrix}-u\\-u^3+u\end{pmatrix}$$
$$a_4 = \begin{pmatrix}12.0101u^{60} - 41.2193u^{59} + \cdots + 70.6756u - 22.2250\\-0.407570u^{60} + 1.25909u^{59} + \cdots + 1.20398u + 1.55347\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}-u^2+1\\-u^4+2u^2\end{pmatrix}$$
$$a_5 = \begin{pmatrix}7.23475u^{60} - 25.7491u^{59} + \cdots + 71.7086u - 14.2434\\-5.32045u^{60} + 17.2364u^{59} + \cdots - 2.23417u + 8.89499\end{pmatrix}$$
$$a_7 = \begin{pmatrix}12.4952u^{60} - 42.3313u^{59} + \cdots + 65.7255u - 22.9269\\-0.0236838u^{60} + 0.0968098u^{59} + \cdots + 2.88901u + 0.876791\end{pmatrix}$$
$$a_3 = \begin{pmatrix}-1.23183u^{60} + 2.22698u^{59} + \cdots + 10.3657u + 2.23332\\-1.82728u^{60} + 4.13641u^{59} + \cdots - 3.93849u + 1.46849\end{pmatrix}$$
$$a_{11} = \begin{pmatrix}u\\u\end{pmatrix}$$
$$a_6 = \begin{pmatrix}7.14430u^{60} - 25.0978u^{59} + \cdots + 62.9492u - 15.2793\\-5.37461u^{60} + 17.3303u^{59} + \cdots + 0.112788u + 8.52436\end{pmatrix}$$
$$a_2 = \begin{pmatrix}-8.78259u^{60} + 27.8143u^{59} + \cdots + 85.7450u + 9.78144\\5.73116u^{60} - 20.6175u^{59} + \cdots + 6.59694u - 9.06352\end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -112.270u^{60} + 381.730u^{59} + \cdots - 78.0643u + 180.153$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_5$ | $u^{61} + 5u^{60} + \cdots - 6u + 2$ |
| $c_3, c_7$ | $u^{61} - 2u^{60} + \cdots - 18u - 1$ |
| $c_4$ | $u^{61} + 14u^{60} + \cdots - 20506u + 253751$ |
| $c_6$ | $u^{61} - 16u^{60} + \cdots - 298u - 71$ |
| $c_8, c_9, c_{11}$<br>$c_{12}$ | $u^{61} + 4u^{60} + \cdots - 2u - 1$ |
| $c_{10}$ | $u^{61} + 2u^{60} + \cdots + 2u - 1$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_5$ | $y^{61} - 67y^{60} + \cdots + 68y - 4$ |
| $c_3, c_7$ | $y^{61} - 34y^{60} + \cdots + 206y - 1$ |
| $c_4$ | $y^{61} - 654y^{60} + \cdots - 751092018078y - 64389570001$ |
| $c_6$ | $y^{61} - 674y^{60} + \cdots + 204818y - 5041$ |
| $c_8, c_9, c_{11}$ $c_{12}$ | $y^{61} - 74y^{60} + \cdots - 98y - 1$ |
| $c_{10}$ | $y^{61} + 2y^{60} + \cdots + 102y - 1$ |

### (vi) Complex Volumes and Cusp Shapes

| Solutions to $I^u_1$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.746185 + 0.718329I$<br>$a = 0.782846 + 0.678292I$<br>$b = -0.677631 + 0.453749I$ | $-7.75122 - 2.10321I$ | 0 |
| $u = 0.746185 - 0.718329I$<br>$a = 0.782846 - 0.678292I$<br>$b = -0.677631 - 0.453749I$ | $-7.75122 + 2.10321I$ | 0 |
| $u = -0.967076 + 0.398497I$<br>$a = -0.312053 + 0.858947I$<br>$b = -0.128262 + 0.982641I$ | $-10.05700 + 6.18751I$ | 0 |
| $u = -0.967076 - 0.398497I$<br>$a = -0.312053 - 0.858947I$<br>$b = -0.128262 - 0.982641I$ | $-10.05700 - 6.18751I$ | 0 |
| $u = -0.814186 + 0.491497I$<br>$a = -0.27925 + 1.52542I$<br>$b = 1.238410 + 0.560509I$ | $0.54223 + 8.36059I$ | 0 |
| $u = -0.814186 - 0.491497I$<br>$a = -0.27925 - 1.52542I$<br>$b = 1.238410 - 0.560509I$ | $0.54223 - 8.36059I$ | 0 |
| $u = 1.07507$<br>$a = 1.21685$<br>$b = 0.0908214$ | $-6.55025$ | 0 |
| $u = -0.919328 + 0.600137I$<br>$a = 0.37668 - 1.39219I$<br>$b = -1.252060 - 0.562320I$ | $-6.64410 + 11.69040I$ | 0 |
| $u = -0.919328 - 0.600137I$<br>$a = 0.37668 + 1.39219I$<br>$b = -1.252060 + 0.562320I$ | $-6.64410 - 11.69040I$ | 0 |
| $u = 1.035030 + 0.370907I$<br>$a = 0.389492 - 0.314417I$<br>$b = 0.923451 + 0.227131I$ | $-0.586497 + 0.638281I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.035030 - 0.370907I$<br>$a = 0.389492 + 0.314417I$<br>$b = 0.923451 - 0.227131I$ | $-0.586497 - 0.638281I$ | $0$ |
| $u = -0.022074 + 0.884978I$<br>$a = 0.760719 + 0.081071I$<br>$b = -1.116060 + 0.470898I$ | $-3.89787 - 6.79256I$ | $0$ |
| $u = -0.022074 - 0.884978I$<br>$a = 0.760719 - 0.081071I$<br>$b = -1.116060 - 0.470898I$ | $-3.89787 + 6.79256I$ | $0$ |
| $u = -0.784824 + 0.190256I$<br>$a = 0.337219 - 1.157560I$<br>$b = 0.146848 - 1.059540I$ | $-2.79892 + 2.75782I$ | $-12.5719 - 8.9610I$ |
| $u = -0.784824 - 0.190256I$<br>$a = 0.337219 + 1.157560I$<br>$b = 0.146848 + 1.059540I$ | $-2.79892 - 2.75782I$ | $-12.5719 + 8.9610I$ |
| $u = 0.609495 + 0.503426I$<br>$a = -0.901420 - 0.967851I$<br>$b = 0.770857 - 0.254010I$ | $-0.88592 - 1.76991I$ | $-10.70286 + 7.10949I$ |
| $u = 0.609495 - 0.503426I$<br>$a = -0.901420 + 0.967851I$<br>$b = 0.770857 + 0.254010I$ | $-0.88592 + 1.76991I$ | $-10.70286 - 7.10949I$ |
| $u = -0.701647 + 0.311220I$<br>$a = -0.02710 - 1.68276I$<br>$b = -1.217220 - 0.602617I$ | $1.19274 + 3.49963I$ | $-4.99930 - 7.32299I$ |
| $u = -0.701647 - 0.311220I$<br>$a = -0.02710 + 1.68276I$<br>$b = -1.217220 + 0.602617I$ | $1.19274 - 3.49963I$ | $-4.99930 + 7.32299I$ |
| $u = -0.760212 + 0.073205I$<br>$a = 0.457673 - 0.810260I$<br>$b = 1.46334 - 0.51937I$ | $-5.23021 + 0.94975I$ | $-19.2405 - 6.6283I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.760212 - 0.073205I$<br>$a = 0.457673 + 0.810260I$<br>$b = 1.46334 + 0.51937I$ | $-5.23021 - 0.94975I$ | $-19.2405 + 6.6283I$ |
| $u = 1.086370 + 0.613746I$<br>$a = -0.145908 + 0.115784I$<br>$b = -0.881548 - 0.426034I$ | $-7.18543 + 1.66168I$ | $0$ |
| $u = 1.086370 - 0.613746I$<br>$a = -0.145908 - 0.115784I$<br>$b = -0.881548 + 0.426034I$ | $-7.18543 - 1.66168I$ | $0$ |
| $u = 0.740049$<br>$a = -0.465551$<br>$b = 0.111226$ | $-1.28803$ | $-7.85780$ |
| $u = 0.217246 + 0.690863I$<br>$a = 0.585924 + 0.057283I$<br>$b = -0.219547 - 0.599860I$ | $-6.43015 - 2.58923I$ | $-10.03195 + 2.41589I$ |
| $u = 0.217246 - 0.690863I$<br>$a = 0.585924 - 0.057283I$<br>$b = -0.219547 + 0.599860I$ | $-6.43015 + 2.58923I$ | $-10.03195 - 2.41589I$ |
| $u = -0.077144 + 0.695385I$<br>$a = -0.802000 + 0.155188I$<br>$b = 1.138390 - 0.392051I$ | $2.78020 - 4.38394I$ | $-1.53700 + 6.52121I$ |
| $u = -0.077144 - 0.695385I$<br>$a = -0.802000 - 0.155188I$<br>$b = 1.138390 + 0.392051I$ | $2.78020 + 4.38394I$ | $-1.53700 - 6.52121I$ |
| $u = 0.623061 + 0.152291I$<br>$a = -0.39384 + 3.45519I$<br>$b = -0.923865 + 0.057323I$ | $0.488805 - 0.376151I$ | $9.8390 - 11.6732I$ |
| $u = 0.623061 - 0.152291I$<br>$a = -0.39384 - 3.45519I$<br>$b = -0.923865 - 0.057323I$ | $0.488805 + 0.376151I$ | $9.8390 + 11.6732I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.624285$<br>$a = -36.9272$<br>$b = 1.01546$ | $-4.28785$ | $381.270$ |
| $u = 1.38099$<br>$a = -0.737085$<br>$b = -1.32091$ | $-1.75297$ | $0$ |
| $u = -0.146537 + 0.414207I$<br>$a = 0.599805 - 0.923128I$<br>$b = -1.184330 + 0.269776I$ | $2.80305 - 0.88629I$ | $0.82315 - 2.43589I$ |
| $u = -0.146537 - 0.414207I$<br>$a = 0.599805 + 0.923128I$<br>$b = -1.184330 - 0.269776I$ | $2.80305 + 0.88629I$ | $0.82315 + 2.43589I$ |
| $u = -1.60938 + 0.03982I$<br>$a = -0.35124 - 1.78283I$<br>$b = -0.934436 - 0.284454I$ | $-7.29629 + 1.06963I$ | $0$ |
| $u = -1.60938 - 0.03982I$<br>$a = -0.35124 + 1.78283I$<br>$b = -0.934436 + 0.284454I$ | $-7.29629 - 1.06963I$ | $0$ |
| $u = -1.61455 + 0.13274I$<br>$a = 0.040334 + 1.272930I$<br>$b = 0.970713 + 0.461820I$ | $-8.57121 + 4.07733I$ | $0$ |
| $u = -1.61455 - 0.13274I$<br>$a = 0.040334 - 1.272930I$<br>$b = 0.970713 - 0.461820I$ | $-8.57121 - 4.07733I$ | $0$ |
| $u = -1.62277$<br>$a = -5.90882$<br>$b = 1.08441$ | $-12.2377$ | $0$ |
| $u = 1.62759 + 0.06997I$<br>$a = -0.77048 + 1.60057I$<br>$b = -1.33629 + 0.86263I$ | $-6.89593 - 4.83384I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.62759 - 0.06997I$<br>$a = -0.77048 - 1.60057I$<br>$b = -1.33629 - 0.86263I$ | $-6.89593 + 4.83384I$ | 0 |
| $u = 1.64847 + 0.04117I$<br>$a = 0.30494 + 1.78899I$<br>$b = 0.22966 + 1.43807I$ | $-11.30720 - 3.57722I$ | 0 |
| $u = 1.64847 - 0.04117I$<br>$a = 0.30494 - 1.78899I$<br>$b = 0.22966 - 1.43807I$ | $-11.30720 + 3.57722I$ | 0 |
| $u = 1.64947 + 0.01439I$<br>$a = 1.12320 + 0.98345I$<br>$b = 1.74629 + 0.70290I$ | $-13.72070 - 1.24651I$ | 0 |
| $u = 1.64947 - 0.01439I$<br>$a = 1.12320 - 0.98345I$<br>$b = 1.74629 - 0.70290I$ | $-13.72070 + 1.24651I$ | 0 |
| $u = 1.65001 + 0.13394I$<br>$a = 0.50978 - 1.60334I$<br>$b = 1.31764 - 0.70879I$ | $-7.91826 - 10.72950I$ | 0 |
| $u = 1.65001 - 0.13394I$<br>$a = 0.50978 + 1.60334I$<br>$b = 1.31764 + 0.70879I$ | $-7.91826 + 10.72950I$ | 0 |
| $u = 0.123537 + 0.319863I$<br>$a = -1.021060 - 0.481385I$<br>$b = 0.014084 + 0.425125I$ | $-0.233943 - 0.995944I$ | $-4.40045 + 6.40501I$ |
| $u = 0.123537 - 0.319863I$<br>$a = -1.021060 + 0.481385I$<br>$b = 0.014084 - 0.425125I$ | $-0.233943 + 0.995944I$ | $-4.40045 - 6.40501I$ |
| $u = -1.65674 + 0.03555I$<br>$a = 0.362387 - 0.621120I$<br>$b = 0.449534 - 0.418699I$ | $-9.99487 + 0.25967I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -1.65674 - 0.03555I$<br>$a = 0.362387 + 0.621120I$<br>$b = 0.449534 + 0.418699I$ | $-9.99487 - 0.25967I$ | 0 |
| $u = -1.67432 + 0.22629I$<br>$a = 0.020974 - 1.105390I$<br>$b = -0.981377 - 0.576312I$ | $-16.0070 + 5.8071I$ | 0 |
| $u = -1.67432 - 0.22629I$<br>$a = 0.020974 + 1.105390I$<br>$b = -0.981377 + 0.576312I$ | $-16.0070 - 5.8071I$ | 0 |
| $u = 1.68740 + 0.17394I$<br>$a = -0.34603 + 1.54557I$<br>$b = -1.34464 + 0.64636I$ | $-15.5798 - 14.7360I$ | 0 |
| $u = 1.68740 - 0.17394I$<br>$a = -0.34603 - 1.54557I$<br>$b = -1.34464 - 0.64636I$ | $-15.5798 + 14.7360I$ | 0 |
| $u = 1.69400 + 0.10712I$<br>$a = -0.32490 - 1.47775I$<br>$b = -0.139744 - 1.234560I$ | $-19.3348 - 8.1899I$ | 0 |
| $u = 1.69400 - 0.10712I$<br>$a = -0.32490 + 1.47775I$<br>$b = -0.139744 + 1.234560I$ | $-19.3348 + 8.1899I$ | 0 |
| $u = -1.73658 + 0.10391I$<br>$a = -0.204374 + 0.738826I$<br>$b = -0.512503 + 0.660988I$ | $-17.3526 + 1.0261I$ | 0 |
| $u = -1.73658 - 0.10391I$<br>$a = -0.204374 - 0.738826I$<br>$b = -0.512503 - 0.660988I$ | $-17.3526 - 1.0261I$ | 0 |
| $u = -0.0120702 + 0.1398260I$<br>$a = -1.36141 + 8.95063I$<br>$b = 0.949803 + 0.197306I$ | $-3.17091 - 0.11856I$ | $-2.06650 - 1.49742I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -0.0120702 - 0.1398260I$<br>$a = -1.36141 - 8.95063I$<br>$b = \quad 0.949803 - 0.197306I$ | $-3.17091 + 0.11856I$ | $-2.06650 + 1.49742I$ |

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

**(i) Arc colorings**

$$a_8 = \begin{pmatrix}1\\0\end{pmatrix}$$

$$a_{12} = \begin{pmatrix}0\\1\end{pmatrix}$$

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

$$a_1 = \begin{pmatrix}-1\\0\end{pmatrix}$$

$$a_4 = \begin{pmatrix}a\\-1\end{pmatrix}$$

$$a_{10} = \begin{pmatrix}0\\1\end{pmatrix}$$

$$a_5 = \begin{pmatrix}a\\-a-1\end{pmatrix}$$

$$a_7 = \begin{pmatrix}-a+1\\1\end{pmatrix}$$

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

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

$$a_6 = \begin{pmatrix}1\\a+1\end{pmatrix}$$

$$a_2 = \begin{pmatrix}-a\\-2\end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -8$

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

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

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_5$ | $(y-2)^2$ |
| $c_3, c_7, c_8$<br>$c_9, c_{10}, c_{11}$<br>$c_{12}$ | $(y-1)^2$ |
| $c_4, c_6$ | $y^2 - 6y + 1$ |

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.00000$<br>$a = 0.414214$<br>$b = -1.00000$ | $-4.93480$ | $-8.00000$ |
| $u = 1.00000$<br>$a = -2.41421$<br>$b = -1.00000$ | $-4.93480$ | $-8.00000$ |

## III. $I_3^u = \langle b-1,\ a-1,\ u-1 \rangle$

**(i) Arc colorings**

$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

$a_{12} = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

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

$a_1 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

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

$a_{10} = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

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

$a_7 = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$

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

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

$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

$a_2 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$

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

**(iii) Cusp Shapes** $= 0$

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

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

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

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

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

| Solutions to $I_3^u$ | | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|---|
| $u =$ | 1.00000 | | |
| $a =$ | 1.00000 | 0 | 0 |
| $b =$ | 1.00000 | | |

## IV. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_5$ | $u(u^2-2)(u^{61}+5u^{60}+\cdots-6u+2)$ |
| $c_3$ | $((u-1)^2)(u+1)(u^{61}-2u^{60}+\cdots-18u-1)$ |
| $c_4$ | $(u-1)(u^2+2u-1)(u^{61}+14u^{60}+\cdots-20506u+253751)$ |
| $c_6$ | $(u-1)(u^2-2u-1)(u^{61}-16u^{60}+\cdots-298u-71)$ |
| $c_7$ | $(u-1)(u+1)^2(u^{61}-2u^{60}+\cdots-18u-1)$ |
| $c_8, c_9$ | $((u-1)^3)(u^{61}+4u^{60}+\cdots-2u-1)$ |
| $c_{10}$ | $(u-1)(u+1)^2(u^{61}+2u^{60}+\cdots+2u-1)$ |
| $c_{11}, c_{12}$ | $((u+1)^3)(u^{61}+4u^{60}+\cdots-2u-1)$ |

## V. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_5$ | $y(y-2)^2(y^{61} - 67y^{60} + \cdots + 68y - 4)$ |
| $c_3, c_7$ | $((y-1)^3)(y^{61} - 34y^{60} + \cdots + 206y - 1)$ |
| $c_4$ | $(y-1)(y^2 - 6y + 1)$ $\cdot (y^{61} - 654y^{60} + \cdots - 751092018078y - 64389570001)$ |
| $c_6$ | $(y-1)(y^2 - 6y + 1)(y^{61} - 674y^{60} + \cdots + 204818y - 5041)$ |
| $c_8, c_9, c_{11}$ $c_{12}$ | $((y-1)^3)(y^{61} - 74y^{60} + \cdots - 98y - 1)$ |
| $c_{10}$ | $((y-1)^3)(y^{61} + 2y^{60} + \cdots + 102y - 1)$ |