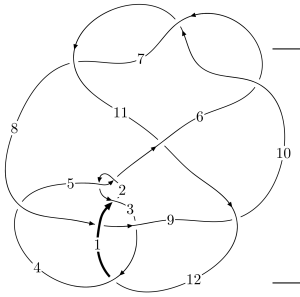
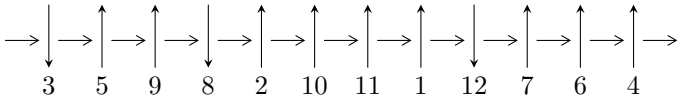
## $12a_{0190}$ $(K12a_{0190})$




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$I_1^u = \langle 2.67377 \times 10^{71} u^{109} - 5.17463 \times 10^{71} u^{108} + \cdots + 4.10404 \times 10^{71} b + 5.42742 \times 10^{71},$$
$$- 9.81616 \times 10^{71} u^{109} + 1.63462 \times 10^{72} u^{108} + \cdots + 2.05202 \times 10^{71} a - 7.57506 \times 10^{71},$$
$$u^{110} - 3u^{109} + \cdots + 8u - 1 \rangle$$
$$I_2^u = \langle 2b - a - 1,\ a^2 + 3,\ u + 1 \rangle$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 112 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.** $\boldsymbol{I_1^u = \langle 2.67 \times 10^{71} u^{109} - 5.17 \times 10^{71} u^{108} + \cdots + 4.10 \times 10^{71} b + 5.43 \times 10^{71},\ -9.82 \times 10^{71} u^{109} + 1.63 \times 10^{72} u^{108} + \cdots + 2.05 \times 10^{71} a - 7.58 \times 10^{71},\ u^{110} - 3u^{109} + \cdots + 8u - 1 \rangle}$

**(i) Arc colorings**

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

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

$$a_7 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} u \\ -u^3 + u \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} 4.78366u^{109} - 7.96591u^{108} + \cdots - 16.2149u + 3.69151 \\ -0.651497u^{109} + 1.26086u^{108} + \cdots + 10.2507u - 1.32246 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -u^3 + 2u \\ -u^3 + u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -14.0684u^{109} + 25.6715u^{108} + \cdots + 96.8437u - 13.6523 \\ -0.875843u^{109} + 1.66189u^{108} + \cdots + 11.1520u - 2.38600 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -13.3409u^{109} + 24.7528u^{108} + \cdots + 99.6560u - 15.0161 \\ -1.58470u^{109} + 2.94901u^{108} + \cdots + 15.5277u - 3.08164 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 2.29763u^{109} - 3.93043u^{108} + \cdots - 9.56518u - 0.0651181 \\ 0.683728u^{109} - 0.838824u^{108} + \cdots - 0.453193u - 0.136203 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -11.4285u^{109} + 22.4100u^{108} + \cdots + 92.0592u - 13.8943 \\ 3.48936u^{109} - 5.81189u^{108} + \cdots - 16.2207u + 1.70832 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u^7 - 4u^5 + 4u^3 \\ u^7 - 3u^5 + 2u^3 + u \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= 82.9086u^{109} - 149.372u^{108} + \cdots - 520.277u + 76.7509$

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

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{110} + 42u^{109} + \cdots - 41u + 1$ |
| $c_2, c_5$ | $u^{110} + 2u^{109} + \cdots - 5u + 1$ |
| $c_3$ | $u^{110} + 2u^{109} + \cdots + 102407u - 11029$ |
| $c_4$ | $u^{110} + 4u^{109} + \cdots - 120613u + 16231$ |
| $c_6, c_7, c_{10}$ | $u^{110} - 3u^{109} + \cdots + 8u - 1$ |
| $c_8$ | $u^{110} - 7u^{109} + \cdots + 4u^2 - 1$ |
| $c_9$ | $u^{110} - 21u^{109} + \cdots - 3668038u + 132529$ |
| $c_{11}$ | $u^{110} + 3u^{109} + \cdots - 60672u + 14144$ |
| $c_{12}$ | $u^{110} + 11u^{109} + \cdots - 4u + 4$ |

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

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{110} + 54y^{109} + \cdots - 249y + 1$ |
| $c_2, c_5$ | $y^{110} + 42y^{109} + \cdots - 41y + 1$ |
| $c_3$ | $y^{110} - 142y^{109} + \cdots - 10478723377y + 121638841$ |
| $c_4$ | $y^{110} - 90y^{109} + \cdots - 24945269141y + 263445361$ |
| $c_6, c_7, c_{10}$ | $y^{110} - 101y^{109} + \cdots - 8y + 1$ |
| $c_8$ | $y^{110} - 13y^{109} + \cdots - 8y + 1$ |
| $c_9$ | $y^{110} + 63y^{109} + \cdots + 713896960236y + 17563935841$ |
| $c_{11}$ | $y^{110} - 23y^{109} + \cdots - 7863217792y + 200052736$ |
| $c_{12}$ | $y^{110} - 15y^{109} + \cdots - 264y + 16$ |

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

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.042430 + 0.304760I$<br>$a = 0.69080 - 1.25394I$<br>$b = -0.490951 - 0.711163I$ | $1.73683 + 1.13820I$ | 0 |
| $u = 1.042430 - 0.304760I$<br>$a = 0.69080 + 1.25394I$<br>$b = -0.490951 + 0.711163I$ | $1.73683 - 1.13820I$ | 0 |
| $u = 0.709787 + 0.529952I$<br>$a = 0.094658 + 0.769532I$<br>$b = -0.612347 + 0.859094I$ | $3.00793 - 1.60581I$ | 0 |
| $u = 0.709787 - 0.529952I$<br>$a = 0.094658 - 0.769532I$<br>$b = -0.612347 - 0.859094I$ | $3.00793 + 1.60581I$ | 0 |
| $u = 0.633711 + 0.588741I$<br>$a = 0.668832 - 1.023250I$<br>$b = -0.615338 - 0.830644I$ | $3.09579 + 3.22900I$ | 0 |
| $u = 0.633711 - 0.588741I$<br>$a = 0.668832 + 1.023250I$<br>$b = -0.615338 + 0.830644I$ | $3.09579 - 3.22900I$ | 0 |
| $u = -1.136620 + 0.182300I$<br>$a = -0.14401 - 1.78120I$<br>$b = -0.070153 - 1.175620I$ | $-2.43949 - 3.79745I$ | 0 |
| $u = -1.136620 - 0.182300I$<br>$a = -0.14401 + 1.78120I$<br>$b = -0.070153 + 1.175620I$ | $-2.43949 + 3.79745I$ | 0 |
| $u = 0.356416 + 0.767376I$<br>$a = 0.95148 - 1.95836I$<br>$b = -0.613775 - 0.920723I$ | $1.82712 + 6.13376I$ | 0 |
| $u = 0.356416 - 0.767376I$<br>$a = 0.95148 + 1.95836I$<br>$b = -0.613775 + 0.920723I$ | $1.82712 - 6.13376I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.406637 + 0.732719I$<br>$a = -0.474129 + 0.329964I$<br>$b = -0.605411 + 0.753946I$ | $2.34496 + 1.30819I$ | 0 |
| $u = 0.406637 - 0.732719I$<br>$a = -0.474129 - 0.329964I$<br>$b = -0.605411 - 0.753946I$ | $2.34496 - 1.30819I$ | 0 |
| $u = -0.631106 + 0.523418I$<br>$a = 0.063499 - 0.929955I$<br>$b = -0.693197 - 1.091710I$ | $3.03970 + 10.45680I$ | 0 |
| $u = -0.631106 - 0.523418I$<br>$a = 0.063499 + 0.929955I$<br>$b = -0.693197 + 1.091710I$ | $3.03970 - 10.45680I$ | 0 |
| $u = -0.357210 + 0.732588I$<br>$a = 1.23601 + 2.38787I$<br>$b = -0.697975 + 1.114660I$ | $2.0566 - 14.7635I$ | 0 |
| $u = -0.357210 - 0.732588I$<br>$a = 1.23601 - 2.38787I$<br>$b = -0.697975 - 1.114660I$ | $2.0566 + 14.7635I$ | 0 |
| $u = -0.365820 + 0.709983I$<br>$a = -0.877302 + 0.431752I$<br>$b = -0.924219 - 0.528395I$ | $3.85584 - 8.80943I$ | $6.00000 + 6.63181I$ |
| $u = -0.365820 - 0.709983I$<br>$a = -0.877302 - 0.431752I$<br>$b = -0.924219 + 0.528395I$ | $3.85584 + 8.80943I$ | $6.00000 - 6.63181I$ |
| $u = 1.196860 + 0.125400I$<br>$a = 0.679124 - 0.504764I$<br>$b = -0.287494 - 0.066047I$ | $1.85030 + 0.56407I$ | 0 |
| $u = 1.196860 - 0.125400I$<br>$a = 0.679124 + 0.504764I$<br>$b = -0.287494 + 0.066047I$ | $1.85030 - 0.56407I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.207530 + 0.036111I$<br>$a = -2.05692 + 4.49642I$<br>$b = 0.475367 + 0.904372I$ | $2.18862 + 2.29145I$ | 0 |
| $u = 1.207530 - 0.036111I$<br>$a = -2.05692 - 4.49642I$<br>$b = 0.475367 - 0.904372I$ | $2.18862 - 2.29145I$ | 0 |
| $u = -0.585644 + 0.524890I$<br>$a = 0.307417 + 0.678703I$<br>$b = -0.887496 + 0.553841I$ | $4.68466 + 4.61363I$ | $10.47045 + 0.I$ |
| $u = -0.585644 - 0.524890I$<br>$a = 0.307417 - 0.678703I$<br>$b = -0.887496 - 0.553841I$ | $4.68466 - 4.61363I$ | $10.47045 + 0.I$ |
| $u = 1.167380 + 0.336331I$<br>$a = -0.364740 + 0.861422I$<br>$b = -0.564442 + 0.983855I$ | $0.77242 - 3.22559I$ | 0 |
| $u = 1.167380 - 0.336331I$<br>$a = -0.364740 - 0.861422I$<br>$b = -0.564442 - 0.983855I$ | $0.77242 + 3.22559I$ | 0 |
| $u = 0.022669 + 0.764528I$<br>$a = -0.28681 - 2.41502I$<br>$b = -0.590058 - 1.033690I$ | $-2.73847 + 7.20991I$ | $2.16879 - 8.38863I$ |
| $u = 0.022669 - 0.764528I$<br>$a = -0.28681 + 2.41502I$<br>$b = -0.590058 + 1.033690I$ | $-2.73847 - 7.20991I$ | $2.16879 + 8.38863I$ |
| $u = -1.240340 + 0.100015I$<br>$a = -0.54389 - 1.88615I$<br>$b = 0.554895 - 1.160570I$ | $2.33423 - 4.86971I$ | 0 |
| $u = -1.240340 - 0.100015I$<br>$a = -0.54389 + 1.88615I$<br>$b = 0.554895 + 1.160570I$ | $2.33423 + 4.86971I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.214290+0.306199I$<br>$a=\ \ 1.03227+1.77137I$<br>$b=-0.618109+1.069640I$ | $1.06963-11.08770I$ | 0 |
| $u=-1.214290-0.306199I$<br>$a=\ \ 1.03227-1.77137I$<br>$b=-0.618109-1.069640I$ | $1.06963+11.08770I$ | 0 |
| $u=-0.310953+0.669600I$<br>$a=-1.14221-2.41787I$<br>$b=\ \ 0.069246-1.279980I$ | $-3.10384-6.63654I$ | $1.93522+9.14652I$ |
| $u=-0.310953-0.669600I$<br>$a=-1.14221+2.41787I$<br>$b=\ \ 0.069246+1.279980I$ | $-3.10384+6.63654I$ | $1.93522-9.14652I$ |
| $u=-1.244590+0.256295I$<br>$a=-0.253010+0.080772I$<br>$b=-0.743437-0.435345I$ | $2.87173-5.93046I$ | 0 |
| $u=-1.244590-0.256295I$<br>$a=-0.253010-0.080772I$<br>$b=-0.743437+0.435345I$ | $2.87173+5.93046I$ | 0 |
| $u=\ \ 1.279450+0.018733I$<br>$a=\ \ 1.00242+1.52201I$<br>$b=\ \ 0.389202-0.762314I$ | $2.64749-1.42674I$ | 0 |
| $u=\ \ 1.279450-0.018733I$<br>$a=\ \ 1.00242-1.52201I$<br>$b=\ \ 0.389202+0.762314I$ | $2.64749+1.42674I$ | 0 |
| $u=-0.350653+0.619552I$<br>$a=-1.34360-2.38427I$<br>$b=\ \ 0.735903-1.161470I$ | $1.54460-6.34301I$ | $9.4689+11.6215I$ |
| $u=-0.350653-0.619552I$<br>$a=-1.34360+2.38427I$<br>$b=\ \ 0.735903+1.161470I$ | $1.54460+6.34301I$ | $9.4689-11.6215I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.293700+0.044391I$<br>$a=-0.367167-0.309954I$<br>$b=\ \ 0.835764-0.804452I$ | $4.82731-3.06865I$ | 0 |
| $u=-1.293700-0.044391I$<br>$a=-0.367167+0.309954I$<br>$b=\ \ 0.835764+0.804452I$ | $4.82731+3.06865I$ | 0 |
| $u=-0.382833+0.589995I$<br>$a=-0.159594-1.232590I$<br>$b=\ \ 1.001380-0.537434I$ | $3.62807-3.58901I$ | $15.0481+7.4264I$ |
| $u=-0.382833-0.589995I$<br>$a=-0.159594+1.232590I$<br>$b=\ \ 1.001380+0.537434I$ | $3.62807+3.58901I$ | $15.0481-7.4264I$ |
| $u=\ \ 0.071201+0.692830I$<br>$a=-0.573489+1.010040I$<br>$b=-0.584487+0.449534I$ | $-1.16620+2.47035I$ | $4.14055-4.42574I$ |
| $u=\ \ 0.071201-0.692830I$<br>$a=-0.573489-1.010040I$<br>$b=-0.584487-0.449534I$ | $-1.16620-2.47035I$ | $4.14055+4.42574I$ |
| $u=-0.401400+0.560284I$<br>$a=\ \ 0.737726-0.734520I$<br>$b=\ \ 0.994561+0.430873I$ | $3.73746-0.06066I$ | $15.7625+0.6829I$ |
| $u=-0.401400-0.560284I$<br>$a=\ \ 0.737726+0.734520I$<br>$b=\ \ 0.994561-0.430873I$ | $3.73746+0.06066I$ | $15.7625-0.6829I$ |
| $u=-1.31180$<br>$a=\ \ 0.293323$<br>$b=\ \ 0.836540$ | 5.58489 | 0 |
| $u=\ \ 1.293690+0.255561I$<br>$a=\ \ 1.56944-1.41967I$<br>$b=-0.229918-1.049980I$ | $-1.21197+2.79771I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.293690 - 0.255561I$<br>$a = 1.56944 + 1.41967I$<br>$b = -0.229918 + 1.049980I$ | $-1.21197 - 2.79771I$ | 0 |
| $u = 0.371452 + 0.569739I$<br>$a = 0.610361 + 0.152921I$<br>$b = 0.213712 + 0.096656I$ | $0.87797 + 1.75361I$ | $4.00098 - 4.23879I$ |
| $u = 0.371452 - 0.569739I$<br>$a = 0.610361 - 0.152921I$<br>$b = 0.213712 - 0.096656I$ | $0.87797 - 1.75361I$ | $4.00098 + 4.23879I$ |
| $u = 0.203337 + 0.648436I$<br>$a = 0.22434 + 1.74473I$<br>$b = -0.070051 + 0.627424I$ | $-0.91786 + 2.31127I$ | $2.88014 - 5.91888I$ |
| $u = 0.203337 - 0.648436I$<br>$a = 0.22434 - 1.74473I$<br>$b = -0.070051 - 0.627424I$ | $-0.91786 - 2.31127I$ | $2.88014 + 5.91888I$ |
| $u = -0.090046 + 0.672441I$<br>$a = 0.91087 + 2.89991I$<br>$b = -0.146928 + 1.096740I$ | $-5.51656 + 0.56608I$ | $-3.17725 - 0.33604I$ |
| $u = -0.090046 - 0.672441I$<br>$a = 0.91087 - 2.89991I$<br>$b = -0.146928 - 1.096740I$ | $-5.51656 - 0.56608I$ | $-3.17725 + 0.33604I$ |
| $u = 0.331204 + 0.577743I$<br>$a = -4.23259 + 1.33722I$<br>$b = 0.545491 + 0.882798I$ | $0.54533 + 3.82916I$ | $-12.0407 + 14.8512I$ |
| $u = 0.331204 - 0.577743I$<br>$a = -4.23259 - 1.33722I$<br>$b = 0.545491 - 0.882798I$ | $0.54533 - 3.82916I$ | $-12.0407 - 14.8512I$ |
| $u = -0.412605 + 0.499950I$<br>$a = 0.487656 + 0.457214I$<br>$b = 0.760775 + 1.087850I$ | $1.96482 + 2.78043I$ | $11.54120 - 4.22354I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.412605-0.499950I$<br>$a=\ 0.487656-0.457214I$<br>$b=\ 0.760775-1.087850I$ | $1.96482-2.78043I$ | $11.54120+4.22354I$ |
| $u=\ 0.349722+0.536822I$<br>$a=-1.56624+1.89326I$<br>$b=\ 0.544235-0.835676I$ | $0.698976-0.541114I$ | $-17.8322-3.1413I$ |
| $u=\ 0.349722-0.536822I$<br>$a=-1.56624-1.89326I$<br>$b=\ 0.544235+0.835676I$ | $0.698976+0.541114I$ | $-17.8322+3.1413I$ |
| $u=-0.524889+0.356431I$<br>$a=\ 0.88263+1.38930I$<br>$b=\ 0.089364+1.183890I$ | $-2.05836+3.02608I$ | $4.11780-3.31029I$ |
| $u=-0.524889-0.356431I$<br>$a=\ 0.88263-1.38930I$<br>$b=\ 0.089364-1.183890I$ | $-2.05836-3.02608I$ | $4.11780+3.31029I$ |
| $u=-1.394820+0.206569I$<br>$a=\ 1.17315+1.83804I$<br>$b=\ 0.305575+0.879647I$ | $4.85990-2.36800I$ | $0$ |
| $u=-1.394820-0.206569I$<br>$a=\ 1.17315-1.83804I$<br>$b=\ 0.305575-0.879647I$ | $4.85990+2.36800I$ | $0$ |
| $u=-1.39245+0.25151I$<br>$a=-0.049930-1.221160I$<br>$b=\ 0.005383-0.793309I$ | $4.20117-5.58561I$ | $0$ |
| $u=-1.39245-0.25151I$<br>$a=-0.049930+1.221160I$<br>$b=\ 0.005383+0.793309I$ | $4.20117+5.58561I$ | $0$ |
| $u=\ 0.223965+0.535065I$<br>$a=\ 2.24434-3.62037I$<br>$b=\ 0.388240-0.839913I$ | $-0.341249-0.362728I$ | $9.62962+1.11519I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.223965 - 0.535065I$<br>$a = 2.24434 + 3.62037I$<br>$b = 0.388240 + 0.839913I$ | $-0.341249 + 0.362728I$ | $9.62962 - 1.11519I$ |
| $u = 1.41580 + 0.16623I$<br>$a = 0.693712 - 0.468034I$<br>$b = 0.232628 - 1.242180I$ | $3.80684 - 1.07968I$ | 0 |
| $u = 1.41580 - 0.16623I$<br>$a = 0.693712 + 0.468034I$<br>$b = 0.232628 + 1.242180I$ | $3.80684 + 1.07968I$ | 0 |
| $u = -1.42866 + 0.21209I$<br>$a = -1.63529 - 1.87231I$<br>$b = 0.577657 + 0.826939I$ | $6.39608 - 2.25864I$ | 0 |
| $u = -1.42866 - 0.21209I$<br>$a = -1.63529 + 1.87231I$<br>$b = 0.577657 - 0.826939I$ | $6.39608 + 2.25864I$ | 0 |
| $u = -1.42691 + 0.22647I$<br>$a = -3.76630 - 0.47368I$<br>$b = 0.569164 - 0.893401I$ | $6.18316 - 6.81181I$ | 0 |
| $u = -1.42691 - 0.22647I$<br>$a = -3.76630 + 0.47368I$<br>$b = 0.569164 + 0.893401I$ | $6.18316 + 6.81181I$ | 0 |
| $u = 1.42542 + 0.25767I$<br>$a = -1.26859 + 1.03129I$<br>$b = 0.084417 + 1.321020I$ | $2.45895 + 10.02040I$ | 0 |
| $u = 1.42542 - 0.25767I$<br>$a = -1.26859 - 1.03129I$<br>$b = 0.084417 - 1.321020I$ | $2.45895 - 10.02040I$ | 0 |
| $u = 1.43680 + 0.19812I$<br>$a = -0.270185 + 0.471506I$<br>$b = 0.826001 - 1.101340I$ | $7.84711 - 0.16066I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.43680 - 0.19812I$<br>$a = -0.270185 - 0.471506I$<br>$b = 0.826001 + 1.101340I$ | $7.84711 + 0.16066I$ | 0 |
| $u = -1.43716 + 0.21885I$<br>$a = 0.211680 - 0.079378I$<br>$b = 0.333859 - 0.125798I$ | $6.67715 - 4.67240I$ | 0 |
| $u = -1.43716 - 0.21885I$<br>$a = 0.211680 + 0.079378I$<br>$b = 0.333859 + 0.125798I$ | $6.67715 + 4.67240I$ | 0 |
| $u = 1.43561 + 0.23691I$<br>$a = -1.93769 + 1.12814I$<br>$b = 0.76225 + 1.19358I$ | $7.27567 + 9.48965I$ | 0 |
| $u = 1.43561 - 0.23691I$<br>$a = -1.93769 - 1.12814I$<br>$b = 0.76225 - 1.19358I$ | $7.27567 - 9.48965I$ | 0 |
| $u = 1.44295 + 0.21305I$<br>$a = -0.281864 + 0.996757I$<br>$b = 1.069420 - 0.405753I$ | $9.64183 + 2.91922I$ | 0 |
| $u = 1.44295 - 0.21305I$<br>$a = -0.281864 - 0.996757I$<br>$b = 1.069420 + 0.405753I$ | $9.64183 - 2.91922I$ | 0 |
| $u = 1.44193 + 0.22409I$<br>$a = -1.093850 + 0.680581I$<br>$b = 1.063650 + 0.559170I$ | $9.47967 + 6.58874I$ | 0 |
| $u = 1.44193 - 0.22409I$<br>$a = -1.093850 - 0.680581I$<br>$b = 1.063650 - 0.559170I$ | $9.47967 - 6.58874I$ | 0 |
| $u = 1.45109 + 0.26993I$<br>$a = 0.002441 - 0.981496I$<br>$b = -0.952285 + 0.531565I$ | $9.6928 + 12.3816I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.45109 - 0.26993I$<br>$a = 0.002441 + 0.981496I$<br>$b = -0.952285 - 0.531565I$ | $9.6928 - 12.3816I$ | 0 |
| $u = 1.45052 + 0.28059I$<br>$a = 1.96222 - 1.34837I$<br>$b = -0.709064 - 1.124990I$ | $7.8603 + 18.4522I$ | 0 |
| $u = 1.45052 - 0.28059I$<br>$a = 1.96222 + 1.34837I$<br>$b = -0.709064 + 1.124990I$ | $7.8603 - 18.4522I$ | 0 |
| $u = -1.45521 + 0.29246I$<br>$a = 1.65577 + 1.16316I$<br>$b = -0.637188 + 0.951042I$ | $7.64698 - 9.97991I$ | 0 |
| $u = -1.45521 - 0.29246I$<br>$a = 1.65577 - 1.16316I$<br>$b = -0.637188 - 0.951042I$ | $7.64698 + 9.97991I$ | 0 |
| $u = 1.48062 + 0.15742I$<br>$a = 1.075990 - 0.114603I$<br>$b = -0.900844 - 0.607256I$ | $11.34470 - 2.23796I$ | 0 |
| $u = 1.48062 - 0.15742I$<br>$a = 1.075990 + 0.114603I$<br>$b = -0.900844 + 0.607256I$ | $11.34470 + 2.23796I$ | 0 |
| $u = -1.46646 + 0.26951I$<br>$a = 0.073782 + 0.489891I$<br>$b = -0.651565 - 0.709449I$ | $8.37652 - 4.94203I$ | 0 |
| $u = -1.46646 - 0.26951I$<br>$a = 0.073782 - 0.489891I$<br>$b = -0.651565 + 0.709449I$ | $8.37652 + 4.94203I$ | 0 |
| $u = 1.48968 + 0.14070I$<br>$a = 0.809922 - 0.019937I$<br>$b = -0.719703 + 1.072350I$ | $9.91130 - 8.21289I$ | 0 |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.48968 - 0.14070I$<br>$a = 0.809922 + 0.019937I$<br>$b = -0.719703 - 1.072350I$ | $9.91130 + 8.21289I$ | 0 |
| $u = -1.49446 + 0.11836I$<br>$a = 0.822095 - 0.013395I$<br>$b = -0.700730 - 0.832418I$ | $10.17480 - 0.40773I$ | 0 |
| $u = -1.49446 - 0.11836I$<br>$a = 0.822095 + 0.013395I$<br>$b = -0.700730 + 0.832418I$ | $10.17480 + 0.40773I$ | 0 |
| $u = -1.50195 + 0.15201I$<br>$a = 1.110550 + 0.180163I$<br>$b = -0.686598 + 0.859901I$ | $10.08970 - 5.72799I$ | 0 |
| $u = -1.50195 - 0.15201I$<br>$a = 1.110550 - 0.180163I$<br>$b = -0.686598 - 0.859901I$ | $10.08970 + 5.72799I$ | 0 |
| $u = -0.033811 + 0.452141I$<br>$a = 2.09508 + 2.81358I$<br>$b = 0.438588 + 1.044620I$ | $-1.21170 + 2.79956I$ | $1.52400 - 4.45007I$ |
| $u = -0.033811 - 0.452141I$<br>$a = 2.09508 - 2.81358I$<br>$b = 0.438588 - 1.044620I$ | $-1.21170 - 2.79956I$ | $1.52400 + 4.45007I$ |
| $u = 0.350449$<br>$a = 1.47447$<br>$b = 0.277047$ | 0.896804 | 11.9350 |
| $u = 0.217409 + 0.128263I$<br>$a = 2.22525 + 1.50519I$<br>$b = 0.580237 + 0.840045I$ | $0.56443 + 2.30394I$ | $0.46885 - 4.62350I$ |
| $u = 0.217409 - 0.128263I$<br>$a = 2.22525 - 1.50519I$<br>$b = 0.580237 - 0.840045I$ | $0.56443 - 2.30394I$ | $0.46885 + 4.62350I$ |

### II. $I_2^u = \langle 2b - a - 1,\ a^2 + 3,\ u + 1 \rangle$

**(i) Arc colorings**

$$a_6 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} a \\ \frac{1}{2}a + \frac{1}{2} \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} \frac{1}{2}a - \frac{1}{2} \\ \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$
$$a_3 = \begin{pmatrix} a - 1 \\ \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} \frac{1}{2}a - \frac{1}{2} \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -2a + 9$

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

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

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

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

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

| Solutions to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -1.00000$<br>$a = 1.73205I$<br>$b = 0.500000 + 0.866025I$ | $1.64493 + 2.02988I$ | $9.00000 - 3.46410I$ |
| $u = -1.00000$<br>$a = -1.73205I$<br>$b = 0.500000 - 0.866025I$ | $1.64493 - 2.02988I$ | $9.00000 + 3.46410I$ |

**III. u-Polynomials**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $(u^2-u+1)(u^{110}+42u^{109}+\cdots-41u+1)$ |
| $c_2$ | $(u^2+u+1)(u^{110}+2u^{109}+\cdots-5u+1)$ |
| $c_3$ | $(u^2-u+1)(u^{110}+2u^{109}+\cdots+102407u-11029)$ |
| $c_4$ | $(u^2-u+1)(u^{110}+4u^{109}+\cdots-120613u+16231)$ |
| $c_5$ | $(u^2-u+1)(u^{110}+2u^{109}+\cdots-5u+1)$ |
| $c_6, c_7$ | $((u+1)^2)(u^{110}-3u^{109}+\cdots+8u-1)$ |
| $c_8$ | $((u+1)^2)(u^{110}-7u^{109}+\cdots+4u^2-1)$ |
| $c_9$ | $((u+1)^2)(u^{110}-21u^{109}+\cdots-3668038u+132529)$ |
| $c_{10}$ | $((u-1)^2)(u^{110}-3u^{109}+\cdots+8u-1)$ |
| $c_{11}$ | $u^2(u^{110}+3u^{109}+\cdots-60672u+14144)$ |
| $c_{12}$ | $u^2(u^{110}+11u^{109}+\cdots-4u+4)$ |

**IV. Riley Polynomials**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $(y^2+y+1)(y^{110}+54y^{109}+\cdots-249y+1)$ |
| $c_2, c_5$ | $(y^2+y+1)(y^{110}+42y^{109}+\cdots-41y+1)$ |
| $c_3$ | $(y^2+y+1)(y^{110}-142y^{109}+\cdots-1.04787\times10^{10}y+1.21639\times10^8)$ |
| $c_4$ | $(y^2+y+1)(y^{110}-90y^{109}+\cdots-2.49453\times10^{10}y+2.63445\times10^8)$ |
| $c_6, c_7, c_{10}$ | $((y-1)^2)(y^{110}-101y^{109}+\cdots-8y+1)$ |
| $c_8$ | $((y-1)^2)(y^{110}-13y^{109}+\cdots-8y+1)$ |
| $c_9$ | $((y-1)^2)(y^{110}+63y^{109}+\cdots+7.13897\times10^{11}y+1.75639\times10^{10})$ |
| $c_{11}$ | $y^2(y^{110}-23y^{109}+\cdots-7.86322\times10^9y+2.00053\times10^8)$ |
| $c_{12}$ | $y^2(y^{110}-15y^{109}+\cdots-264y+16)$ |