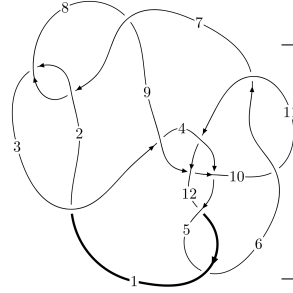
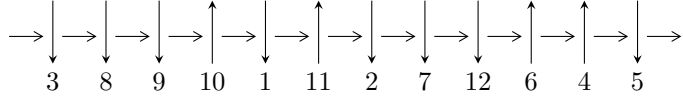


12a<sub>0734</sub> (K12a<sub>0734</sub>)



A knot diagram<sup>1</sup>

**Linearized knot diagram**



**Solving Sequence**

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

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

$$I_1^u = \langle -2.97114 \times 10^{105} u^{133} - 5.11035 \times 10^{105} u^{132} + \dots + 2.97121 \times 10^{105} b - 1.45203 \times 10^{106}, \\ - 3.46940 \times 10^{104} u^{133} + 3.75417 \times 10^{105} u^{132} + \dots + 2.97121 \times 10^{105} a + 2.11161 \times 10^{106}, \\ u^{134} + u^{133} + \dots + 10u - 1 \rangle$$

$$I_2^u = \langle u^{22} - 3u^{20} + \dots + b + 1, -2u^{22} + 8u^{20} + \dots + a + 1, u^{23} - 4u^{21} + \dots + 5u^2 - 1 \rangle$$

\* 2 irreducible components of  $\dim_{\mathbb{C}} = 0$ , with total 157 representations.

<sup>1</sup>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>).

<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.

$$\mathbf{I. } I_1^u = \langle -2.97 \times 10^{105} u^{133} - 5.11 \times 10^{105} u^{132} + \dots + 2.97 \times 10^{105} b - 1.45 \times 10^{106}, -3.47 \times 10^{104} u^{133} + 3.75 \times 10^{105} u^{132} + \dots + 2.97 \times 10^{105} a + 2.11 \times 10^{106}, u^{134} + u^{133} + \dots + 10u - 1 \rangle$$

(i) Arc colorings

$$a_2 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

$$a_3 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} u^7 - 2u^5 + 2u^3 - 2u \\ -u^7 + u^5 - 2u^3 + u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^3 \\ u^5 - u^3 + u \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0.116768u^{133} - 1.26352u^{132} + \dots + 60.7927u - 7.10691 \\ 0.999978u^{133} + 1.71996u^{132} + \dots - 29.3278u + 4.88700 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 3.52824u^{133} + 4.00376u^{132} + \dots - 89.9457u + 14.1154 \\ -0.297130u^{133} - 0.372411u^{132} + \dots - 19.6107u + 4.78497 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 3.80149u^{133} + 4.73934u^{132} + \dots - 86.7946u + 13.8273 \\ -0.918708u^{133} - 0.673553u^{132} + \dots - 22.2627u + 4.69214 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -2.62310u^{133} - 2.19393u^{132} + \dots + 63.9528u - 13.2154 \\ -0.420115u^{133} - 2.13033u^{132} + \dots + 16.6696u - 3.45228 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 0.830120u^{133} - 0.920307u^{132} + \dots + 57.8837u - 6.78105 \\ 0.724769u^{133} + 2.05722u^{132} + \dots - 24.2254u + 4.43038 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes =  $10.8383u^{133} + 15.1679u^{132} + \dots - 191.542u + 28.8434$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
$c_1, c_8$	$u^{134} + 45u^{133} + \dots + 42u + 1$
$c_2, c_7$	$u^{134} + u^{133} + \dots + 10u - 1$
$c_3$	$u^{134} - u^{133} + \dots + 2211594u - 322117$
$c_4$	$u^{134} + u^{133} + \dots - 4u + 5$
$c_5, c_{12}$	$u^{134} - 44u^{132} + \dots - 4575u + 919$
$c_6, c_{10}$	$u^{134} - 42u^{132} + \dots + 3u - 1$
$c_9$	$u^{134} - 17u^{133} + \dots - 107441u + 19231$
$c_{11}$	$u^{134} - 3u^{133} + \dots - 326u + 31$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
$c_1, c_8$	$y^{134} + 91y^{133} + \dots - 342y + 1$
$c_2, c_7$	$y^{134} - 45y^{133} + \dots - 42y + 1$
$c_3$	$y^{134} - 41y^{133} + \dots - 7998700268362y + 103759361689$
$c_4$	$y^{134} + 7y^{133} + \dots - 596y + 25$
$c_5, c_{12}$	$y^{134} - 88y^{133} + \dots + 5233305y + 844561$
$c_6, c_{10}$	$y^{134} - 84y^{133} + \dots - 51y + 1$
$c_9$	$y^{134} - 37y^{133} + \dots - 30165676559y + 369831361$
$c_{11}$	$y^{134} - y^{133} + \dots - 42416y + 961$

(vi) Complex Volumes and Cusp Shapes

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.684442 + 0.733546I$ $a = 2.93257 - 0.13650I$ $b = -1.117790 - 0.303819I$	$0.13126 + 3.76020I$	0
$u = 0.684442 - 0.733546I$ $a = 2.93257 + 0.13650I$ $b = -1.117790 + 0.303819I$	$0.13126 - 3.76020I$	0
$u = -0.993324 + 0.055528I$ $a = -0.87671 - 1.16073I$ $b = -1.072980 - 0.443967I$	$-1.111230 + 0.840477I$	0
$u = -0.993324 - 0.055528I$ $a = -0.87671 + 1.16073I$ $b = -1.072980 + 0.443967I$	$-1.111230 - 0.840477I$	0
$u = 0.983126 + 0.123044I$ $a = 0.04349 + 2.03867I$ $b = -1.020900 + 0.901256I$	$-2.25368 - 4.95612I$	0
$u = 0.983126 - 0.123044I$ $a = 0.04349 - 2.03867I$ $b = -1.020900 - 0.901256I$	$-2.25368 + 4.95612I$	0
$u = 0.980207 + 0.122170I$ $a = 0.67712 + 1.35533I$ $b = -0.144821 + 0.342733I$	$-3.65962 - 2.88425I$	0
$u = 0.980207 - 0.122170I$ $a = 0.67712 - 1.35533I$ $b = -0.144821 - 0.342733I$	$-3.65962 + 2.88425I$	0
$u = 0.699391 + 0.738009I$ $a = -1.60398 + 0.14202I$ $b = 1.37660 + 0.48386I$	$4.30951 + 0.70051I$	0
$u = 0.699391 - 0.738009I$ $a = -1.60398 - 0.14202I$ $b = 1.37660 - 0.48386I$	$4.30951 - 0.70051I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.646937 + 0.785603I$ $a = 0.352650 - 0.862831I$ $b = -0.185620 + 1.306980I$	$-2.19258 + 6.44742I$	0
$u = 0.646937 - 0.785603I$ $a = 0.352650 + 0.862831I$ $b = -0.185620 - 1.306980I$	$-2.19258 - 6.44742I$	0
$u = -0.725623 + 0.715193I$ $a = -2.72667 + 0.35767I$ $b = 1.76527 + 0.20617I$	$4.76768 + 0.25459I$	0
$u = -0.725623 - 0.715193I$ $a = -2.72667 - 0.35767I$ $b = 1.76527 - 0.20617I$	$4.76768 - 0.25459I$	0
$u = -1.018770 + 0.034217I$ $a = -0.53054 + 1.67932I$ $b = 1.091790 + 0.459188I$	$-5.23217 + 3.65374I$	0
$u = -1.018770 - 0.034217I$ $a = -0.53054 - 1.67932I$ $b = 1.091790 - 0.459188I$	$-5.23217 - 3.65374I$	0
$u = 0.979326$ $a = -0.706647$ $b = -1.80602$	$-0.121193$	0
$u = -0.745718 + 0.708422I$ $a = 2.26590 + 1.43565I$ $b = -0.848685 + 0.042631I$	$0.97082 + 3.42476I$	0
$u = -0.745718 - 0.708422I$ $a = 2.26590 - 1.43565I$ $b = -0.848685 - 0.042631I$	$0.97082 - 3.42476I$	0
$u = -0.704844 + 0.757071I$ $a = -0.158069 - 0.265759I$ $b = -0.104520 - 0.614928I$	$2.02384 - 2.44865I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.704844 - 0.757071I$ $a = -0.158069 + 0.265759I$ $b = -0.104520 + 0.614928I$	$2.02384 + 2.44865I$	0
$u = 0.657855 + 0.808376I$ $a = 1.56797 - 0.48147I$ $b = -1.186820 - 0.463114I$	$5.16293 + 6.70891I$	0
$u = 0.657855 - 0.808376I$ $a = 1.56797 + 0.48147I$ $b = -1.186820 + 0.463114I$	$5.16293 - 6.70891I$	0
$u = 0.706317 + 0.642030I$ $a = 1.54370 + 1.33246I$ $b = -0.951225 + 0.587828I$	$-0.74094 - 3.24037I$	0
$u = 0.706317 - 0.642030I$ $a = 1.54370 - 1.33246I$ $b = -0.951225 - 0.587828I$	$-0.74094 + 3.24037I$	0
$u = 0.763866 + 0.719672I$ $a = -0.737072 + 0.150277I$ $b = 0.396256 - 0.628401I$	$3.00510 - 1.42234I$	0
$u = 0.763866 - 0.719672I$ $a = -0.737072 - 0.150277I$ $b = 0.396256 + 0.628401I$	$3.00510 + 1.42234I$	0
$u = 0.971285 + 0.405356I$ $a = 0.376939 + 0.546656I$ $b = -0.649772 - 0.556802I$	$-4.07179 - 3.37298I$	0
$u = 0.971285 - 0.405356I$ $a = 0.376939 - 0.546656I$ $b = -0.649772 + 0.556802I$	$-4.07179 + 3.37298I$	0
$u = 0.943457 + 0.049332I$ $a = 0.77885 + 1.84113I$ $b = 0.350763 + 0.127891I$	$-3.55400 - 2.88849I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.943457 - 0.049332I$		
$a = 0.77885 - 1.84113I$	$-3.55400 + 2.88849I$	0
$b = 0.350763 - 0.127891I$		
$u = 0.899780 + 0.555811I$		
$a = -0.071715 + 1.275470I$	$1.67472 - 4.16197I$	0
$b = -0.898793 + 0.052125I$		
$u = 0.899780 - 0.555811I$		
$a = -0.071715 - 1.275470I$	$1.67472 + 4.16197I$	0
$b = -0.898793 - 0.052125I$		
$u = -0.362484 + 0.867831I$		
$a = -1.004240 + 0.319388I$	$-1.70180 - 2.29247I$	0
$b = 0.779929 - 0.214276I$		
$u = -0.362484 - 0.867831I$		
$a = -1.004240 - 0.319388I$	$-1.70180 + 2.29247I$	0
$b = 0.779929 + 0.214276I$		
$u = -0.712312 + 0.789223I$		
$a = -1.77504 + 0.40262I$	$3.80981 - 4.48373I$	0
$b = 1.20788 - 0.89236I$		
$u = -0.712312 - 0.789223I$		
$a = -1.77504 - 0.40262I$	$3.80981 + 4.48373I$	0
$b = 1.20788 + 0.89236I$		
$u = -0.652606 + 0.845014I$		
$a = 1.89303 - 0.10955I$	$1.50915 - 13.23120I$	0
$b = -1.35075 + 0.66313I$		
$u = -0.652606 - 0.845014I$		
$a = 1.89303 + 0.10955I$	$1.50915 + 13.23120I$	0
$b = -1.35075 - 0.66313I$		
$u = -0.573471 + 0.732554I$		
$a = -0.171084 - 0.109456I$	$-2.02732 - 1.13246I$	0
$b = -0.410102 + 0.448250I$		



Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.573471 - 0.732554I$ $a = -0.171084 + 0.109456I$ $b = -0.410102 - 0.448250I$	$-2.02732 + 1.13246I$	0
$u = -0.900602 + 0.582021I$ $a = -0.355599 + 0.775540I$ $b = -0.060900 + 0.569504I$	$-1.24223 + 2.25110I$	0
$u = -0.900602 - 0.582021I$ $a = -0.355599 - 0.775540I$ $b = -0.060900 - 0.569504I$	$-1.24223 - 2.25110I$	0
$u = -1.073760 + 0.080613I$ $a = 0.397190 - 1.192100I$ $b = 0.340595 - 1.245100I$	$-8.23494 + 5.99826I$	0
$u = -1.073760 - 0.080613I$ $a = 0.397190 + 1.192100I$ $b = 0.340595 + 1.245100I$	$-8.23494 - 5.99826I$	0
$u = -0.551055 + 0.738693I$ $a = -0.213930 + 0.122406I$ $b = -0.404330 - 0.120701I$	$-2.09099 - 1.28486I$	0
$u = -0.551055 - 0.738693I$ $a = -0.213930 - 0.122406I$ $b = -0.404330 + 0.120701I$	$-2.09099 + 1.28486I$	0
$u = -0.824025 + 0.696263I$ $a = -0.340201 - 0.106572I$ $b = 0.446065 + 1.023540I$	$0.73766 + 5.74889I$	0
$u = -0.824025 - 0.696263I$ $a = -0.340201 + 0.106572I$ $b = 0.446065 - 1.023540I$	$0.73766 - 5.74889I$	0
$u = -1.074080 + 0.106049I$ $a = 0.36031 + 1.67688I$ $b = 1.095130 + 0.436256I$	$-1.13493 + 6.37304I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.074080 - 0.106049I$		
$a = 0.36031 - 1.67688I$	$-1.13493 - 6.37304I$	0
$b = 1.095130 - 0.436256I$		
$u = 0.768552 + 0.778416I$		
$a = -2.02934 + 0.23062I$	$4.70969 - 2.13025I$	0
$b = 1.307780 - 0.520205I$		
$u = 0.768552 - 0.778416I$		
$a = -2.02934 - 0.23062I$	$4.70969 + 2.13025I$	0
$b = 1.307780 + 0.520205I$		
$u = 0.658952 + 0.880946I$		
$a = -1.84008 - 0.19747I$	$1.81144 + 3.77799I$	0
$b = 1.183440 + 0.314188I$		
$u = 0.658952 - 0.880946I$		
$a = -1.84008 + 0.19747I$	$1.81144 - 3.77799I$	0
$b = 1.183440 - 0.314188I$		
$u = -0.725737 + 0.835925I$		
$a = -1.48018 - 0.35781I$	$2.82780 - 2.03901I$	0
$b = 0.742267 - 0.113059I$		
$u = -0.725737 - 0.835925I$		
$a = -1.48018 + 0.35781I$	$2.82780 + 2.03901I$	0
$b = 0.742267 + 0.113059I$		
$u = 1.111060 + 0.006629I$		
$a = 0.577799 - 0.214621I$	$-7.58998 + 0.01142I$	0
$b = 0.190841 - 0.191786I$		
$u = 1.111060 - 0.006629I$		
$a = 0.577799 + 0.214621I$	$-7.58998 - 0.01142I$	0
$b = 0.190841 + 0.191786I$		
$u = 0.972411 + 0.552013I$		
$a = 0.250380 - 0.201692I$	$1.44464 + 0.17219I$	0
$b = 1.002960 + 0.302049I$		

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.972411 - 0.552013I$ $a = 0.250380 + 0.201692I$ $b = 1.002960 - 0.302049I$	$1.44464 - 0.17219I$	0
$u = 1.113290 + 0.136976I$ $a = -0.07874 - 1.46746I$ $b = 1.27329 - 0.69395I$	$-5.23705 - 12.72340I$	0
$u = 1.113290 - 0.136976I$ $a = -0.07874 + 1.46746I$ $b = 1.27329 + 0.69395I$	$-5.23705 + 12.72340I$	0
$u = -0.901543 + 0.671542I$ $a = -1.079850 - 0.497635I$ $b = -0.604635 + 1.011430I$	$0.496744 - 0.478918I$	0
$u = -0.901543 - 0.671542I$ $a = -1.079850 + 0.497635I$ $b = -0.604635 - 1.011430I$	$0.496744 + 0.478918I$	0
$u = -1.113520 + 0.183490I$ $a = 0.502829 - 0.878263I$ $b = -1.036420 - 0.443824I$	$-5.39188 + 3.36105I$	0
$u = -1.113520 - 0.183490I$ $a = 0.502829 + 0.878263I$ $b = -1.036420 + 0.443824I$	$-5.39188 - 3.36105I$	0
$u = -0.830902 + 0.225120I$ $a = -0.905119 - 0.340070I$ $b = -0.955906 + 0.451896I$	$-1.213400 - 0.444872I$	0
$u = -0.830902 - 0.225120I$ $a = -0.905119 + 0.340070I$ $b = -0.955906 - 0.451896I$	$-1.213400 + 0.444872I$	0
$u = -0.845718 + 0.772491I$ $a = 2.40039 - 0.91885I$ $b = -1.329910 - 0.217967I$	$8.31013 + 4.43310I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.845718 - 0.772491I$ $a = 2.40039 + 0.91885I$ $b = -1.329910 + 0.217967I$	$8.31013 - 4.43310I$	0
$u = 0.997474 + 0.579143I$ $a = -1.65813 - 0.69858I$ $b = 0.480525 - 1.066170I$	$-5.26789 - 0.25431I$	0
$u = 0.997474 - 0.579143I$ $a = -1.65813 + 0.69858I$ $b = 0.480525 + 1.066170I$	$-5.26789 + 0.25431I$	0
$u = -1.045270 + 0.493316I$ $a = 0.191609 + 0.650376I$ $b = 1.152950 - 0.636975I$	$-3.06521 - 5.76942I$	0
$u = -1.045270 - 0.493316I$ $a = 0.191609 - 0.650376I$ $b = 1.152950 + 0.636975I$	$-3.06521 + 5.76942I$	0
$u = 1.16417$ $a = 0.0449136$ $b = -0.427411$	$-7.51483$	0
$u = 0.946649 + 0.685219I$ $a = -0.289792 + 0.644511I$ $b = -0.528125 - 0.626255I$	$2.44261 - 3.96455I$	0
$u = 0.946649 - 0.685219I$ $a = -0.289792 - 0.644511I$ $b = -0.528125 + 0.626255I$	$2.44261 + 3.96455I$	0
$u = 0.972681 + 0.650597I$ $a = -0.467017 - 0.152712I$ $b = 1.025890 + 0.594212I$	$-1.56056 - 1.84691I$	0
$u = 0.972681 - 0.650597I$ $a = -0.467017 + 0.152712I$ $b = 1.025890 - 0.594212I$	$-1.56056 + 1.84691I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.895049 + 0.759031I$ $a = -2.05925 + 0.91387I$ $b = 1.340920 - 0.172860I$	$8.15901 + 1.33731I$	0
$u = -0.895049 - 0.759031I$ $a = -2.05925 - 0.91387I$ $b = 1.340920 + 0.172860I$	$8.15901 - 1.33731I$	0
$u = -0.957084 + 0.680461I$ $a = -1.62682 + 2.51238I$ $b = 0.800593 + 0.132838I$	$0.32272 + 1.91916I$	0
$u = -0.957084 - 0.680461I$ $a = -1.62682 - 2.51238I$ $b = 0.800593 - 0.132838I$	$0.32272 - 1.91916I$	0
$u = -0.970553 + 0.682636I$ $a = 1.68283 - 2.13343I$ $b = -1.82651 + 0.17662I$	$4.02087 + 5.11946I$	0
$u = -0.970553 - 0.682636I$ $a = 1.68283 + 2.13343I$ $b = -1.82651 - 0.17662I$	$4.02087 - 5.11946I$	0
$u = 0.956768 + 0.730351I$ $a = 0.97582 + 1.79918I$ $b = -1.322770 - 0.451203I$	$4.13347 - 3.57074I$	0
$u = 0.956768 - 0.730351I$ $a = 0.97582 - 1.79918I$ $b = -1.322770 + 0.451203I$	$4.13347 + 3.57074I$	0
$u = 0.986046 + 0.690716I$ $a = 1.64970 + 1.99316I$ $b = -1.32902 + 0.55856I$	$3.44626 - 6.16415I$	0
$u = 0.986046 - 0.690716I$ $a = 1.64970 - 1.99316I$ $b = -1.32902 - 0.55856I$	$3.44626 + 6.16415I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.993031 + 0.684647I$ $a = -2.62363 - 1.84119I$ $b = 1.162630 - 0.338533I$	$-0.79602 - 9.19285I$	0
$u = 0.993031 - 0.684647I$ $a = -2.62363 + 1.84119I$ $b = 1.162630 + 0.338533I$	$-0.79602 + 9.19285I$	0
$u = 0.887286 + 0.818837I$ $a = 2.11398 + 0.37298I$ $b = -1.231790 + 0.362617I$	$5.72201 - 9.47851I$	0
$u = 0.887286 - 0.818837I$ $a = 2.11398 - 0.37298I$ $b = -1.231790 - 0.362617I$	$5.72201 + 9.47851I$	0
$u = 0.883503 + 0.825249I$ $a = -1.64011 - 1.09626I$ $b = 1.192810 + 0.316023I$	$5.73822 + 3.36674I$	0
$u = 0.883503 - 0.825249I$ $a = -1.64011 + 1.09626I$ $b = 1.192810 - 0.316023I$	$5.73822 - 3.36674I$	0
$u = -0.986523 + 0.699527I$ $a = 0.874910 - 0.352664I$ $b = 0.191200 - 0.609874I$	$1.17309 + 7.98971I$	0
$u = -0.986523 - 0.699527I$ $a = 0.874910 + 0.352664I$ $b = 0.191200 + 0.609874I$	$1.17309 - 7.98971I$	0
$u = -1.029730 + 0.661865I$ $a = -0.344960 + 0.498301I$ $b = 0.313366 + 0.544307I$	$-3.34183 + 6.47157I$	0
$u = -1.029730 - 0.661865I$ $a = -0.344960 - 0.498301I$ $b = 0.313366 - 0.544307I$	$-3.34183 - 6.47157I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.993726 + 0.717846I$ $a = 2.42241 - 1.46955I$ $b = -1.19776 - 0.94141I$	$2.95398 + 10.17470I$	0
$u = -0.993726 - 0.717846I$ $a = 2.42241 + 1.46955I$ $b = -1.19776 + 0.94141I$	$2.95398 - 10.17470I$	0
$u = -1.038350 + 0.651686I$ $a = 0.492741 + 0.507756I$ $b = 0.369761 - 0.074424I$	$-3.50265 + 6.59407I$	0
$u = -1.038350 - 0.651686I$ $a = 0.492741 - 0.507756I$ $b = 0.369761 + 0.074424I$	$-3.50265 - 6.59407I$	0
$u = -0.246431 + 0.732903I$ $a = 1.79748 - 0.04135I$ $b = -1.242930 - 0.611221I$	$-0.69453 + 10.16310I$	$0. - 7.37612I$
$u = -0.246431 - 0.732903I$ $a = 1.79748 + 0.04135I$ $b = -1.242930 + 0.611221I$	$-0.69453 - 10.16310I$	$0. + 7.37612I$
$u = -1.085870 + 0.570975I$ $a = 0.701874 - 0.646899I$ $b = -0.751925 - 0.406373I$	$-3.96455 + 7.44216I$	0
$u = -1.085870 - 0.570975I$ $a = 0.701874 + 0.646899I$ $b = -0.751925 + 0.406373I$	$-3.96455 - 7.44216I$	0
$u = 1.021430 + 0.696683I$ $a = 1.38338 - 0.54250I$ $b = 0.222377 + 1.356410I$	$-3.31482 - 12.05230I$	0
$u = 1.021430 - 0.696683I$ $a = 1.38338 + 0.54250I$ $b = 0.222377 - 1.356410I$	$-3.31482 + 12.05230I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.087738 + 0.756044I$ $a = -1.72621 + 0.35110I$ $b = 0.880270 - 0.294838I$	$-1.249260 - 0.296309I$	$-7.28753 + 0.I$
$u = 0.087738 - 0.756044I$ $a = -1.72621 - 0.35110I$ $b = 0.880270 + 0.294838I$	$-1.249260 + 0.296309I$	$-7.28753 + 0.I$
$u = -0.759386$ $a = -0.600655$ $b = -0.487135$	$-1.25667$	$-7.25320$
$u = 1.024920 + 0.708478I$ $a = -1.58312 - 2.05437I$ $b = 1.173760 - 0.493077I$	$4.05312 - 12.41580I$	0
$u = 1.024920 - 0.708478I$ $a = -1.58312 + 2.05437I$ $b = 1.173760 + 0.493077I$	$4.05312 + 12.41580I$	0
$u = -1.003160 + 0.741475I$ $a = 1.39301 - 1.26119I$ $b = -0.697623 - 0.201205I$	$1.96950 + 7.93716I$	0
$u = -1.003160 - 0.741475I$ $a = 1.39301 + 1.26119I$ $b = -0.697623 + 0.201205I$	$1.96950 - 7.93716I$	0
$u = -1.040440 + 0.721467I$ $a = -2.09702 + 1.74380I$ $b = 1.36061 + 0.68998I$	$0.3269 + 19.0807I$	0
$u = -1.040440 - 0.721467I$ $a = -2.09702 - 1.74380I$ $b = 1.36061 - 0.68998I$	$0.3269 - 19.0807I$	0
$u = 1.049730 + 0.734629I$ $a = 1.78403 + 1.33198I$ $b = -1.219340 + 0.362480I$	$0.60294 - 9.76672I$	0



Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.049730 - 0.734629I$ $a = 1.78403 - 1.33198I$ $b = -1.219340 - 0.362480I$	$0.60294 + 9.76672I$	0
$u = 0.367673 + 0.596899I$ $a = 0.507487 + 0.683187I$ $b = -0.281515 - 1.040940I$	$-3.72418 - 4.25497I$	$-6.08937 + 5.23557I$
$u = 0.367673 - 0.596899I$ $a = 0.507487 - 0.683187I$ $b = -0.281515 + 1.040940I$	$-3.72418 + 4.25497I$	$-6.08937 - 5.23557I$
$u = 0.269050 + 0.617565I$ $a = 1.48508 + 0.88631I$ $b = -1.139340 + 0.333732I$	$3.17608 - 4.32551I$	$1.35411 + 6.19967I$
$u = 0.269050 - 0.617565I$ $a = 1.48508 - 0.88631I$ $b = -1.139340 - 0.333732I$	$3.17608 + 4.32551I$	$1.35411 - 6.19967I$
$u = 0.387092 + 0.432373I$ $a = -0.995704 - 0.403192I$ $b = 1.184950 - 0.049242I$	$2.70285 + 0.26610I$	$2.78339 + 0.22411I$
$u = 0.387092 - 0.432373I$ $a = -0.995704 + 0.403192I$ $b = 1.184950 + 0.049242I$	$2.70285 - 0.26610I$	$2.78339 - 0.22411I$
$u = -0.084896 + 0.525243I$ $a = -1.84860 - 0.20121I$ $b = 1.096610 + 0.698947I$	$1.03926 + 2.94824I$	$1.60490 - 6.40134I$
$u = -0.084896 - 0.525243I$ $a = -1.84860 + 0.20121I$ $b = 1.096610 - 0.698947I$	$1.03926 - 2.94824I$	$1.60490 + 6.40134I$
$u = -0.180376 + 0.434875I$ $a = -0.664695 + 0.300319I$ $b = 0.084546 + 0.491566I$	$-0.217472 + 1.237780I$	$-2.82425 - 4.88586I$

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.180376 - 0.434875I$		
$a = -0.664695 - 0.300319I$	$-0.217472 - 1.237780I$	$-2.82425 + 4.88586I$
$b = 0.084546 - 0.491566I$		
$u = 0.207137 + 0.168766I$		
$a = 6.13205 + 2.14952I$	$-1.45340 - 3.00117I$	$-6.83039 + 9.00039I$
$b = -0.845796 + 0.370223I$		
$u = 0.207137 - 0.168766I$		
$a = 6.13205 - 2.14952I$	$-1.45340 + 3.00117I$	$-6.83039 - 9.00039I$
$b = -0.845796 - 0.370223I$		
$u = 0.192711$		
$a = 1.44974$	$2.70140$	$9.56400$
$b = 1.44990$		

**II.**

$$I_2^u = \langle u^{22} - 3u^{20} + \dots + b + 1, -2u^{22} + 8u^{20} + \dots + a + 1, u^{23} - 4u^{21} + \dots + 5u^2 - 1 \rangle$$

**(i) Arc colorings**

$$a_2 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

$$a_3 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} u^7 - 2u^5 + 2u^3 - 2u \\ -u^7 + u^5 - 2u^3 + u \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^3 \\ u^5 - u^3 + u \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 2u^{22} - 8u^{20} + \dots + 4u - 1 \\ -u^{22} + 3u^{20} + \dots - 2u - 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u^{22} - 2u^{21} + \dots + 16u^3 - 5u \\ -u^{20} + 4u^{18} + \dots + 3u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u^{22} - u^{21} + \dots - 5u + 1 \\ -u^{20} + 4u^{18} + \dots + 4u + 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 2u^{22} - 7u^{20} + \dots - 6u^3 + 3u^2 \\ u^{22} + u^{21} + \dots + 4u + 2 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 2u^{22} - 8u^{20} + \dots + 4u - 3 \\ -u^{22} + 3u^{20} + \dots - 5u^2 - 2u \end{pmatrix}$$

**(ii) Obstruction class = 1**

**(iii) Cusp Shapes**

$$= -3u^{22} + 2u^{21} + 13u^{20} - 9u^{19} - 39u^{18} + 21u^{17} + 80u^{16} - 36u^{15} - 127u^{14} + 33u^{13} + 164u^{12} - 14u^{11} - 163u^{10} - 26u^9 + 139u^8 + 60u^7 - 79u^6 - 61u^5 + 31u^4 + 49u^3 + u^2 - 16u - 13$$

(iv)  $u$ -Polynomials at the component

Crossings	u-Polynomials at each crossing
$c_1$	$u^{23} - 8u^{22} + \dots + 10u - 1$
$c_2$	$u^{23} - 4u^{21} + \dots - 5u^2 + 1$
$c_3$	$u^{23} - 4u^{21} + \dots - 2u + 1$
$c_4$	$u^{23} + 2u^{20} + \dots - 2u^2 - 1$
$c_5$	$u^{23} - u^{22} + \dots - u + 1$
$c_6$	$u^{23} - u^{22} + \dots - u + 1$
$c_7$	$u^{23} - 4u^{21} + \dots + 5u^2 - 1$
$c_8$	$u^{23} + 8u^{22} + \dots + 10u + 1$
$c_9$	$u^{23} - 6u^{21} + \dots + 11u - 1$
$c_{10}$	$u^{23} + u^{22} + \dots - u - 1$
$c_{11}$	$u^{23} + 2u^{21} + \dots - 2u^3 - 1$
$c_{12}$	$u^{23} + u^{22} + \dots - u - 1$



(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
$c_1, c_8$	$y^{23} + 16y^{22} + \cdots + 6y - 1$
$c_2, c_7$	$y^{23} - 8y^{22} + \cdots + 10y - 1$
$c_3$	$y^{23} - 8y^{22} + \cdots + 14y - 1$
$c_4$	$y^{23} - 2y^{21} + \cdots - 4y - 1$
$c_5, c_{12}$	$y^{23} - 19y^{22} + \cdots + 23y - 1$
$c_6, c_{10}$	$y^{23} - 23y^{22} + \cdots + 19y - 1$
$c_9$	$y^{23} - 12y^{22} + \cdots + 11y - 1$
$c_{11}$	$y^{23} + 4y^{22} + \cdots + 2y^2 - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.789676 + 0.635091I$ $a = -0.01623 + 1.61769I$ $b = -0.624578 + 0.481706I$	$-0.09644 - 4.34636I$	$-6.43553 + 7.86992I$
$u = 0.789676 - 0.635091I$ $a = -0.01623 - 1.61769I$ $b = -0.624578 - 0.481706I$	$-0.09644 + 4.34636I$	$-6.43553 - 7.86992I$
$u = -0.963368 + 0.127646I$ $a = -0.89384 + 1.89023I$ $b = 0.826105 + 0.507900I$	$-3.41508 + 4.12503I$	$-9.63250 - 7.62808I$
$u = -0.963368 - 0.127646I$ $a = -0.89384 - 1.89023I$ $b = 0.826105 - 0.507900I$	$-3.41508 - 4.12503I$	$-9.63250 + 7.62808I$
$u = -0.781718 + 0.735321I$ $a = 2.26319 - 0.09688I$ $b = -1.60010 - 0.15916I$	$5.45220 + 1.13330I$	$3.45932 - 2.91783I$
$u = -0.781718 - 0.735321I$ $a = 2.26319 + 0.09688I$ $b = -1.60010 + 0.15916I$	$5.45220 - 1.13330I$	$3.45932 + 2.91783I$
$u = 0.718410 + 0.821305I$ $a = 1.93152 + 0.20986I$ $b = -1.046350 - 0.451258I$	$2.91868 + 3.41376I$	$-1.19815 - 3.77673I$
$u = 0.718410 - 0.821305I$ $a = 1.93152 - 0.20986I$ $b = -1.046350 + 0.451258I$	$2.91868 - 3.41376I$	$-1.19815 + 3.77673I$
$u = 0.905730$ $a = 1.44985$ $b = 1.64031$	$0.733078$	$0.0906350$
$u = 0.924227 + 0.639459I$ $a = 0.355446 + 0.708297I$ $b = 0.654499 + 0.532828I$	$-0.525275 - 0.642283I$	$-6.84803 - 1.22318I$



Solutions to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.924227 - 0.639459I$ $a = 0.355446 - 0.708297I$ $b = 0.654499 - 0.532828I$	$-0.525275 + 0.642283I$	$-6.84803 + 1.22318I$
$u = 1.14910$ $a = 0.515546$ $b = 0.647002$	$-7.06832$	$0.599370$
$u = -0.387412 + 0.742711I$ $a = 0.738338 - 0.661111I$ $b = -0.734604 + 0.163087I$	$-1.46442 - 1.89698I$	$-0.596084 - 0.928142I$
$u = -0.387412 - 0.742711I$ $a = 0.738338 + 0.661111I$ $b = -0.734604 - 0.163087I$	$-1.46442 + 1.89698I$	$-0.596084 + 0.928142I$
$u = -0.943028 + 0.704990I$ $a = -1.47417 + 2.15490I$ $b = 1.64624 - 0.14078I$	$4.95360 + 4.36576I$	$3.36870 - 3.50878I$
$u = -0.943028 - 0.704990I$ $a = -1.47417 - 2.15490I$ $b = 1.64624 + 0.14078I$	$4.95360 - 4.36576I$	$3.36870 + 3.50878I$
$u = -1.045620 + 0.628888I$ $a = -0.011755 + 0.403755I$ $b = 0.613329 + 0.151958I$	$-3.15294 + 6.97577I$	$-0.33481 - 9.58642I$
$u = -1.045620 - 0.628888I$ $a = -0.011755 - 0.403755I$ $b = 0.613329 - 0.151958I$	$-3.15294 - 6.97577I$	$-0.33481 + 9.58642I$
$u = 1.000320 + 0.731290I$ $a = -2.14868 - 1.33130I$ $b = 1.033420 - 0.518597I$	$2.05059 - 9.23426I$	$-3.39793 + 8.73183I$
$u = 1.000320 - 0.731290I$ $a = -2.14868 + 1.33130I$ $b = 1.033420 + 0.518597I$	$2.05059 + 9.23426I$	$-3.39793 - 8.73183I$

Solutions to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.585531 + 0.422605I$	$-1.44350 - 2.11057I$	$-5.68122 + 1.44020I$
$a = -0.43217 - 1.92851I$		
$b = -0.680777 + 0.308139I$		
$u = -0.585531 - 0.422605I$	$-1.44350 + 2.11057I$	$-5.68122 - 1.44020I$
$a = -0.43217 + 1.92851I$		
$b = -0.680777 - 0.308139I$		
$u = 0.493256$	2.36013	-15.0980
$a = 1.41129$		
$b = -1.46168$		

### III. u-Polynomials

Crossings	u-Polynomials at each crossing
$c_1$	$(u^{23} - 8u^{22} + \dots + 10u - 1)(u^{134} + 45u^{133} + \dots + 42u + 1)$
$c_2$	$(u^{23} - 4u^{21} + \dots - 5u^2 + 1)(u^{134} + u^{133} + \dots + 10u - 1)$
$c_3$	$(u^{23} - 4u^{21} + \dots - 2u + 1)(u^{134} - u^{133} + \dots + 2211594u - 322117)$
$c_4$	$(u^{23} + 2u^{20} + \dots - 2u^2 - 1)(u^{134} + u^{133} + \dots - 4u + 5)$
$c_5$	$(u^{23} - u^{22} + \dots - u + 1)(u^{134} - 44u^{132} + \dots - 4575u + 919)$
$c_6$	$(u^{23} - u^{22} + \dots - u + 1)(u^{134} - 42u^{132} + \dots + 3u - 1)$
$c_7$	$(u^{23} - 4u^{21} + \dots + 5u^2 - 1)(u^{134} + u^{133} + \dots + 10u - 1)$
$c_8$	$(u^{23} + 8u^{22} + \dots + 10u + 1)(u^{134} + 45u^{133} + \dots + 42u + 1)$
$c_9$	$(u^{23} - 6u^{21} + \dots + 11u - 1)(u^{134} - 17u^{133} + \dots - 107441u + 19231)$
$c_{10}$	$(u^{23} + u^{22} + \dots - u - 1)(u^{134} - 42u^{132} + \dots + 3u - 1)$
$c_{11}$	$(u^{23} + 2u^{21} + \dots - 2u^3 - 1)(u^{134} - 3u^{133} + \dots - 326u + 31)$
$c_{12}$	$(u^{23} + u^{22} + \dots - u - 1)(u^{134} - 44u^{132} + \dots - 4575u + 919)$

#### IV. Riley Polynomials

Crossings	Riley Polynomials at each crossing
$c_1, c_8$	$(y^{23} + 16y^{22} + \dots + 6y - 1)(y^{134} + 91y^{133} + \dots - 342y + 1)$
$c_2, c_7$	$(y^{23} - 8y^{22} + \dots + 10y - 1)(y^{134} - 45y^{133} + \dots - 42y + 1)$
$c_3$	$(y^{23} - 8y^{22} + \dots + 14y - 1)$ $\cdot (y^{134} - 41y^{133} + \dots - 7998700268362y + 103759361689)$
$c_4$	$(y^{23} - 2y^{21} + \dots - 4y - 1)(y^{134} + 7y^{133} + \dots - 596y + 25)$
$c_5, c_{12}$	$(y^{23} - 19y^{22} + \dots + 23y - 1)$ $\cdot (y^{134} - 88y^{133} + \dots + 5233305y + 844561)$
$c_6, c_{10}$	$(y^{23} - 23y^{22} + \dots + 19y - 1)(y^{134} - 84y^{133} + \dots - 51y + 1)$
$c_9$	$(y^{23} - 12y^{22} + \dots + 11y - 1)$ $\cdot (y^{134} - 37y^{133} + \dots - 30165676559y + 369831361)$
$c_{11}$	$(y^{23} + 4y^{22} + \dots + 2y^2 - 1)(y^{134} - y^{133} + \dots - 42416y + 961)$