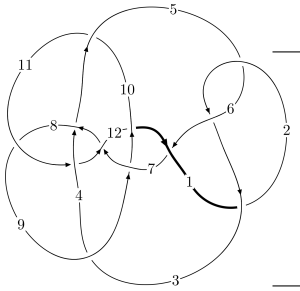
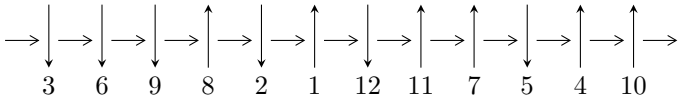
$12a_{0359}$ $(K12a_{0359})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u &= \langle -6.19368 \times 10^{103} u^{61} + 2.38805 \times 10^{105} u^{60} + \cdots + 6.33524 \times 10^{104} b - 9.63557 \times 10^{103}, \\
&\quad - 5.27642 \times 10^{103} u^{61} + 2.16564 \times 10^{105} u^{60} + \cdots + 2.11175 \times 10^{104} a + 6.20998 \times 10^{104}, \\
&\quad u^{62} - 42u^{61} + \cdots + u + 1 \rangle \\
I_2^u &= \langle -583832u^{30}a^3 - 50272u^{30}a^2 + \cdots - 1355616a - 8946449,\ 24u^{30}a^3 + 144u^{30}a^2 + \cdots + 838a + 793, \\
&\quad u^{31} + 15u^{30} + \cdots + 3u + 2 \rangle \\
I_3^u &= \langle -4.46583 \times 10^{21} u^{31} - 8.87689 \times 10^{22} u^{30} + \cdots + 1.43348 \times 10^{22} b - 3.51023 \times 10^{23}, \\
&\quad 4.78754 \times 10^{22} u^{31} + 8.67713 \times 10^{23} u^{30} + \cdots + 7.16738 \times 10^{22} a + 7.19257 \times 10^{23}, \\
&\quad u^{32} + 19u^{31} + \cdots + 90u + 25 \rangle
\end{aligned}$$

$$\begin{aligned}
I_1^v &= \langle a,\ b^2 - bv + 2b - v + 3,\ v^2 - 3v + 1 \rangle \\
I_2^v &= \langle a,\ b^2 - b + 1,\ v - 1 \rangle
\end{aligned}$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 224 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. $\boldsymbol{I_1^u = \langle -6.19 \times 10^{103} u^{61} + 2.39 \times 10^{105} u^{60} + \cdots + 6.34 \times 10^{104} b - 9.64 \times 10^{103},\ -5.28 \times 10^{103} u^{61} + 2.17 \times 10^{105} u^{60} + \cdots + 2.11 \times 10^{104} a + 6.21 \times 10^{104},\ u^{62} - 42 u^{61} + \cdots + u + 1 \rangle}$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0.249860u^{61} - 10.2552u^{60} + \cdots - 30.5916u - 2.94069 \\ 0.0977655u^{61} - 3.76946u^{60} + \cdots + 3.24488u + 0.152095 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} 0.152095u^{61} - 6.48575u^{60} + \cdots - 33.8365u - 3.09278 \\ 0.0977655u^{61} - 3.76946u^{60} + \cdots + 3.24488u + 0.152095 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 1.48851u^{61} - 61.9811u^{60} + \cdots + 9.74232u + 4.15415 \\ -0.536530u^{61} + 22.1350u^{60} + \cdots - 1.66564u + 1.48851 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -0.0868270u^{61} + 3.37589u^{60} + \cdots - 30.6459u - 2.84292 \\ 0.0990411u^{61} - 4.06016u^{60} + \cdots + 2.83287u - 0.0209841 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0.368383u^{61} - 15.6825u^{60} + \cdots - 33.3998u - 3.23851 \\ 0.609772u^{61} - 24.7449u^{60} + \cdots + 2.58185u - 0.168147 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.814764u^{61} - 34.3056u^{60} + \cdots + 2.38599u + 6.59465 \\ -0.137220u^{61} + 5.54053u^{60} + \cdots - 3.69068u + 0.951984 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0.435369u^{61} - 17.8972u^{60} + \cdots + 35.4392u + 0.0678684 \\ -0.552957u^{61} + 22.6502u^{60} + \cdots + 0.563674u + 0.541616 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0.102413u^{61} - 4.15773u^{60} + \cdots + 39.1917u + 0.298157 \\ -0.224608u^{61} + 9.09838u^{60} + \cdots - 0.175732u + 0.131771 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 0.0118368u^{61} - 0.600731u^{60} + \cdots - 38.9999u - 0.409916 \\ 0.232933u^{61} - 9.64908u^{60} + \cdots + 0.103997u - 0.205997 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -2.49621u^{61} + 103.028u^{60} + \cdots - 7.16311u + 4.09666$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{62}+32u^{61}+\cdots+25u+1$
c_2, c_5	$u^{62}+10u^{61}+\cdots+9u+1$
c_3, c_{10}	$u^{62}+u^{61}+\cdots+157u^2+9$
c_4, c_{11}	$u^{62}+u^{61}+\cdots-u+1$
c_6	$u^{62}+30u^{61}+\cdots+37547u+2393$
c_7	$u^{62}+51u^{61}+\cdots+30064771072u+1073741824$
c_8	$u^{62}+42u^{61}+\cdots-u+1$
c_9, c_{12}	$u^{62}-3u^{61}+\cdots-3u+1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{62}+56y^{60}+\cdots+127y+1$
c_2, c_5	$y^{62}-32y^{61}+\cdots-25y+1$
c_3, c_{10}	$y^{62}+21y^{61}+\cdots+2826y+81$
c_4, c_{11}	$y^{62}+9y^{61}+\cdots+17y+1$
c_6	$y^{62}+26y^{61}+\cdots-77618039y+5726449$
c_7	$y^{62}+19y^{61}+\cdots-1.15\times10^{18}y+1.15\times10^{18}$
c_8	$y^{62}-8y^{61}+\cdots-51y+1$
c_9, c_{12}	$y^{62}+21y^{61}+\cdots+y+1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.920164 + 0.258178I$ $a = -0.171522 - 0.193932I$ $b = -0.669614 + 0.624449I$	$-2.59019 - 4.63724I$	0
$u = 0.920164 - 0.258178I$ $a = -0.171522 + 0.193932I$ $b = -0.669614 - 0.624449I$	$-2.59019 + 4.63724I$	0
$u = 0.499373 + 0.963398I$ $a = 0.438750 - 0.923022I$ $b = -0.501971 - 0.889599I$	$-3.88281 - 0.46065I$	0
$u = 0.499373 - 0.963398I$ $a = 0.438750 + 0.923022I$ $b = -0.501971 + 0.889599I$	$-3.88281 + 0.46065I$	0
$u = 0.979389 + 0.514465I$ $a = -0.220792 + 0.721446I$ $b = 1.19645 + 1.09383I$	$1.85971 + 4.94822I$	0
$u = 0.979389 - 0.514465I$ $a = -0.220792 - 0.721446I$ $b = 1.19645 - 1.09383I$	$1.85971 - 4.94822I$	0
$u = 0.438857 + 1.057020I$ $a = -0.410593 + 1.007440I$ $b = 0.493823 + 0.915752I$	$-6.71452 - 5.10423I$	0
$u = 0.438857 - 1.057020I$ $a = -0.410593 - 1.007440I$ $b = 0.493823 - 0.915752I$	$-6.71452 + 5.10423I$	0
$u = 0.888552 + 0.744591I$ $a = 0.185048 - 0.989964I$ $b = -1.15174 - 1.03840I$	$-2.92298 + 9.42642I$	0
$u = 0.888552 - 0.744591I$ $a = 0.185048 + 0.989964I$ $b = -1.15174 + 1.03840I$	$-2.92298 - 9.42642I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.629220 + 1.055740I$ $a = -0.319267 + 0.898480I$ $b = 0.532879 + 0.901613I$	$-7.79004 + 3.14172I$	0
$u = 0.629220 - 1.055740I$ $a = -0.319267 - 0.898480I$ $b = 0.532879 - 0.901613I$	$-7.79004 - 3.14172I$	0
$u = 1.234050 + 0.374671I$ $a = 0.014869 - 0.420306I$ $b = -0.774223 - 0.952918I$	$-0.34790 - 1.71219I$	0
$u = 1.234050 - 0.374671I$ $a = 0.014869 + 0.420306I$ $b = -0.774223 + 0.952918I$	$-0.34790 + 1.71219I$	0
$u = 0.541110 + 0.364429I$ $a = 0.919250 - 0.771221I$ $b = -1.127670 - 0.716169I$	$-2.36554 - 0.52359I$	0
$u = 0.541110 - 0.364429I$ $a = 0.919250 + 0.771221I$ $b = -1.127670 + 0.716169I$	$-2.36554 + 0.52359I$	0
$u = -0.226942 + 0.567500I$ $a = -1.15526 + 1.37476I$ $b = 0.047302 + 0.810504I$	$-3.30081 + 1.51078I$	0
$u = -0.226942 - 0.567500I$ $a = -1.15526 - 1.37476I$ $b = 0.047302 - 0.810504I$	$-3.30081 - 1.51078I$	0
$u = 1.34172 + 0.51463I$ $a = -0.055225 + 0.493349I$ $b = 0.560633 + 1.009600I$	$1.18701 + 3.96993I$	0
$u = 1.34172 - 0.51463I$ $a = -0.055225 - 0.493349I$ $b = 0.560633 - 1.009600I$	$1.18701 - 3.96993I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.317222+0.464851I$ $a=-1.54500+1.62152I$ $b=-0.115660+0.894922I$	$-2.78728-5.95527I$	$-4.95646+7.62237I$
$u=-0.317222-0.464851I$ $a=-1.54500-1.62152I$ $b=-0.115660-0.894922I$	$-2.78728+5.95527I$	$-4.95646-7.62237I$
$u=0.249047+0.492818I$ $a=1.049160-0.849645I$ $b=-0.446366-0.699671I$	$-1.63065-0.67826I$	$-5.63896+2.73445I$
$u=0.249047-0.492818I$ $a=1.049160+0.849645I$ $b=-0.446366+0.699671I$	$-1.63065+0.67826I$	$-5.63896-2.73445I$
$u=-0.203334+0.491918I$ $a=1.53789-0.98833I$ $b=0.155182-0.732250I$	$-0.19950-1.86693I$	$-1.22584+4.41138I$
$u=-0.203334-0.491918I$ $a=1.53789+0.98833I$ $b=0.155182+0.732250I$	$-0.19950+1.86693I$	$-1.22584-4.41138I$
$u=1.19510+0.85598I$ $a=0.111753+0.918781I$ $b=1.16040+1.02724I$	$5.91226+7.99963I$	0
$u=1.19510-0.85598I$ $a=0.111753-0.918781I$ $b=1.16040-1.02724I$	$5.91226-7.99963I$	0
$u=1.20252+0.93906I$ $a=-0.152053-0.972240I$ $b=-1.17474-1.03088I$	$6.0483+13.4168I$	0
$u=1.20252-0.93906I$ $a=-0.152053+0.972240I$ $b=-1.17474+1.03088I$	$6.0483-13.4168I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.10244 + 1.06100I$ $a = 0.146064 + 1.095100I$ $b = 1.18184 + 1.05744I$	$-1.67279 + 12.65800I$	0
$u = 1.10244 - 1.06100I$ $a = 0.146064 - 1.095100I$ $b = 1.18184 - 1.05744I$	$-1.67279 - 12.65800I$	0
$u = -1.48802 + 0.48856I$ $a = 0.139890 - 0.500048I$ $b = 0.047752 - 0.317158I$	$2.20261 - 2.33406I$	0
$u = -1.48802 - 0.48856I$ $a = 0.139890 + 0.500048I$ $b = 0.047752 + 0.317158I$	$2.20261 + 2.33406I$	0
$u = 1.21760 + 1.00691I$ $a = 0.063374 - 0.672036I$ $b = -0.561277 - 0.869964I$	$-5.76493 + 4.37566I$	0
$u = 1.21760 - 1.00691I$ $a = 0.063374 + 0.672036I$ $b = -0.561277 + 0.869964I$	$-5.76493 - 4.37566I$	0
$u = 1.16698 + 1.07593I$ $a = -0.191200 - 1.072920I$ $b = -1.19188 - 1.05052I$	$3.2276 + 16.0824I$	0
$u = 1.16698 - 1.07593I$ $a = -0.191200 + 1.072920I$ $b = -1.19188 + 1.05052I$	$3.2276 - 16.0824I$	0
$u = 1.16841 + 1.11208I$ $a = 0.208737 + 1.092990I$ $b = 1.19732 + 1.05500I$	$0.5718 + 21.3392I$	0
$u = 1.16841 - 1.11208I$ $a = 0.208737 - 1.092990I$ $b = 1.19732 - 1.05500I$	$0.5718 - 21.3392I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.326655+0.081761I$ $a=-1.01998-4.35874I$ $b=-0.455772-1.038460I$	$-2.34446-1.67897I$	$-3.97540+0.64256I$
$u=-0.326655-0.081761I$ $a=-1.01998+4.35874I$ $b=-0.455772+1.038460I$	$-2.34446+1.67897I$	$-3.97540-0.64256I$
$u=-0.238513+0.230540I$ $a=\ \ 0.43580-4.41695I$ $b=-0.545904-1.033350I$	$-2.44610+5.55793I$	$-3.92344-7.42769I$
$u=-0.238513-0.230540I$ $a=\ \ 0.43580+4.41695I$ $b=-0.545904+1.033350I$	$-2.44610-5.55793I$	$-3.92344+7.42769I$
$u=\ \ 1.30406+1.14133I$ $a=\ \ 0.495631+0.091161I$ $b=\ \ 0.678233-0.294448I$	$-1.69191-4.30137I$	0
$u=\ \ 1.30406-1.14133I$ $a=\ \ 0.495631-0.091161I$ $b=\ \ 0.678233+0.294448I$	$-1.69191+4.30137I$	0
$u=\ \ 1.43507+1.00279I$ $a=\ \ 0.006386+0.624885I$ $b=\ \ 0.533141+0.847055I$	$-0.63962+7.41146I$	0
$u=\ \ 1.43507-1.00279I$ $a=\ \ 0.006386-0.624885I$ $b=\ \ 0.533141-0.847055I$	$-0.63962-7.41146I$	0
$u=\ \ 1.44646+1.10837I$ $a=-0.032947-0.651358I$ $b=-0.548879-0.829457I$	$-3.10035+12.75660I$	0
$u=\ \ 1.44646-1.10837I$ $a=-0.032947+0.651358I$ $b=-0.548879+0.829457I$	$-3.10035-12.75660I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.059087 + 0.137841I$ $a = -6.27225 + 2.11029I$ $b = 0.575488 + 0.870652I$	$-0.00632 + 2.04316I$	$0.51473 - 3.73697I$
$u = 0.059087 - 0.137841I$ $a = -6.27225 - 2.11029I$ $b = 0.575488 - 0.870652I$	$-0.00632 - 2.04316I$	$0.51473 + 3.73697I$
$u = -0.1162010 + 0.0391791I$ $a = 6.30651 - 6.74361I$ $b = 0.451685 - 0.907545I$	$0.00633 - 2.03596I$	$0.03927 + 3.79777I$
$u = -0.1162010 - 0.0391791I$ $a = 6.30651 + 6.74361I$ $b = 0.451685 + 0.907545I$	$0.00633 + 2.03596I$	$0.03927 - 3.79777I$
$u = 1.42808 + 1.37693I$ $a = -0.496587 - 0.104373I$ $b = -0.667948 + 0.203001I$	$2.88874 - 7.13321I$	0
$u = 1.42808 - 1.37693I$ $a = -0.496587 + 0.104373I$ $b = -0.667948 - 0.203001I$	$2.88874 + 7.13321I$	0
$u = 1.53493 + 1.32200I$ $a = 0.507691 + 0.106764I$ $b = 0.710619 - 0.195157I$	$0.49623 - 12.18690I$	0
$u = 1.53493 - 1.32200I$ $a = 0.507691 - 0.106764I$ $b = 0.710619 + 0.195157I$	$0.49623 + 12.18690I$	0
$u = 1.11399 + 1.72823I$ $a = -0.462115 - 0.079137I$ $b = -0.525267 + 0.184090I$	$4.48939 - 4.83470I$	0
$u = 1.11399 - 1.72823I$ $a = -0.462115 + 0.079137I$ $b = -0.525267 - 0.184090I$	$4.48939 + 4.83470I$	0

	Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=$	$0.82068+1.97978I$		
$a=$	$0.437989+0.036032I$	$3.56951+0.16849I$	0
$b=$	$0.436166-0.185034I$		
$u=$	$0.82068-1.97978I$		
$a=$	$0.437989-0.036032I$	$3.56951-0.16849I$	0
$b=$	$0.436166+0.185034I$		

II. $\boldsymbol{I_2^u = \langle -5.84 \times 10^5 a^3 u^{30} - 5.03 \times 10^4 a^2 u^{30} + \cdots - 1.36 \times 10^6 a - 8.95 \times 10^6,\ 24u^{30}a^3 + 144u^{30}a^2 + \cdots + 838a + 793,\ u^{31} + 15u^{30} + \cdots + 3u + 2 \rangle}$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} a \\ 0.495299a^3u^{30} + 0.0426487a^2u^{30} + \cdots + 1.15005a + 7.58980 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} -0.495299a^3u^{30} - 0.0426487a^2u^{30} + \cdots - 0.150049a - 7.58980 \\ 0.495299a^3u^{30} + 0.0426487a^2u^{30} + \cdots + 1.15005a + 7.58980 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -0.121390a^3u^{30} - 0.530815a^2u^{30} + \cdots + 0.594693a - 2.19483 \\ 0.0787413a^3u^{30} - 0.0221048a^2u^{30} + \cdots + 1.82404a - 0.212522 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -0.898170a^3u^{30} + 0.878610a^2u^{30} + \cdots + 0.903562a - 1.36728 \\ 1.92968a^3u^{30} - 1.83328a^2u^{30} + \cdots + 3.91158a + 5.36658 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0.0407111a^3u^{30} - 0.535162a^2u^{30} + \cdots - 3.84252a - 2.55769 \\ 0.0787413a^3u^{30} - 0.0221048a^2u^{30} + \cdots + 1.82404a + 0.787478 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} a^2u \\ 0.0426487a^3u^{30} + 0.552920a^2u^{30} + \cdots - 2.41874a + 2.40735 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 0.00461847a^3u^{30} - 0.960137a^2u^{30} + \cdots - 2.08530a - 1.93781 \\ -2.09453a^3u^{30} + 1.81444a^2u^{30} + \cdots - 4.99193a + 4.06092 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0.953931a^3u^{30} - 0.775684a^2u^{30} + \cdots - 1.46886a - 2.39151 \\ -3.38652a^3u^{30} + 1.47922a^2u^{30} + \cdots - 3.39276a + 4.99159 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -1.13256a^3u^{30} + 0.301378a^2u^{30} + \cdots - 0.658493a + 0.715757 \\ 0.609317a^3u^{30} - 0.0145222a^2u^{30} + \cdots - 2.67703a - 5.87958 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{185632}{589373}u^{30}a^3 + \frac{52112}{589373}u^{30}a^2 + \cdots - \frac{4300168}{589373}a + \frac{19950327}{589373}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$(u^{31}+16u^{30}+\cdots+2u+1)^4$
c_2, c_5	$(u^{31}-2u^{30}+\cdots-2u+1)^4$
c_3, c_{10}	$u^{124}+2u^{123}+\cdots+445543889u+54599377$
c_4, c_{11}	$u^{124}+2u^{123}+\cdots-u+1$
c_6	$(u^{31}-9u^{30}+\cdots+73u-8)^4$
c_7	$(u^2-u+1)^{62}$
c_8	$(u^{31}-15u^{30}+\cdots+3u-2)^4$
c_9, c_{12}	$u^{124}-3u^{123}+\cdots+54u+1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$(y^{31}+28y^{29}+\cdots-14y-1)^4$
c_2, c_5	$(y^{31}-16y^{30}+\cdots+2y-1)^4$
c_3, c_{10}	$y^{124}+42y^{123}+\cdots-6608919476226557y+2981091968788129$
c_4, c_{11}	$y^{124}-42y^{123}+\cdots+283y+1$
c_6	$(y^{31}+13y^{30}+\cdots+833y-64)^4$
c_7	$(y^2+y+1)^{62}$
c_8	$(y^{31}-3y^{30}+\cdots+69y-4)^4$
c_9, c_{12}	$y^{124}-31y^{123}+\cdots-498y+1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.409801+0.900274I$ $a=-0.506789+0.851719I$ $b=-1.53214+0.83196I$	$-0.60079-6.55319I$	$-2.41907+9.71050I$
$u=-0.409801+0.900274I$ $a=\ \ 0.534702-0.939505I$ $b=\ \ 0.603624-0.987957I$	$-0.60079-2.49343I$	$-2.41907+2.78230I$
$u=-0.409801+0.900274I$ $a=\ \ 1.177230+0.223519I$ $b=\ \ 0.0153756+0.0819040I$	$-0.60079-2.49343I$	$-2.41907+2.78230I$
$u=-0.409801+0.900274I$ $a=-0.96924-1.97631I$ $b=\ \ 0.437980-0.915004I$	$-0.60079-6.55319I$	$-2.41907+9.71050I$
$u=-0.409801-0.900274I$ $a=-0.506789-0.851719I$ $b=-1.53214-0.83196I$	$-0.60079+6.55319I$	$-2.41907-9.71050I$
$u=-0.409801-0.900274I$ $a=\ \ 0.534702+0.939505I$ $b=\ \ 0.603624+0.987957I$	$-0.60079+2.49343I$	$-2.41907-2.78230I$
$u=-0.409801-0.900274I$ $a=\ \ 1.177230-0.223519I$ $b=\ \ 0.0153756-0.0819040I$	$-0.60079+2.49343I$	$-2.41907-2.78230I$
$u=-0.409801-0.900274I$ $a=-0.96924+1.97631I$ $b=\ \ 0.437980+0.915004I$	$-0.60079+6.55319I$	$-2.41907-9.71050I$
$u=-1.020150+0.219444I$ $a=\ \ 0.137660+1.011220I$ $b=-0.599567-0.078037I$	$3.66483+1.12535I$	$9.65108-2.67079I$
$u=-1.020150+0.219444I$ $a=\ \ 0.542247-0.929539I$ $b=\ \ 1.23471-1.06885I$	$3.66483-2.93441I$	$9.65108+4.25741I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.020150+0.219444I$ $a=\ 0.445103+0.755471I$ $b=\ 0.991109+0.949417I$	$3.66483+1.12535I$	$9.65108-2.67079I$
$u=-1.020150+0.219444I$ $a=\ 0.696367-0.458492I$ $b=-0.675842+0.294074I$	$3.66483-2.93441I$	$9.65108+4.25741I$
$u=-1.020150-0.219444I$ $a=\ 0.137660-1.011220I$ $b=-0.599567+0.078037I$	$3.66483-1.12535I$	$9.65108+2.67079I$
$u=-1.020150-0.219444I$ $a=\ 0.542247+0.929539I$ $b=\ 1.23471+1.06885I$	$3.66483+2.93441I$	$9.65108-4.25741I$
$u=-1.020150-0.219444I$ $a=\ 0.445103-0.755471I$ $b=\ 0.991109-0.949417I$	$3.66483-1.12535I$	$9.65108+2.67079I$
$u=-1.020150-0.219444I$ $a=\ 0.696367+0.458492I$ $b=-0.675842-0.294074I$	$3.66483+2.93441I$	$9.65108-4.25741I$
$u=-0.350417+0.991768I$ $a=\ 0.504244-0.840575I$ $b=\ 1.53201-0.78532I$	$-3.44393-11.22350I$	$-5.49289+12.45420I$
$u=-0.350417+0.991768I$ $a=-0.612387+0.973879I$ $b=-0.753682+1.014450I$	$-3.44393-7.16369I$	$-5.49289+5.52600I$
$u=-0.350417+0.991768I$ $a=-1.138770-0.508651I$ $b=\ 0.009280-0.154348I$	$-3.44393-7.16369I$	$-5.49289+5.52600I$
$u=-0.350417+0.991768I$ $a=\ 0.77423+2.12451I$ $b=-0.414943+0.999946I$	$-3.44393-11.22350I$	$-5.49289+12.45420I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.350417-0.991768I$ $a=\ \ 0.504244+0.840575I$ $b=\ \ 1.53201+0.78532I$	$-3.44393+11.22350I$	$-5.49289-12.45420I$
$u=-0.350417-0.991768I$ $a=-0.612387-0.973879I$ $b=-0.753682-1.014450I$	$-3.44393+7.16369I$	$-5.49289-5.52600I$
$u=-0.350417-0.991768I$ $a=-1.138770+0.508651I$ $b=\ \ 0.009280+0.154348I$	$-3.44393+7.16369I$	$-5.49289-5.52600I$
$u=-0.350417-0.991768I$ $a=\ \ 0.77423-2.12451I$ $b=-0.414943-0.999946I$	$-3.44393+11.22350I$	$-5.49289-12.45420I$
$u=-0.270659+0.813098I$ $a=\ \ 0.525534-0.836875I$ $b=\ \ 1.61610-0.82213I$	$-4.53268-2.91050I$	$-8.63801+6.37131I$
$u=-0.270659+0.813098I$ $a=-0.491451+1.068510I$ $b=-0.599508+1.236640I$	$-4.53268+1.14926I$	$-8.63801-0.55689I$
$u=-0.270659+0.813098I$ $a=-1.69758-0.34137I$ $b=-0.107453-0.133364I$	$-4.53268+1.14926I$	$-8.63801-0.55689I$
$u=-0.270659+0.813098I$ $a=\ \ 1.19871+2.36906I$ $b=-0.307156+0.882745I$	$-4.53268-2.91050I$	$-8.63801+6.37131I$
$u=-0.270659-0.813098I$ $a=\ \ 0.525534+0.836875I$ $b=\ \ 1.61610+0.82213I$	$-4.53268+2.91050I$	$-8.63801-6.37131I$
$u=-0.270659-0.813098I$ $a=-0.491451-1.068510I$ $b=-0.599508-1.236640I$	$-4.53268-1.14926I$	$-8.63801+0.55689I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.270659-0.813098I$ $a=-1.69758+0.34137I$ $b=-0.107453+0.133364I$	$-4.53268-1.14926I$	$-8.63801+0.55689I$
$u=-0.270659-0.813098I$ $a=\ \ 1.19871-2.36906I$ $b=-0.307156-0.882745I$	$-4.53268+2.91050I$	$-8.63801-6.37131I$
$u=-1.143470+0.448145I$ $a=\ \ 0.115197-0.867097I$ $b=\ \ 0.636723-0.038100I$	$2.09249-3.38872I$	$5.67347+2.42300I$
$u=-1.143470+0.448145I$ $a=-0.568570+0.991737I$ $b=-1.28760+1.03758I$	$2.09249-7.44849I$	$5.67347+9.35121I$
$u=-1.143470+0.448145I$ $a=-0.473847-0.553922I$ $b=-0.967860-0.714214I$	$2.09249-3.38872I$	$5.67347+2.42300I$
$u=-1.143470+0.448145I$ $a=-0.482744+0.029373I$ $b=\ \ 0.801645-0.374650I$	$2.09249-7.44849I$	$5.67347+9.35121I$
$u=-1.143470-0.448145I$ $a=\ \ 0.115197+0.867097I$ $b=\ \ 0.636723+0.038100I$	$2.09249+3.38872I$	$5.67347-2.42300I$
$u=-1.143470-0.448145I$ $a=-0.568570-0.991737I$ $b=-1.28760-1.03758I$	$2.09249+7.44849I$	$5.67347-9.35121I$
$u=-1.143470-0.448145I$ $a=-0.473847+0.553922I$ $b=-0.967860+0.714214I$	$2.09249+3.38872I$	$5.67347-2.42300I$
$u=-1.143470-0.448145I$ $a=-0.482744-0.029373I$ $b=\ \ 0.801645+0.374650I$	$2.09249+7.44849I$	$5.67347-9.35121I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.822348+0.989602I$ $a=-0.395184+0.875113I$ $b=-1.32730+0.83675I$	$1.52153-6.66542I$	$0.+12.11217I$
$u=-0.822348+0.989602I$ $a=0.547490-0.651940I$ $b=0.726923-0.378010I$	$1.52153-2.60565I$	0
$u=-0.822348+0.989602I$ $a=-0.354968-1.268640I$ $b=0.804487-0.890882I$	$1.52153-6.66542I$	$0.+12.11217I$
$u=-0.822348+0.989602I$ $a=0.168388+0.199051I$ $b=-0.418639-0.047698I$	$1.52153-2.60565I$	$0.+5.18397I$
$u=-0.822348-0.989602I$ $a=-0.395184-0.875113I$ $b=-1.32730-0.83675I$	$1.52153+6.66542I$	$0.-12.11217I$
$u=-0.822348-0.989602I$ $a=0.547490+0.651940I$ $b=0.726923+0.378010I$	$1.52153+2.60565I$	0
$u=-0.822348-0.989602I$ $a=-0.354968+1.268640I$ $b=0.804487+0.890882I$	$1.52153+6.66542I$	$0.-12.11217I$
$u=-0.822348-0.989602I$ $a=0.168388-0.199051I$ $b=-0.418639+0.047698I$	$1.52153+2.60565I$	$0.-5.18397I$
$u=0.622733+0.295826I$ $a=0.639824+0.808155I$ $b=-1.184250+0.044416I$	$-0.17715+8.26022I$	$4.35716-7.98513I$
$u=0.622733+0.295826I$ $a=0.43247-1.52881I$ $b=1.32230-1.56744I$	$-0.17715+12.32000I$	$4.3572-14.9133I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.622733 + 0.295826I$ $a = 0.61394 - 1.81047I$ $b = -0.909978 - 1.015220I$	$-0.17715 + 8.26022I$	$4.35716 - 7.98513I$
$u = 0.622733 + 0.295826I$ $a = -0.19132 + 3.11576I$ $b = 0.565553 + 0.239182I$	$-0.17715 + 12.32000I$	$4.3572 - 14.9133I$
$u = 0.622733 - 0.295826I$ $a = 0.639824 - 0.808155I$ $b = -1.184250 - 0.044416I$	$-0.17715 - 8.26022I$	$4.35716 + 7.98513I$
$u = 0.622733 - 0.295826I$ $a = 0.43247 + 1.52881I$ $b = 1.32230 + 1.56744I$	$-0.17715 - 12.32000I$	$4.3572 + 14.9133I$
$u = 0.622733 - 0.295826I$ $a = 0.61394 + 1.81047I$ $b = -0.909978 + 1.015220I$	$-0.17715 - 8.26022I$	$4.35716 + 7.98513I$
$u = 0.622733 - 0.295826I$ $a = -0.19132 - 3.11576I$ $b = 0.565553 - 0.239182I$	$-0.17715 - 12.32000I$	$4.3572 + 14.9133I$
$u = 0.601541 + 0.243060I$ $a = -0.914035 - 0.774581I$ $b = 1.107250 + 0.029166I$	$2.50780 + 3.03742I$	$8.75638 - 4.58888I$
$u = 0.601541 + 0.243060I$ $a = -0.40227 + 1.50045I$ $b = -1.35153 + 1.54479I$	$2.50780 + 7.09718I$	$8.7564 - 11.5171I$
$u = 0.601541 + 0.243060I$ $a = -0.57866 + 1.57246I$ $b = 1.020520 + 0.974779I$	$2.50780 + 3.03742I$	$8.75638 - 4.58888I$
$u = 0.601541 + 0.243060I$ $a = 0.45763 - 3.19210I$ $b = -0.581798 - 0.204056I$	$2.50780 + 7.09718I$	$8.7564 - 11.5171I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.601541 - 0.243060I$ $a = -0.914035 + 0.774581I$ $b = 1.107250 - 0.029166I$	$2.50780 - 3.03742I$	$8.75638 + 4.58888I$
$u = 0.601541 - 0.243060I$ $a = -0.40227 - 1.50045I$ $b = -1.35153 - 1.54479I$	$2.50780 - 7.09718I$	$8.7564 + 11.5171I$
$u = 0.601541 - 0.243060I$ $a = -0.57866 - 1.57246I$ $b = 1.020520 - 0.974779I$	$2.50780 - 3.03742I$	$8.75638 + 4.58888I$
$u = 0.601541 - 0.243060I$ $a = 0.45763 + 3.19210I$ $b = -0.581798 + 0.204056I$	$2.50780 - 7.09718I$	$8.7564 + 11.5171I$
$u = 0.631386 + 0.046109I$ $a = 0.02710 + 1.44042I$ $b = 1.29317 + 1.23847I$	$5.43979 + 0.59934I$	$12.53544 - 0.73085I$
$u = 0.631386 + 0.046109I$ $a = -0.18713 + 1.46019I$ $b = -1.34033 + 1.35511I$	$5.43979 + 4.65911I$	$12.5354 - 7.6590I$
$u = 0.631386 + 0.046109I$ $a = -1.37107 - 1.87145I$ $b = 0.808687 - 0.069132I$	$5.43979 + 0.59934I$	$12.53544 - 0.73085I$
$u = 0.631386 + 0.046109I$ $a = 1.23240 - 2.40859I$ $b = -0.723271 - 0.119520I$	$5.43979 + 4.65911I$	$12.5354 - 7.6590I$
$u = 0.631386 - 0.046109I$ $a = 0.02710 - 1.44042I$ $b = 1.29317 - 1.23847I$	$5.43979 - 0.59934I$	$12.53544 + 0.73085I$
$u = 0.631386 - 0.046109I$ $a = -0.18713 - 1.46019I$ $b = -1.34033 - 1.35511I$	$5.43979 - 4.65911I$	$12.5354 + 7.6590I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.631386 - 0.046109I$ $a = -1.37107 + 1.87145I$ $b = 0.808687 + 0.069132I$	$5.43979 - 0.59934I$	$12.53544 + 0.73085I$
$u = 0.631386 - 0.046109I$ $a = 1.23240 + 2.40859I$ $b = -0.723271 + 0.119520I$	$5.43979 - 4.65911I$	$12.5354 + 7.6590I$
$u = 0.489498 + 0.248123I$ $a = 0.637086 - 0.158363I$ $b = -1.325820 - 0.366582I$	$-2.33026 - 0.43819I$	$4.64802 - 6.67686I$
$u = 0.489498 + 0.248123I$ $a = 0.45350 - 1.43470I$ $b = 1.42531 - 1.61209I$	$-2.33026 + 3.62158I$	$4.6480 - 13.6051I$
$u = 0.489498 + 0.248123I$ $a = 1.54770 - 1.08544I$ $b = -0.909174 - 0.588965I$	$-2.33026 - 0.43819I$	$4.64802 - 6.67686I$
$u = 0.489498 + 0.248123I$ $a = -0.46872 + 3.94868I$ $b = 0.519715 + 0.154299I$	$-2.33026 + 3.62158I$	$4.6480 - 13.6051I$
$u = 0.489498 - 0.248123I$ $a = 0.637086 + 0.158363I$ $b = -1.325820 + 0.366582I$	$-2.33026 + 0.43819I$	$4.64802 + 6.67686I$
$u = 0.489498 - 0.248123I$ $a = 0.45350 + 1.43470I$ $b = 1.42531 + 1.61209I$	$-2.33026 - 3.62158I$	$4.6480 + 13.6051I$
$u = 0.489498 - 0.248123I$ $a = 1.54770 + 1.08544I$ $b = -0.909174 + 0.588965I$	$-2.33026 + 0.43819I$	$4.64802 + 6.67686I$
$u = 0.489498 - 0.248123I$ $a = -0.46872 - 3.94868I$ $b = 0.519715 - 0.154299I$	$-2.33026 - 3.62158I$	$4.6480 + 13.6051I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.24063+0.87066I$ $a=\ \ 0.208118-0.717998I$ $b=\ \ 0.666559-0.178120I$	$2.08710+2.52400I$	0
$u=-1.24063+0.87066I$ $a=-0.484779+1.176110I$ $b=-1.23957+1.06053I$	$2.08710-1.53576I$	0
$u=-1.24063+0.87066I$ $a=-0.611314-0.114212I$ $b=-1.038810-0.270646I$	$2.08710+2.52400I$	0
$u=-1.24063+0.87066I$ $a=-0.034338-0.410827I$ $b=\ \ 1.037050-0.513771I$	$2.08710-1.53576I$	0
$u=-1.24063-0.87066I$ $a=\ \ 0.208118+0.717998I$ $b=\ \ 0.666559+0.178120I$	$2.08710-2.52400I$	0
$u=-1.24063-0.87066I$ $a=-0.484779-1.176110I$ $b=-1.23957-1.06053I$	$2.08710+1.53576I$	0
$u=-1.24063-0.87066I$ $a=-0.611314+0.114212I$ $b=-1.038810+0.270646I$	$2.08710-2.52400I$	0
$u=-1.24063-0.87066I$ $a=-0.034338+0.410827I$ $b=\ \ 1.037050+0.513771I$	$2.08710+1.53576I$	0
$u=-1.16890+0.97715I$ $a=\ \ 0.384905-1.213680I$ $b=\ \ 1.18207-1.05155I$	$3.75655-5.67101I$	0
$u=-1.16890+0.97715I$ $a=-0.193226+0.671460I$ $b=-0.645853+0.189384I$	$3.75655-1.61124I$	0

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.16890+0.97715I$ $a=\ \ 0.595165-0.055307I$ $b=\ \ 1.000140+0.121212I$	$3.75655-1.61124I$	0
$u=-1.16890+0.97715I$ $a=-0.052270+0.557513I$ $b=-1.090220+0.589435I$	$3.75655-5.67101I$	0
$u=-1.16890-0.97715I$ $a=\ \ 0.384905+1.213680I$ $b=\ \ 1.18207+1.05155I$	$3.75655+5.67101I$	0
$u=-1.16890-0.97715I$ $a=-0.193226-0.671460I$ $b=-0.645853-0.189384I$	$3.75655+1.61124I$	0
$u=-1.16890-0.97715I$ $a=\ \ 0.595165+0.055307I$ $b=\ \ 1.000140-0.121212I$	$3.75655+1.61124I$	0
$u=-1.16890-0.97715I$ $a=-0.052270-0.557513I$ $b=-1.090220-0.589435I$	$3.75655+5.67101I$	0
$u=-0.96606+1.18137I$ $a=-0.712451+0.453230I$ $b=-1.012460+0.269165I$	$0.230355+0.167426I$	0
$u=-0.96606+1.18137I$ $a=\ \ 0.338391-0.724664I$ $b=\ \ 1.28205-0.69278I$	$0.23036-3.89234I$	0
$u=-0.96606+1.18137I$ $a=-0.049246-0.578533I$ $b=\ \ 0.507273-0.176602I$	$0.230355+0.167426I$	0
$u=-0.96606+1.18137I$ $a=-0.06606+1.44697I$ $b=-0.94929+1.08400I$	$0.23036-3.89234I$	0

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.96606-1.18137I$ $a=-0.712451-0.453230I$ $b=-1.012460-0.269165I$	$0.230355-0.167426I$	0
$u=-0.96606-1.18137I$ $a=\ \ 0.338391+0.724664I$ $b=\ \ 1.28205+0.69278I$	$0.23036+3.89234I$	0
$u=-0.96606-1.18137I$ $a=-0.049246+0.578533I$ $b=\ \ 0.507273+0.176602I$	$0.230355-0.167426I$	0
$u=-0.96606-1.18137I$ $a=-0.06606-1.44697I$ $b=-0.94929-1.08400I$	$0.23036+3.89234I$	0
$u=-0.466333$ $a=-0.443642+1.147910I$ $b=-1.16747+1.69050I$	$-1.30280-2.02988I$	$15.0429+3.4641I$
$u=-0.466333$ $a=-0.443642-1.147910I$ $b=-1.16747-1.69050I$	$-1.30280+2.02988I$	$15.0429-3.4641I$
$u=-0.466333$ $a=-2.16598+3.37208I$ $b=\ \ 0.337546-0.253027I$	$-1.30280-2.02988I$	$15.0429+3.4641I$
$u=-0.466333$ $a=-2.16598-3.37208I$ $b=\ \ 0.337546+0.253027I$	$-1.30280+2.02988I$	$15.0429-3.4641I$
$u=-1.10803+1.11733I$ $a=\ \ 0.687315-0.255580I$ $b=\ \ 1.043690-0.074878I$	$3.31713-2.53416I$	0
$u=-1.10803+1.11733I$ $a=-0.225497+0.637652I$ $b=-1.197980+0.634447I$	$3.31713-6.59393I$	0

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.10803+1.11733I$ $a=-0.095962+0.635413I$ $b=-0.596781+0.197969I$	$3.31713-2.53416I$	0
$u=-1.10803+1.11733I$ $a=0.258765-1.339700I$ $b=1.08112-1.08303I$	$3.31713-6.59393I$	0
$u=-1.10803-1.11733I$ $a=0.687315+0.255580I$ $b=1.043690+0.074878I$	$3.31713+2.53416I$	0
$u=-1.10803-1.11733I$ $a=-0.225497-0.637652I$ $b=-1.197980-0.634447I$	$3.31713+6.59393I$	0
$u=-1.10803-1.11733I$ $a=-0.095962-0.635413I$ $b=-0.596781-0.197969I$	$3.31713+2.53416I$	0
$u=-1.10803-1.11733I$ $a=0.258765+1.339700I$ $b=1.08112+1.08303I$	$3.31713+6.59393I$	0
$u=-1.11153+1.19848I$ $a=-0.778587+0.297189I$ $b=-1.119500+0.134690I$	$1.10056-6.88524I$	0
$u=-1.11153+1.19848I$ $a=0.297759-0.616591I$ $b=1.245540-0.616665I$	$1.10056-10.94500I$	0
$u=-1.11153+1.19848I$ $a=0.047541-0.674074I$ $b=0.573682-0.227950I$	$1.10056-6.88524I$	0
$u=-1.11153+1.19848I$ $a=-0.25863+1.43814I$ $b=-1.05340+1.13598I$	$1.10056-10.94500I$	0

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.11153-1.19848I$ $a=-0.778587-0.297189I$ $b=-1.119500-0.134690I$	$1.10056+6.88524I$	0
$u=-1.11153-1.19848I$ $a=0.297759+0.616591I$ $b=1.245540+0.616665I$	$1.10056+10.94500I$	0
$u=-1.11153-1.19848I$ $a=0.047541+0.674074I$ $b=0.573682+0.227950I$	$1.10056+6.88524I$	0
$u=-1.11153-1.19848I$ $a=-0.25863-1.43814I$ $b=-1.05340-1.13598I$	$1.10056+10.94500I$	0

III. $I_3^u = \langle -4.47 \times 10^{21} u^{31} - 8.88 \times 10^{22} u^{30} + \cdots + 1.43 \times 10^{22} b - 3.51 \times 10^{23},\ 4.79 \times 10^{22} u^{31} + 8.68 \times 10^{23} u^{30} + \cdots + 7.17 \times 10^{22} a + 7.19 \times 10^{23},\ u^{32} + 19 u^{31} + \cdots + 90u + 25 \rangle$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -0.667963u^{31} - 12.1064u^{30} + \cdots - 39.4438u - 10.0351 \\ 0.311539u^{31} + 6.19257u^{30} + \cdots + 53.6324u + 24.4875 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} -0.979501u^{31} - 18.2990u^{30} + \cdots - 93.0762u - 34.5227 \\ 0.311539u^{31} + 6.19257u^{30} + \cdots + 53.6324u + 24.4875 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 1.70114u^{31} + 30.9669u^{30} + \cdots + 127.404u + 48.3701 \\ -1.35473u^{31} - 24.8075u^{30} + \cdots - 103.732u - 42.5285 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -0.394630u^{31} - 7.39431u^{30} + \cdots - 42.9948u - 17.8236 \\ 0.648401u^{31} + 11.7901u^{30} + \cdots + 49.5454u + 19.2906 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -2.04037u^{31} - 38.4678u^{30} + \cdots - 204.978u - 101.979 \\ -0.633106u^{31} - 10.5498u^{30} + \cdots + 1.25683u + 17.1410 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -0.0759806u^{31} - 1.35741u^{30} + \cdots - 2.66347u - 2.81860 \\ -0.422391u^{31} - 7.51682u^{30} + \cdots - 24.3353u - 8.66027 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} 1.71932u^{31} + 31.3533u^{30} + \cdots + 125.165u + 50.2261 \\ -0.781724u^{31} - 14.5169u^{30} + \cdots - 70.5173u - 30.8133 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0.0999657u^{31} + 1.71787u^{30} + \cdots + 5.19448u + 0.992100 \\ 0.262654u^{31} + 4.74927u^{30} + \cdots + 19.1426u + 7.68738 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -0.488973u^{31} - 8.79151u^{30} + \cdots - 33.6906u - 11.0311 \\ 0.310704u^{31} + 5.69483u^{30} + \cdots + 24.6780u + 9.97506 \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= \frac{16771962131537272675106 4}{14334761307521948282105}u^{31} + \frac{30658926026067180194232 71}{14334761307521948282105}u^{30} + \cdots + \frac{14165838622959990791344032}{14334761307521948282105}u + \frac{907755503948170820806660}{2866952261504389656421}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{32} - 17u^{31} + \cdots - 8u + 1$
c_2	$u^{32} + 3u^{31} + \cdots + 4u + 1$
c_3, c_{10}	$u^{32} + 6u^{30} + \cdots - u + 1$
c_4, c_{11}	$u^{32} - 2u^{31} + \cdots + 2u + 1$
c_5	$u^{32} - 3u^{31} + \cdots - 4u + 1$
c_6	$u^{32} - 9u^{31} + \cdots - 170u + 25$
c_7	$u^{32} + 3u^{31} + \cdots + 11u + 1$
c_8	$u^{32} + 19u^{31} + \cdots + 90u + 25$
c_9, c_{12}	$u^{32} - 8u^{31} + \cdots - 3u^2 + 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{32} - y^{31} + \cdots + 16y + 1$
c_2, c_5	$y^{32} - 17y^{31} + \cdots - 8y + 1$
c_3, c_{10}	$y^{32} + 12y^{31} + \cdots + 27y + 1$
c_4, c_{11}	$y^{32} - 16y^{31} + \cdots - 22y + 1$
c_6	$y^{32} + 13y^{31} + \cdots - 6050y + 625$
c_7	$y^{32} + 19y^{31} + \cdots + 13y + 1$
c_8	$y^{32} - 5y^{31} + \cdots - 11950y + 625$
c_9, c_{12}	$y^{32} - 12y^{31} + \cdots - 6y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.382303 + 0.934070I$ $a = -1.010960 + 0.075541I$ $b = -0.534216 - 0.301258I$	$4.12302 - 4.19312I$	$4.47577 + 4.00568I$
$u = 0.382303 - 0.934070I$ $a = -1.010960 - 0.075541I$ $b = -0.534216 + 0.301258I$	$4.12302 + 4.19312I$	$4.47577 - 4.00568I$
$u = -0.675417 + 0.768967I$ $a = 0.226037 + 1.137460I$ $b = -1.13478 + 0.85700I$	$-1.79090 - 9.17694I$	$0. + 10.35277I$
$u = -0.675417 - 0.768967I$ $a = 0.226037 - 1.137460I$ $b = -1.13478 - 0.85700I$	$-1.79090 + 9.17694I$	$0. - 10.35277I$
$u = -0.944337 + 0.611040I$ $a = -0.177695 - 0.791351I$ $b = 1.13301 - 0.96276I$	$1.90055 - 4.71902I$	$5.77628 + 0.I$
$u = -0.944337 - 0.611040I$ $a = -0.177695 + 0.791351I$ $b = 1.13301 + 0.96276I$	$1.90055 + 4.71902I$	$5.77628 + 0.I$
$u = -1.088410 + 0.317668I$ $a = 0.140152 - 0.243786I$ $b = 0.966370 - 0.032542I$	$3.70712 - 0.85429I$	$9.75163 + 0.I$
$u = -1.088410 - 0.317668I$ $a = 0.140152 + 0.243786I$ $b = 0.966370 + 0.032542I$	$3.70712 + 0.85429I$	$9.75163 + 0.I$
$u = 0.659216 + 0.195884I$ $a = 1.61688 + 1.10693I$ $b = 0.578112 + 0.562424I$	$-0.75786 - 11.40500I$	$-1.06255 + 7.05435I$
$u = 0.659216 - 0.195884I$ $a = 1.61688 - 1.10693I$ $b = 0.578112 - 0.562424I$	$-0.75786 + 11.40500I$	$-1.06255 - 7.05435I$

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.579244 + 0.299588I$ $a = -1.75160 - 0.79694I$ $b = -0.588585 - 0.512936I$	$1.84734 - 6.29478I$	$2.01774 + 3.71090I$
$u = 0.579244 - 0.299588I$ $a = -1.75160 + 0.79694I$ $b = -0.588585 + 0.512936I$	$1.84734 + 6.29478I$	$2.01774 - 3.71090I$
$u = -0.934573 + 1.046980I$ $a = 0.133797 - 1.040530I$ $b = 1.115820 - 0.851370I$	$2.29932 - 6.02300I$	0
$u = -0.934573 - 1.046980I$ $a = 0.133797 + 1.040530I$ $b = 1.115820 + 0.851370I$	$2.29932 + 6.02300I$	0
$u = -0.551583 + 0.223512I$ $a = 1.076320 + 0.516590I$ $b = -1.30623 + 0.55213I$	$-2.57938 + 0.49550I$	$-36.4479 - 6.8831I$
$u = -0.551583 - 0.223512I$ $a = 1.076320 - 0.516590I$ $b = -1.30623 - 0.55213I$	$-2.57938 - 0.49550I$	$-36.4479 + 6.8831I$
$u = -1.320300 + 0.486945I$ $a = -0.294768 + 0.282605I$ $b = -0.977789 + 0.126535I$	$2.04449 - 5.23982I$	0
$u = -1.320300 - 0.486945I$ $a = -0.294768 - 0.282605I$ $b = -0.977789 - 0.126535I$	$2.04449 + 5.23982I$	0
$u = 0.11829 + 1.49282I$ $a = 0.614440 - 0.151421I$ $b = 0.481912 + 0.160898I$	$3.50639 + 0.63489I$	0
$u = 0.11829 - 1.49282I$ $a = 0.614440 + 0.151421I$ $b = 0.481912 - 0.160898I$	$3.50639 - 0.63489I$	0

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.12326+1.01606I$ $a=\ 0.194610-0.898929I$ $b=\ 1.089400-0.815943I$	$2.94511-5.61763I$	0
$u=-1.12326-1.01606I$ $a=\ 0.194610+0.898929I$ $b=\ 1.089400+0.815943I$	$2.94511+5.61763I$	0
$u=-1.01659+1.15746I$ $a=-0.241094+1.028020I$ $b=-1.132070+0.832498I$	$0.42325-2.83616I$	0
$u=-1.01659-1.15746I$ $a=-0.241094-1.028020I$ $b=-1.132070-0.832498I$	$0.42325+2.83616I$	0
$u=\ 0.383280+0.156976I$ $a=\ 2.69050+1.07564I$ $b=\ 0.683093+0.525840I$	$-2.78183-3.00079I$	$-3.82465+1.75831I$
$u=\ 0.383280-0.156976I$ $a=\ 2.69050-1.07564I$ $b=\ 0.683093-0.525840I$	$-2.78183+3.00079I$	$-3.82465-1.75831I$
$u=-1.15033+1.12465I$ $a=-0.275362+0.930475I$ $b=-1.120340+0.798580I$	$0.93635-9.74729I$	0
$u=-1.15033-1.12465I$ $a=-0.275362-0.930475I$ $b=-1.120340-0.798580I$	$0.93635+9.74729I$	0
$u=-1.39951+0.85040I$ $a=-0.302639+0.408785I$ $b=-0.833387+0.302247I$	$1.53098+0.83665I$	0
$u=-1.39951-0.85040I$ $a=-0.302639-0.408785I$ $b=-0.833387-0.302247I$	$1.53098-0.83665I$	0

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.41802+1.24729I$		
$a=\quad 0.261385-0.353992I$	$2.38528-2.94082I$	0
$b=\quad 0.579675-0.251102I$		
$u=-1.41802-1.24729I$		
$a=\quad 0.261385+0.353992I$	$2.38528+2.94082I$	0
$b=\quad 0.579675+0.251102I$		

IV. $\boldsymbol{I_1^v = \langle a,\ b^2 - bv + 2b - v + 3,\ v^2 - 3v + 1 \rangle}$

(i) Arc colorings

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

$$a_{11} = \begin{pmatrix} v \\ 0 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -b \\ b \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} bv - b + v - 1 \\ -bv + b + 1 \end{pmatrix}$$

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

$$a_7 = \begin{pmatrix} bv - v + 1 \\ bv - b \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} v \\ -bv + b + 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -bv + v - 1 \\ -bv + b \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -bv + v - 1 \\ -bv + 2b \end{pmatrix}$$

$$a_6 = \begin{pmatrix} bv - v + 1 \\ bv - b \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -4bv + 4b - 9$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$v = 0.381966$ $a = 0$ $b = -0.80902 + 1.40126I$	$-1.64493 - 2.02988I$	$-11.00000 + 3.46410I$
$v = 0.381966$ $a = 0$ $b = -0.80902 - 1.40126I$	$-1.64493 + 2.02988I$	$-11.00000 - 3.46410I$
$v = 2.61803$ $a = 0$ $b = 0.309017 + 0.535233I$	$-1.64493 + 2.02988I$	$-11.00000 - 3.46410I$
$v = 2.61803$ $a = 0$ $b = 0.309017 - 0.535233I$	$-1.64493 - 2.02988I$	$-11.00000 + 3.46410I$

V. $I_2^v = \langle a,\ b^2 - b + 1,\ v - 1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4b + 2$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

	Solutions to I_2^v	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$v=$	1.00000		
$a=$	0	$2.02988I$	$0.-3.46410I$
$b=$	$0.500000+0.866025I$		
$v=$	1.00000		
$a=$	0	$-2.02988I$	$0.+3.46410I$
$b=$	$0.500000-0.866025I$		

VI. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$u^2(u-1)^4(u^{31}+16u^{30}+\cdots+2u+1)^4(u^{32}-17u^{31}+\cdots-8u+1)$ $\cdot(u^{62}+32u^{61}+\cdots+25u+1)$
c_2	$u^2(u-1)^4(u^{31}-2u^{30}+\cdots-2u+1)^4(u^{32}+3u^{31}+\cdots+4u+1)$ $\cdot(u^{62}+10u^{61}+\cdots+9u+1)$
c_3, c_{10}	$(u^2-u+1)(u^4-u^3+2u^2+u+1)(u^{32}+6u^{30}+\cdots-u+1)$ $\cdot(u^{62}+u^{61}+\cdots+157u^2+9)$ $\cdot(u^{124}+2u^{123}+\cdots+445543889u+54599377)$
c_4, c_{11}	$(u^2-u+1)(u^4-u^3+2u^2+u+1)(u^{32}-2u^{31}+\cdots+2u+1)$ $\cdot(u^{62}+u^{61}+\cdots-u+1)(u^{124}+2u^{123}+\cdots-u+1)$
c_5	$u^2(u+1)^4(u^{31}-2u^{30}+\cdots-2u+1)^4(u^{32}-3u^{31}+\cdots-4u+1)$ $\cdot(u^{62}+10u^{61}+\cdots+9u+1)$
c_6	$u^6(u^{31}-9u^{30}+\cdots+73u-8)^4(u^{32}-9u^{31}+\cdots-170u+25)$ $\cdot(u^{62}+30u^{61}+\cdots+37547u+2393)$
c_7	$((u^2-u+1)^{64})(u^2+u+1)(u^{32}+3u^{31}+\cdots+11u+1)$ $\cdot(u^{62}+51u^{61}+\cdots+30064771072u+1073741824)$
c_8	$u^6(u^{31}-15u^{30}+\cdots+3u-2)^4(u^{32}+19u^{31}+\cdots+90u+25)$ $\cdot(u^{62}+42u^{61}+\cdots-u+1)$
c_9, c_{12}	$((u^2-u+1)^3)(u^{32}-8u^{31}+\cdots-3u^2+1)(u^{62}-3u^{61}+\cdots-3u+1)$ $\cdot(u^{124}-3u^{123}+\cdots+54u+1)$

VII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$y^2(y-1)^4(y^{31}+28y^{29}+\cdots-14y-1)^4(y^{32}-y^{31}+\cdots+16y+1)$ $\cdot(y^{62}+56y^{60}+\cdots+127y+1)$
c_2, c_5	$y^2(y-1)^4(y^{31}-16y^{30}+\cdots+2y-1)^4(y^{32}-17y^{31}+\cdots-8y+1)$ $\cdot(y^{62}-32y^{61}+\cdots-25y+1)$
c_3, c_{10}	$(y^2+y+1)(y^4+3y^3+\cdots+3y+1)(y^{32}+12y^{31}+\cdots+27y+1)$ $\cdot(y^{62}+21y^{61}+\cdots+2826y+81)$ $\cdot(y^{124}+42y^{123}+\cdots-6608919476226557y+2981091968788129)$
c_4, c_{11}	$(y^2+y+1)(y^4+3y^3+\cdots+3y+1)(y^{32}-16y^{31}+\cdots-22y+1)$ $\cdot(y^{62}+9y^{61}+\cdots+17y+1)(y^{124}-42y^{123}+\cdots+283y+1)$
c_6	$y^6(y^{31}+13y^{30}+\cdots+833y-64)^4$ $\cdot(y^{32}+13y^{31}+\cdots-6050y+625)$ $\cdot(y^{62}+26y^{61}+\cdots-77618039y+5726449)$
c_7	$((y^2+y+1)^{65})(y^{32}+19y^{31}+\cdots+13y+1)$ $\cdot(y^{62}+19y^{61}+\cdots-1.15\times10^{18}y+1.15\times10^{18})$
c_8	$y^6(y^{31}-3y^{30}+\cdots+69y-4)^4(y^{32}-5y^{31}+\cdots-11950y+625)$ $\cdot(y^{62}-8y^{61}+\cdots-51y+1)$
c_9, c_{12}	$((y^2+y+1)^3)(y^{32}-12y^{31}+\cdots-6y+1)(y^{62}+21y^{61}+\cdots+y+1)$ $\cdot(y^{124}-31y^{123}+\cdots-498y+1)$