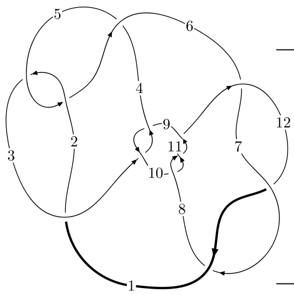
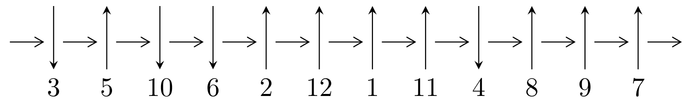
$12a_{0195}$ $(K12a_{0195})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u = \langle & 2.98338 \times 10^{44} u^{32} + 6.07211 \times 10^{44} u^{31} + \cdots + 8.30969 \times 10^{46} d + 2.51360 \times 10^{46}, \\
& 7.43844 \times 10^{44} u^{32} + 1.59524 \times 10^{45} u^{31} + \cdots + 1.66194 \times 10^{47} c - 9.07104 \times 10^{46}, \\
& -2.43633 \times 10^{45} u^{32} - 5.73801 \times 10^{45} u^{31} + \cdots + 8.30969 \times 10^{46} b - 1.04987 \times 10^{47}, \\
& -1.26296 \times 10^{45} u^{32} - 3.00101 \times 10^{45} u^{31} + \cdots + 8.30969 \times 10^{46} a - 1.12331 \times 10^{47}, \\
& u^{33} + 3u^{32} + \cdots - 32u - 32 \rangle \\
I_2^u = \langle & -33577974480092 u^{24} a + 53309187006291 u^{24} + \cdots + 196002507777016 a + 140186694789454, \\
& -106618374012582 u^{24} a - 153454383700573 u^{24} + \cdots - 280373389578908 a - 552236032471050, \\
& b - 1,\ -1.33548 \times 10^{14} a u^{24} + 1.93299 \times 10^{14} u^{24} + \cdots + 1.95694 \times 10^{15} a + 2.03280 \times 10^{15}, \\
& u^{25} - u^{24} + \cdots + 4u + 4 \rangle
\end{aligned}$$

$$\begin{aligned}
I_1^v &= \langle a,\ d,\ c - 1,\ b - 1,\ v^2 - v + 1 \rangle \\
I_2^v &= \langle a,\ d + 1,\ c + a,\ b - 1,\ v^2 - v + 1 \rangle \\
I_3^v &= \langle a,\ d + 1,\ c + a + 1,\ b - 1,\ v + 1 \rangle \\
I_4^v &= \langle c,\ d + 1,\ cb + a + 1,\ -v^2 ba + v^2 c - v^2 b + 2v^2 a - cv - av + 2v^2 + c - v,\ b^2 v^2 - 2v^2 b + bv + v^2 - v + 1 \rangle
\end{aligned}$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 88 representations.
* 1 irreducible components of $\dim_{\mathbb{C}} = 1$

[1] The image of knot diagram is generated by the software "**Draw programme**" developed by Andrew Bartholomew(`http://www.layer8.co.uk/maths/draw/index.htm#Running-draw`), where we modified some parts for our purpose(`https://github.com/CATsTAILs/LinksPainter`).

[2] All coefficients of polynomials are rational numbers. But the coefficients are sometimes approximated in decimal forms when there is not enough margin.

I.

$$I_1^u = \langle 2.98\times10^{44}u^{32}+6.07\times10^{44}u^{31}+\cdots+8.31\times10^{46}d+2.51\times10^{46},\ 7.44\times10^{44}u^{32}+1.60\times10^{45}u^{31}+\cdots+1.66\times10^{47}c-9.07\times10^{46},\ -2.44\times10^{45}u^{32}-5.74\times10^{45}u^{31}+\cdots+8.31\times10^{46}b-1.05\times10^{47},\ -1.26\times10^{45}u^{32}-3.00\times10^{45}u^{31}+\cdots+8.31\times10^{46}a-1.12\times10^{47},\ u^{33}+3u^{32}+\cdots-32u-32\rangle$$

(i) Arc colorings

$$a_4 = \begin{pmatrix}0\\u\end{pmatrix}$$

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

$$a_7 = \begin{pmatrix}0.0151986u^{32}+0.0361146u^{31}+\cdots-0.765502u+1.35181\\0.0293192u^{32}+0.0690520u^{31}+\cdots-1.79735u+1.26343\end{pmatrix}$$

$$a_{10} = \begin{pmatrix}1\\u^2\end{pmatrix}$$

$$a_{12} = \begin{pmatrix}-0.00447577u^{32}-0.00959870u^{31}+\cdots+0.258096u+0.545811\\-0.00359025u^{32}-0.00730726u^{31}+\cdots+0.166618u-0.302490\end{pmatrix}$$

$$a_1 = \begin{pmatrix}-0.0150061u^{32}-0.0352289u^{31}+\cdots+1.12333u-0.0633242\\-0.0275000u^{32}-0.0663276u^{31}+\cdots+1.81369u-1.26434\end{pmatrix}$$

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

$$a_6 = \begin{pmatrix}0.0197140u^{32}+0.0451970u^{31}+\cdots-0.857293u+1.51428\\0.0347201u^{32}+0.0804259u^{31}+\cdots-1.98062u+1.57761\end{pmatrix}$$

$$a_5 = \begin{pmatrix}0.0254851u^{32}+0.0825348u^{31}+\cdots-2.53688u-1.85413\\0.0263436u^{32}+0.101429u^{31}+\cdots-2.69293u-2.59143\end{pmatrix}$$

$$a_2 = \begin{pmatrix}-0.0169811u^{32}-0.0390647u^{31}+\cdots+1.30794u-0.509563\\-0.0254461u^{32}-0.0623905u^{31}+\cdots+2.00195u-1.64373\end{pmatrix}$$

$$a_{11} = \begin{pmatrix}-0.000885519u^{32}-0.00229144u^{31}+\cdots+0.0914785u+0.848301\\-0.00359025u^{32}-0.00730726u^{31}+\cdots+0.166618u-0.302490\end{pmatrix}$$

$$a_8 = \begin{pmatrix}-0.000885519u^{32}-0.00229144u^{31}+\cdots+0.0914785u+0.848301\\0.00540092u^{32}+0.0113739u^{31}+\cdots-0.183270u+0.314174\end{pmatrix}$$

(ii) Obstruction class $=-1$

(iii) Cusp Shapes $=0.0605080u^{32}+0.0513753u^{31}+\cdots+7.44134u+11.1534$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4	$u^{33} + 11u^{32} + \cdots + 8u - 16$
c_2, c_5	$u^{33} + u^{32} + \cdots - 12u + 4$
c_3, c_9	$u^{33} - 3u^{32} + \cdots - 32u + 32$
c_6, c_7, c_8 c_{10}, c_{11}, c_{12}	$u^{33} + 5u^{32} + \cdots - 7u^2 - 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$y^{33} + 23y^{32} + \cdots - 14304y - 256$
c_2, c_5	$y^{33} + 11y^{32} + \cdots + 8y - 16$
c_3, c_9	$y^{33} + 15y^{32} + \cdots - 6144y - 1024$
c_6, c_7, c_8 c_{10}, c_{11}, c_{12}	$y^{33} - 39y^{32} + \cdots - 14y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.979372+0.273800I$ $a=-1.96498-0.53087I$ $b=-4.30037-1.10323I$ $c=-0.881800+0.153170I$ $d=-1.312830+0.129109I$	$4.01193-3.40996I$	$6.93635+3.61829I$
$u=-0.979372-0.273800I$ $a=-1.96498+0.53087I$ $b=-4.30037+1.10323I$ $c=-0.881800-0.153170I$ $d=-1.312830-0.129109I$	$4.01193+3.40996I$	$6.93635-3.61829I$
$u=-0.581985+0.777781I$ $a=-0.007920-0.444148I$ $b=-0.601205+0.151913I$ $c=0.549449-1.043340I$ $d=-0.117441-0.653397I$	$-3.19812+2.28214I$	$-2.55468-4.65224I$
$u=-0.581985-0.777781I$ $a=-0.007920+0.444148I$ $b=-0.601205-0.151913I$ $c=0.549449+1.043340I$ $d=-0.117441+0.653397I$	$-3.19812-2.28214I$	$-2.55468+4.65224I$
$u=0.342726+1.062970I$ $a=-0.156749+0.042002I$ $b=-0.772312-0.554016I$ $c=0.138173+1.013650I$ $d=-0.419652+0.727712I$	$2.46500-1.75021I$	$7.36804+3.35767I$
$u=0.342726-1.062970I$ $a=-0.156749-0.042002I$ $b=-0.772312+0.554016I$ $c=0.138173-1.013650I$ $d=-0.419652-0.727712I$	$2.46500+1.75021I$	$7.36804-3.35767I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.16826$ $a = -1.85589$ $b = -4.05777$ $c = -0.988324$ $d = -1.40425$	7.47395	12.4850
$u = -0.464136 + 1.103860I$ $a = -0.232978 - 0.137172I$ $b = -0.849884 + 0.432403I$ $c = 0.189734 - 1.130300I$ $d = -0.355294 - 0.806119I$	$1.74788 + 7.33440I$	$5.47919 - 8.14278I$
$u = -0.464136 - 1.103860I$ $a = -0.232978 + 0.137172I$ $b = -0.849884 - 0.432403I$ $c = 0.189734 + 1.130300I$ $d = -0.355294 + 0.806119I$	$1.74788 - 7.33440I$	$5.47919 + 8.14278I$
$u = -0.635877 + 0.397843I$ $a = 0.450608 - 1.006370I$ $b = -0.324141 - 0.199030I$ $c = 1.07971 - 0.93923I$ $d = 0.155830 - 0.448444I$	$-0.42221 - 2.98824I$	$-0.68495 + 3.66701I$
$u = -0.635877 - 0.397843I$ $a = 0.450608 + 1.006370I$ $b = -0.324141 + 0.199030I$ $c = 1.07971 + 0.93923I$ $d = 0.155830 + 0.448444I$	$-0.42221 + 2.98824I$	$-0.68495 - 3.66701I$
$u = 0.239228 + 0.607577I$ $a = 0.467370 + 0.141887I$ $b = -0.118760 - 0.290085I$ $c = 0.499292 + 0.509831I$ $d = -0.251234 + 0.318679I$	$0.292144 - 0.942663I$	$5.66111 + 7.03214I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.239228 - 0.607577I$ $a = 0.467370 - 0.141887I$ $b = -0.118760 + 0.290085I$ $c = 0.499292 - 0.509831I$ $d = -0.251234 - 0.318679I$	$0.292144 + 0.942663I$	$5.66111 - 7.03214I$
$u = -0.351447 + 1.312440I$ $a = 1.33782 - 2.18315I$ $b = -3.47360 + 0.63971I$ $c = -0.402867 + 0.835349I$ $d = 1.47320 + 0.16826I$	$9.06107 + 0.86504I$	$11.01805 - 0.17133I$
$u = -0.351447 - 1.312440I$ $a = 1.33782 + 2.18315I$ $b = -3.47360 - 0.63971I$ $c = -0.402867 - 0.835349I$ $d = 1.47320 - 0.16826I$	$9.06107 - 0.86504I$	$11.01805 + 0.17133I$
$u = -0.611782 + 1.268620I$ $a = -0.19716 - 2.64343I$ $b = -3.14566 + 0.96096I$ $c = -0.094088 + 1.305100I$ $d = 1.45334 + 0.29571I$	$7.09875 + 9.27148I$	$8.26421 - 6.23171I$
$u = -0.611782 - 1.268620I$ $a = -0.19716 + 2.64343I$ $b = -3.14566 - 0.96096I$ $c = -0.094088 - 1.305100I$ $d = 1.45334 - 0.29571I$	$7.09875 - 9.27148I$	$8.26421 + 6.23171I$
$u = -0.053785 + 0.584876I$ $a = 1.43770 - 0.61824I$ $b = 2.23372 - 1.30037I$ $c = -0.191785 + 0.115518I$ $d = -0.758918 + 0.087353I$	$2.76296 - 2.31801I$	$12.30250 + 4.19824I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.053785 - 0.584876I$ $a = 1.43770 + 0.61824I$ $b = 2.23372 + 1.30037I$ $c = -0.191785 - 0.115518I$ $d = -0.758918 - 0.087353I$	$2.76296 + 2.31801I$	$12.30250 - 4.19824I$
$u = 1.38673 + 0.43185I$ $a = -1.48910 + 0.29979I$ $b = -3.28939 + 0.65121I$ $c = -1.113710 - 0.239357I$ $d = -1.50951 - 0.20675I$	$11.58920 + 2.62797I$	$12.22236 - 0.42879I$
$u = 1.38673 - 0.43185I$ $a = -1.48910 - 0.29979I$ $b = -3.28939 - 0.65121I$ $c = -1.113710 + 0.239357I$ $d = -1.50951 + 0.20675I$	$11.58920 - 2.62797I$	$12.22236 + 0.42879I$
$u = 0.489796 + 0.230188I$ $a = 1.109100 + 0.758351I$ $b = -0.062609 + 0.144250I$ $c = 1.276410 + 0.540576I$ $d = 0.164799 + 0.231913I$	$0.15528 - 1.56621I$	$-1.22779 + 2.98994I$
$u = 0.489796 - 0.230188I$ $a = 1.109100 - 0.758351I$ $b = -0.062609 - 0.144250I$ $c = 1.276410 - 0.540576I$ $d = 0.164799 - 0.231913I$	$0.15528 + 1.56621I$	$-1.22779 - 2.98994I$
$u = -1.35730 + 0.53891I$ $a = -1.43837 - 0.36025I$ $b = -3.18755 - 0.78570I$ $c = -1.099800 + 0.300126I$ $d = -1.49615 + 0.25900I$	$10.79550 - 8.72073I$	$10.94592 + 5.35160I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.35730-0.53891I$ $a=-1.43837+0.36025I$ $b=-3.18755+0.78570I$ $c=-1.099800-0.300126I$ $d=-1.49615-0.25900I$	$10.79550+8.72073I$	$10.94592-5.35160I$
$u=\ 0.48684+1.39736I$ $a=\ 0.45444+2.00395I$ $b=-3.21670-0.69297I$ $c=-0.095787-0.962823I$ $d=\ 1.51512-0.23328I$	$12.10590-5.85939I$	$13.7252+3.8290I$
$u=\ 0.48684-1.39736I$ $a=\ 0.45444-2.00395I$ $b=-3.21670+0.69297I$ $c=-0.095787+0.962823I$ $d=\ 1.51512+0.23328I$	$12.10590+5.85939I$	$13.7252-3.8290I$
$u=-0.82581+1.33817I$ $a=-0.91423-1.96766I$ $b=-2.83075+0.93309I$ $c=\ 0.26972+1.39679I$ $d=\ 1.49169+0.40077I$	$13.4411+16.4286I$	$10.77382-8.75984I$
$u=-0.82581-1.33817I$ $a=-0.91423+1.96766I$ $b=-2.83075-0.93309I$ $c=\ 0.26972-1.39679I$ $d=\ 1.49169-0.40077I$	$13.4411-16.4286I$	$10.77382+8.75984I$
$u=\ 0.77347+1.38729I$ $a=-0.67577+1.91732I$ $b=-2.88328-0.86577I$ $c=\ 0.242390-1.297210I$ $d=\ 1.51473-0.37364I$	$14.7439-10.2508I$	$12.57547+4.19472I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.77347 - 1.38729I$ $a = -0.67577 - 1.91732I$ $b = -2.88328 + 0.86577I$ $c = 0.242390 + 1.297210I$ $d = 1.51473 + 0.37364I$	$14.7439 + 10.2508I$	$12.57547 - 4.19472I$
$u = 0.05858 + 1.69521I$ $a = 0.748153 + 0.165681I$ $b = -3.14863 - 0.06028I$ $c = 0.129127 - 0.091732I$ $d = 1.65444 - 0.02754I$	$-19.6551 - 3.2714I$	$13.9526 + 2.4448I$
$u = 0.05858 - 1.69521I$ $a = 0.748153 - 0.165681I$ $b = -3.14863 + 0.06028I$ $c = 0.129127 + 0.091732I$ $d = 1.65444 + 0.02754I$	$-19.6551 + 3.2714I$	$13.9526 - 2.4448I$

II.

$\boldsymbol{I_2^u = \langle -3.36\times10^{13}au^{24}+5.33\times10^{13}u^{24}+\cdots+1.96\times10^{14}a+1.40\times10^{14},\ -1.07\times 10^{14}au^{24} - 1.53\times10^{14}u^{24}+\cdots-2.80\times10^{14}a-5.52\times10^{14},\ b-1,\ -1.34\times 10^{14}au^{24}+1.93\times10^{14}u^{24}+\cdots+1.96\times10^{15}a+2.03\times10^{15},\ u^{25}-u^{24}+\cdots+4u+4\rangle}$

(i) Arc colorings

$$a_4 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

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

$$a_{10} = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 0.721304au^{24} + 1.03816u^{24} + \cdots + 1.89681a + 3.73603 \\ 0.454329au^{24} - 0.721304u^{24} + \cdots - 2.65203a - 1.89681 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.266975u^{24} - 0.378004u^{23} + \cdots - 6.66427u - 4.54883 \\ -0.454329u^{24} + 0.893251u^{23} + \cdots + 1.84504u + 2.65203 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} 0.282934u^{24} - 0.934782u^{23} + \cdots - 4.86150u - 4.62094 \\ 0.549909u^{24} - 0.556778u^{23} + \cdots + 1.80277u - 0.0721112 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -0.458322u^{24} + 1.29881u^{23} + \cdots + 3.35855u + 5.36998 \\ 0.447032u^{24} - 0.0235195u^{23} + \cdots + 4.94194u + 1.21733 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -0.688545u^{24} + 0.415749u^{23} + \cdots - 5.18862u - 1.94144 \\ -0.450261u^{24} + 1.04887u^{23} + \cdots + 3.51825u + 3.77069 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0.266975au^{24} + 1.75947u^{24} + \cdots + 4.54883a + 5.63284 \\ 0.454329au^{24} - 0.721304u^{24} + \cdots - 2.65203a - 1.89681 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 0.266975au^{24} + 1.75947u^{24} + \cdots + 4.54883a + 5.63284 \\ -0.549909au^{24} - 0.266975u^{24} + \cdots + 0.0721112a - 2.54883 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes
$= -\frac{6062761600965}{9238337702138}u^{24} - \frac{3225176474347}{9238337702138}u^{23} + \cdots - \frac{61042729884201}{9238337702138}u + \frac{27155343409896}{4619168851069}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4	$(u^{25} + 8u^{24} + \cdots + 11u - 1)^2$
c_2, c_5	$(u^{25} + 2u^{24} + \cdots + 3u + 1)^2$
c_3, c_9	$(u^{25} + u^{24} + \cdots + 4u - 4)^2$
c_6, c_7, c_8 c_{10}, c_{11}, c_{12}	$u^{50} + 3u^{49} + \cdots + 24u - 16$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$(y^{25} + 20y^{24} + \cdots + 251y - 1)^2$
c_2, c_5	$(y^{25} + 8y^{24} + \cdots + 11y - 1)^2$
c_3, c_9	$(y^{25} + 15y^{24} + \cdots - 88y - 16)^2$
c_6, c_7, c_8 c_{10}, c_{11}, c_{12}	$y^{50} - 39y^{49} + \cdots - 3872y + 256$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.111975 + 0.962557I$ $a = 0.887355 + 0.433567I$ $b = 1.00000$ $c = 0.010055 + 0.767731I$ $d = -0.557801 + 0.562636I$	$3.08820 - 2.66172I$	$9.28523 + 3.57661I$
$u = 0.111975 + 0.962557I$ $a = 0.774124 - 0.392043I$ $b = 1.00000$ $c = -0.222055 - 0.664059I$ $d = -0.748963 - 0.510317I$	$3.08820 - 2.66172I$	$9.28523 + 3.57661I$
$u = 0.111975 - 0.962557I$ $a = 0.887355 - 0.433567I$ $b = 1.00000$ $c = 0.010055 - 0.767731I$ $d = -0.557801 - 0.562636I$	$3.08820 + 2.66172I$	$9.28523 - 3.57661I$
$u = 0.111975 - 0.962557I$ $a = 0.774124 + 0.392043I$ $b = 1.00000$ $c = -0.222055 + 0.664059I$ $d = -0.748963 + 0.510317I$	$3.08820 + 2.66172I$	$9.28523 - 3.57661I$
$u = -1.061780 + 0.135314I$ $a = 0.243332 + 0.435875I$ $b = 1.00000$ $c = -0.928818 + 0.075525I$ $d = -1.353420 + 0.063981I$	$4.81480 + 0.43356I$	$8.91196 + 0.04506I$
$u = -1.061780 + 0.135314I$ $a = 1.38189 - 1.33044I$ $b = 1.00000$ $c = 1.27869 - 1.72252I$ $d = 0.571600 - 0.649877I$	$4.81480 + 0.43356I$	$8.91196 + 0.04506I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.061780-0.135314I$ $a=\ \ 0.243332-0.435875I$ $b=\ \ 1.00000$ $c=-0.928818-0.075525I$ $d=-1.353420-0.063981I$	$4.81480-0.43356I$	$8.91196-0.04506I$
$u=-1.061780-0.135314I$ $a=\ \ 1.38189+1.33044I$ $b=\ \ 1.00000$ $c=\ \ 1.27869+1.72252I$ $d=\ \ 0.571600+0.649877I$	$4.81480-0.43356I$	$8.91196-0.04506I$
$u=\ \ 0.465035+1.033020I$ $a=-0.665026-0.733516I$ $b=\ \ 1.00000$ $c=-0.72869-1.59218I$ $d=\ \ 1.336380-0.223022I$	$1.37392-5.41987I$	$4.64303+6.54919I$
$u=\ \ 0.465035+1.033020I$ $a=\ \ 0.21222-2.16973I$ $b=\ \ 1.00000$ $c=\ \ 0.244469+1.086540I$ $d=-0.323623+0.760243I$	$1.37392-5.41987I$	$4.64303+6.54919I$
$u=\ \ 0.465035-1.033020I$ $a=-0.665026+0.733516I$ $b=\ \ 1.00000$ $c=-0.72869+1.59218I$ $d=\ \ 1.336380+0.223022I$	$1.37392+5.41987I$	$4.64303-6.54919I$
$u=\ \ 0.465035-1.033020I$ $a=\ \ 0.21222+2.16973I$ $b=\ \ 1.00000$ $c=\ \ 0.244469-1.086540I$ $d=-0.323623-0.760243I$	$1.37392+5.41987I$	$4.64303-6.54919I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.096160 + 0.296196I$ $a = 0.306675 - 0.445331I$ $b = 1.00000$ $c = -0.948099 - 0.166211I$ $d = -1.368770 - 0.141145I$	$4.43073 + 5.11531I$	$7.81745 - 5.48464I$
$u = 1.096160 + 0.296196I$ $a = 1.28492 + 1.16223I$ $b = 1.00000$ $c = 1.11556 + 1.62331I$ $d = 0.465476 + 0.732479I$	$4.43073 + 5.11531I$	$7.81745 - 5.48464I$
$u = 1.096160 - 0.296196I$ $a = 0.306675 + 0.445331I$ $b = 1.00000$ $c = -0.948099 + 0.166211I$ $d = -1.368770 + 0.141145I$	$4.43073 - 5.11531I$	$7.81745 + 5.48464I$
$u = 1.096160 - 0.296196I$ $a = 1.28492 - 1.16223I$ $b = 1.00000$ $c = 1.11556 - 1.62331I$ $d = 0.465476 - 0.732479I$	$4.43073 - 5.11531I$	$7.81745 + 5.48464I$
$u = -0.202658 + 1.122680I$ $a = -1.166770 + 0.081144I$ $b = 1.00000$ $c = -1.078630 + 0.717142I$ $d = 1.382070 + 0.096385I$	$5.39169 + 2.44039I$	$11.83401 - 3.61173I$
$u = -0.202658 + 1.122680I$ $a = -0.14908 + 1.80180I$ $b = 1.00000$ $c = -0.008599 - 0.965558I$ $d = -0.541755 - 0.717454I$	$5.39169 + 2.44039I$	$11.83401 - 3.61173I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.202658 - 1.122680I$ $a = -1.166770 - 0.081144I$ $b = 1.00000$ $c = -1.078630 - 0.717142I$ $d = 1.382070 - 0.096385I$	$5.39169 - 2.44039I$	$11.83401 + 3.61173I$
$u = -0.202658 - 1.122680I$ $a = -0.14908 - 1.80180I$ $b = 1.00000$ $c = -0.008599 + 0.965558I$ $d = -0.541755 + 0.717454I$	$5.39169 - 2.44039I$	$11.83401 + 3.61173I$
$u = 0.641188 + 0.544744I$ $a = 0.469914 - 0.315102I$ $b = 1.00000$ $c = -0.672537 - 0.303472I$ $d = -1.134680 - 0.249465I$	$-0.175498 + 1.059220I$	$0.606046 - 0.370576I$
$u = 0.641188 + 0.544744I$ $a = 1.31697 + 0.65566I$ $b = 1.00000$ $c = 0.858117 + 1.005430I$ $d = 0.060728 + 0.543785I$	$-0.175498 + 1.059220I$	$0.606046 - 0.370576I$
$u = 0.641188 - 0.544744I$ $a = 0.469914 + 0.315102I$ $b = 1.00000$ $c = -0.672537 + 0.303472I$ $d = -1.134680 + 0.249465I$	$-0.175498 - 1.059220I$	$0.606046 + 0.370576I$
$u = 0.641188 - 0.544744I$ $a = 1.31697 - 0.65566I$ $b = 1.00000$ $c = 0.858117 - 1.005430I$ $d = 0.060728 - 0.543785I$	$-0.175498 - 1.059220I$	$0.606046 + 0.370576I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.082989 + 0.805818I$ $a = -1.08067 - 1.83898I$ $b = 1.00000$ $c = 0.083284 + 0.569058I$ $d = -0.527939 + 0.406461I$	$2.66645 + 1.39976I$	$8.95722 - 0.06062I$
$u = 0.082989 + 0.805818I$ $a = -2.78270 - 0.32226I$ $b = 1.00000$ $c = -2.91998 - 0.70018I$ $d = 1.234720 - 0.037441I$	$2.66645 + 1.39976I$	$8.95722 - 0.06062I$
$u = 0.082989 - 0.805818I$ $a = -1.08067 + 1.83898I$ $b = 1.00000$ $c = 0.083284 - 0.569058I$ $d = -0.527939 - 0.406461I$	$2.66645 - 1.39976I$	$8.95722 + 0.06062I$
$u = 0.082989 - 0.805818I$ $a = -2.78270 + 0.32226I$ $b = 1.00000$ $c = -2.91998 + 0.70018I$ $d = 1.234720 + 0.037441I$	$2.66645 - 1.39976I$	$8.95722 + 0.06062I$
$u = -0.340493 + 0.559321I$ $a = -0.545776 - 0.548289I$ $b = 1.00000$ $c = -0.465623 + 0.271176I$ $d = -0.967761 + 0.216045I$	$2.95409 + 1.50728I$	$9.02072 - 4.31266I$
$u = -0.340493 + 0.559321I$ $a = -2.38737 + 4.52460I$ $b = 1.00000$ $c = -2.32796 + 4.47861I$ $d = 1.112260 + 0.141525I$	$2.95409 + 1.50728I$	$9.02072 - 4.31266I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.340493 - 0.559321I$ $a = -0.545776 + 0.548289I$ $b = \quad 1.00000$ $c = -0.465623 - 0.271176I$ $d = -0.967761 - 0.216045I$	$2.95409 - 1.50728I$	$9.02072 + 4.31266I$
$u = -0.340493 - 0.559321I$ $a = -2.38737 - 4.52460I$ $b = \quad 1.00000$ $c = -2.32796 - 4.47861I$ $d = \quad 1.112260 - 0.141525I$	$2.95409 - 1.50728I$	$9.02072 + 4.31266I$
$u = \quad 0.291960 + 1.368920I$ $a = -0.071208 + 1.221280I$ $b = \quad 1.00000$ $c = -0.490940 - 0.949387I$ $d = -0.936546 - 0.771795I$	$10.21860 + 0.59688I$	$12.46758 - 1.80507I$
$u = \quad 0.291960 + 1.368920I$ $a = -0.765668 - 1.023270I$ $b = \quad 1.00000$ $c = -0.354801 - 0.656555I$ $d = \quad 1.50021 - 0.13944I$	$10.21860 + 0.59688I$	$12.46758 - 1.80507I$
$u = \quad 0.291960 - 1.368920I$ $a = -0.071208 - 1.221280I$ $b = \quad 1.00000$ $c = -0.490940 + 0.949387I$ $d = -0.936546 + 0.771795I$	$10.21860 - 0.59688I$	$12.46758 + 1.80507I$
$u = \quad 0.291960 - 1.368920I$ $a = -0.765668 + 1.023270I$ $b = \quad 1.00000$ $c = -0.354801 + 0.656555I$ $d = \quad 1.50021 + 0.13944I$	$10.21860 - 0.59688I$	$12.46758 + 1.80507I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.414621 + 1.342760I$ $a = -0.073917 - 1.142440I$ $b = \quad 1.00000$ $c = -0.570268 + 0.899298I$ $d = -1.008850 + 0.738143I$	$9.63785 + 5.44271I$	$11.50171 - 3.51350I$
$u = -0.414621 + 1.342760I$ $a = -0.698244 + 1.203490I$ $b = \quad 1.00000$ $c = -0.269346 + 0.914070I$ $d = \quad 1.48812 + 0.19869I$	$9.63785 + 5.44271I$	$11.50171 - 3.51350I$
$u = -0.414621 - 1.342760I$ $a = -0.073917 + 1.142440I$ $b = \quad 1.00000$ $c = -0.570268 - 0.899298I$ $d = -1.008850 - 0.738143I$	$9.63785 - 5.44271I$	$11.50171 + 3.51350I$
$u = -0.414621 - 1.342760I$ $a = -0.698244 - 1.203490I$ $b = \quad 1.00000$ $c = -0.269346 - 0.914070I$ $d = \quad 1.48812 - 0.19869I$	$9.63785 - 5.44271I$	$11.50171 + 3.51350I$
$u = -0.55118 + 1.32473I$ $a = -0.311266 + 0.170366I$ $b = \quad 1.00000$ $c = -0.114785 + 1.146410I$ $d = \quad 1.48035 + 0.26533I$	$8.61369 + 5.36637I$	$10.46678 - 3.05337I$
$u = -0.55118 + 1.32473I$ $a = \quad 0.37098 + 1.75649I$ $b = \quad 1.00000$ $c = \quad 0.090254 - 1.314840I$ $d = -0.391201 - 0.976798I$	$8.61369 + 5.36637I$	$10.46678 - 3.05337I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.55118 - 1.32473I$ $a = -0.311266 - 0.170366I$ $b = 1.00000$ $c = -0.114785 - 1.146410I$ $d = 1.48035 - 0.26533I$	$8.61369 - 5.36637I$	$10.46678 + 3.05337I$
$u = -0.55118 - 1.32473I$ $a = 0.37098 - 1.75649I$ $b = 1.00000$ $c = 0.090254 + 1.314840I$ $d = -0.391201 + 0.976798I$	$8.61369 - 5.36637I$	$10.46678 + 3.05337I$
$u = 0.64072 + 1.29917I$ $a = -0.185163 - 0.238710I$ $b = 1.00000$ $c = -0.016343 - 1.290710I$ $d = 1.46878 - 0.30967I$	$7.62261 - 11.39030I$	$8.71017 + 7.76664I$
$u = 0.64072 + 1.29917I$ $a = 0.46408 - 1.77801I$ $b = 1.00000$ $c = 0.151729 + 1.358490I$ $d = -0.329543 + 0.997435I$	$7.62261 - 11.39030I$	$8.71017 + 7.76664I$
$u = 0.64072 - 1.29917I$ $a = -0.185163 + 0.238710I$ $b = 1.00000$ $c = -0.016343 + 1.290710I$ $d = 1.46878 + 0.30967I$	$7.62261 + 11.39030I$	$8.71017 - 7.76664I$
$u = 0.64072 - 1.29917I$ $a = 0.46408 + 1.77801I$ $b = 1.00000$ $c = 0.151729 - 1.358490I$ $d = -0.329543 - 0.997435I$	$7.62261 + 11.39030I$	$8.71017 - 7.76664I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.518583$ $a = 0.311182$ $b = 1.00000$ $c = -0.641169$ $d = -1.11417$	2.09579	3.55620
$u = -0.518583$ $a = 2.02963$ $b = 1.00000$ $c = 1.71181$ $d = 0.294460$	2.09579	3.55620

III. $I_1^v = \langle a,\ d,\ c-1,\ b-1,\ v^2-v+1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4v + 1$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

	Solutions to I_1^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v =$	$0.500000 + 0.866025I$		
$a =$	0		
$b =$	1.00000	$1.64493 - 2.02988I$	$3.00000 + 3.46410I$
$c =$	1.00000		
$d =$	0		
$v =$	$0.500000 - 0.866025I$		
$a =$	0		
$b =$	1.00000	$1.64493 + 2.02988I$	$3.00000 - 3.46410I$
$c =$	1.00000		
$d =$	0		

IV. $\boldsymbol{I_2^v = \langle a,\ d+1,\ c+a,\ b-1,\ v^2-v+1\rangle}$

(i) Arc colorings

$$a_4 = \begin{pmatrix} v \\ 0 \end{pmatrix}$$

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

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

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

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

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

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

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

$$a_5 = \begin{pmatrix} v \\ v \end{pmatrix}$$

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

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 4v + 1$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v = 0.500000 + 0.866025I$ $a = 0$ $b = 1.00000$ $c = 0$ $d = -1.00000$	$1.64493 - 2.02988I$	$3.00000 + 3.46410I$
$v = 0.500000 - 0.866025I$ $a = 0$ $b = 1.00000$ $c = 0$ $d = -1.00000$	$1.64493 + 2.02988I$	$3.00000 - 3.46410I$

V. $I_3^v = \langle a,\ d+1,\ c+a+1,\ b-1,\ v+1 \rangle$

(i) Arc colorings

$$a_4 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$

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

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

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

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

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

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

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

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

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

$$a_{11} = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$$

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 12$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^v	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$v = -1.00000$ $a = 0$ $b = 1.00000$ $c = -1.00000$ $d = -1.00000$	3.28987	12.0000

VI.

$\boldsymbol{I_4^v = \langle c,\ d+1,\ cb+a+1,\ -v^2ba+v^2c+\cdots+c-v,\ b^2v^2-2v^2b+\cdots-v+1\rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= b^3v - 3b^2v - bv + v^2 + 3v + 8$

(iv) u-Polynomials at the component : It cannot be defined for a positive dimension component.

(v) Riley Polynomials at the component : It cannot be defined for a positive dimension component.

(iv) Complex Volumes and Cusp Shapes

Solution to I_4^v	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$v = \cdots$ $a = \cdots$ $b = \cdots$ $c = \cdots$ $d = \cdots$	$3.28987 - 2.02988I$	$8.46981 - 3.56831I$

VII. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_4	$u(u^2-u+1)^2(u^{25}+8u^{24}+\cdots+11u-1)^2$ $\cdot(u^{33}+11u^{32}+\cdots+8u-16)$
c_2	$u(u^2+u+1)^2(u^{25}+2u^{24}+\cdots+3u+1)^2(u^{33}+u^{32}+\cdots-12u+4)$
c_3, c_9	$u^5(u^{25}+u^{24}+\cdots+4u-4)^2(u^{33}-3u^{32}+\cdots-32u+32)$
c_5	$u(u^2-u+1)^2(u^{25}+2u^{24}+\cdots+3u+1)^2(u^{33}+u^{32}+\cdots-12u+4)$
c_6, c_7	$u^2(u-1)(u+1)^2(u^{33}+5u^{32}+\cdots-7u^2-1)$ $\cdot(u^{50}+3u^{49}+\cdots+24u-16)$
c_8	$u^2(u+1)^3(u^{33}+5u^{32}+\cdots-7u^2-1)(u^{50}+3u^{49}+\cdots+24u-16)$
c_{10}, c_{11}	$u^2(u-1)^3(u^{33}+5u^{32}+\cdots-7u^2-1)(u^{50}+3u^{49}+\cdots+24u-16)$
c_{12}	$u^2(u-1)^2(u+1)(u^{33}+5u^{32}+\cdots-7u^2-1)$ $\cdot(u^{50}+3u^{49}+\cdots+24u-16)$

VIII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_4	$y(y^2+y+1)^2(y^{25}+20y^{24}+\cdots+251y-1)^2$ $\cdot(y^{33}+23y^{32}+\cdots-14304y-256)$
c_2, c_5	$y(y^2+y+1)^2(y^{25}+8y^{24}+\cdots+11y-1)^2$ $\cdot(y^{33}+11y^{32}+\cdots+8y-16)$
c_3, c_9	$y^5(y^{25}+15y^{24}+\cdots-88y-16)^2$ $\cdot(y^{33}+15y^{32}+\cdots-6144y-1024)$
c_6, c_7, c_8 c_{10}, c_{11}, c_{12}	$y^2(y-1)^3(y^{33}-39y^{32}+\cdots-14y-1)$ $\cdot(y^{50}-39y^{49}+\cdots-3872y+256)$