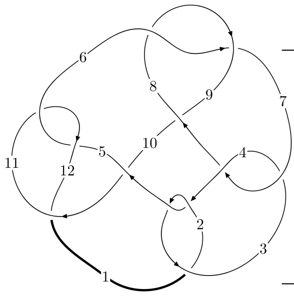
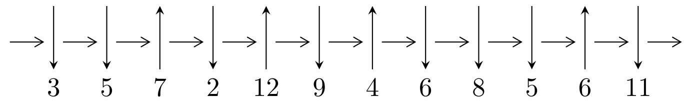
$12n_{0223}$ ($K12n_{0223}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I_1^u = \langle &-1.05608\times 10^{32}u^{27} + 2.39983\times 10^{32}u^{26} + \cdots + 4.71199\times 10^{33}d - 1.14579\times 10^{30},\\
&-7.16121\times 10^{28}u^{27} + 2.11432\times 10^{32}u^{26} + \cdots + 9.42397\times 10^{33}c + 9.50662\times 10^{33},\\
&7.43837\times 10^{31}u^{27} - 2.05180\times 10^{32}u^{26} + \cdots + 4.71199\times 10^{33}b - 3.81499\times 10^{32},\\
&5.68907\times 10^{31}u^{27} - 1.81131\times 10^{32}u^{26} + \cdots + 1.88479\times 10^{34}a - 1.63326\times 10^{34},\ u^{28} - 3u^{27} + \cdots - 64u +
\end{aligned}$$

$$\begin{aligned}
I_2^u = \langle &-7778149750u^{19}a + 21085480149u^{19} + \cdots + 37111822100a - 70739740318,\\
&18555911050u^{19}a - 33847094283u^{19} + \cdots - 266919956828a + 210342367834,\\
&4182326921u^{19}a + 3076005459u^{19} + \cdots - 29433713862a + 28068851486,\\
&49133842327u^{19}a - 33157787379u^{19} + \cdots - 204672432210a + 75288972938,\\
&u^{20} + u^{19} + \cdots - 8u - 4\rangle
\end{aligned}$$

$$\begin{aligned}
I_1^v &= \langle c,\ d - v,\ b,\ a - 1,\ v^2 + v + 1\rangle\\
I_2^v &= \langle a,\ d + v,\ -av + c - v - 1,\ b + 1,\ v^2 + v + 1\rangle\\
I_3^v &= \langle a,\ d - 1,\ c + a,\ b + 1,\ v + 1\rangle\\
I_4^v &= \langle a,\ d^2a + d^2v + dc - dv - d + v + 1,\ d^2v^2 - v^2d - dv + v^2 + 2v + 1,\\
&\quad dca + dcv - da - dv + c^2 - cv - av - 2c - a + 1,\ v^2dc - v^2d - v^2c - v^2a - cv - 2av - a,\\
&\quad dav + da + dv + cv + c - v - 1,\ c^2v^2 + v^2ca + a^2v^2 + cav - v^2c + 2a^2v + v^2a + a^2 + av + v^2,\ b + 1\rangle
\end{aligned}$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 73 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`).

* 1 irreducible components of $\dim_{\mathbb{C}} = 1$

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

I. $\boldsymbol{I^u_1 = \langle -1.06\times10^{32}u^{27} + 2.40\times10^{32}u^{26} + \cdots + 4.71\times10^{33}d - 1.15\times10^{30},\ -7.16\times10^{28}u^{27} + 2.11\times10^{32}u^{26} + \cdots + 9.42\times10^{33}c + 9.51\times10^{33},\ 7.44\times10^{31}u^{27} - 2.05\times10^{32}u^{26} + \cdots + 4.71\times10^{33}b - 3.81\times10^{32},\ 5.69\times10^{31}u^{27} - 1.81\times10^{32}u^{26} + \cdots + 1.88\times10^{34}a - 1.63\times10^{34},\ u^{28} - 3u^{27} + \cdots - 64u + 32\rangle}$

(i) Arc colorings

$$a_4 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -0.00301840u^{27} + 0.00961014u^{26} + \cdots - 0.512168u + 0.866547 \\ -0.0157861u^{27} + 0.0435442u^{26} + \cdots - 1.70037u + 0.0809635 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -0.00301840u^{27} + 0.00961014u^{26} + \cdots - 0.512168u + 0.866547 \\ 0.0152750u^{27} - 0.0402637u^{26} + \cdots + 1.56827u - 0.0632056 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u \\ u \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 7.59893\times10^{-6}u^{27} - 0.0224355u^{26} + \cdots + 3.09707u - 1.00877 \\ 0.0224127u^{27} - 0.0509304u^{26} + \cdots + 1.00828u + 0.000243166 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -0.00253011u^{27} - 0.00819574u^{26} + \cdots + 1.54524u - 1.53844 \\ 0.000554935u^{27} - 0.00115373u^{26} + \cdots + 0.673369u + 0.0965888 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 0.00197517u^{27} + 0.00934947u^{26} + \cdots - 2.21861u + 1.44185 \\ 0.000554935u^{27} - 0.00115373u^{26} + \cdots + 0.673369u + 0.0965888 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0.00578915u^{27} - 0.00833409u^{26} + \cdots - 1.28926u + 0.936700 \\ -0.00325904u^{27} + 0.0165298u^{26} + \cdots - 0.255976u + 0.601743 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -0.00186302u^{27} - 0.00814762u^{26} + \cdots + 1.14940u - 0.178203 \\ 0.0260420u^{27} - 0.0682809u^{26} + \cdots + 2.68644u - 0.560928 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -0.0188045u^{27} + 0.0531544u^{26} + \cdots - 2.21254u + 0.947510 \\ 0.00903337u^{27} - 0.0298398u^{26} + \cdots + 1.30721u - 0.185253 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -0.217306u^{27} + 0.532528u^{26} + \cdots - 20.8205u - 2.69421$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_9	$u^{28} + 9u^{27} + \cdots + u + 1$
c_2, c_4, c_6 c_8	$u^{28} - 5u^{27} + \cdots - 3u + 1$
c_3, c_7	$u^{28} - 3u^{27} + \cdots - 64u + 32$
c_5, c_{11}	$u^{28} + u^{27} + \cdots + 8u + 4$
c_{10}	$u^{28} - u^{27} + \cdots + 1736u + 1252$
c_{12}	$u^{28} + 9u^{27} + \cdots - 56u + 16$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_9	$y^{28} + 31y^{27} + \cdots + 39y + 1$
c_2, c_4, c_6 c_8	$y^{28} - 9y^{27} + \cdots - y + 1$
c_3, c_7	$y^{28} - 15y^{27} + \cdots + 3072y + 1024$
c_5, c_{11}	$y^{28} + 9y^{27} + \cdots - 56y + 16$
c_{10}	$y^{28} + 33y^{27} + \cdots - 17874936y + 1567504$
c_{12}	$y^{28} + 21y^{27} + \cdots - 6432y + 256$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.387721 + 0.851263I$ $a = 0.488405 - 0.103669I$ $b = -0.747142 - 0.797802I$ $c = -0.79488 - 1.41620I$ $d = -0.89737 + 1.22574I$	$-4.11180 - 3.97036I$	$-11.03599 + 5.92521I$
$u = 0.387721 - 0.851263I$ $a = 0.488405 + 0.103669I$ $b = -0.747142 + 0.797802I$ $c = -0.79488 + 1.41620I$ $d = -0.89737 - 1.22574I$	$-4.11180 + 3.97036I$	$-11.03599 - 5.92521I$
$u = -0.048850 + 0.802561I$ $a = 0.570907 + 0.125829I$ $b = -0.313957 + 0.493682I$ $c = 0.167451 + 0.444862I$ $d = 0.365209 - 0.112658I$	$-1.00554 + 1.45329I$	$-3.70692 - 4.69342I$
$u = -0.048850 - 0.802561I$ $a = 0.570907 - 0.125829I$ $b = -0.313957 - 0.493682I$ $c = 0.167451 - 0.444862I$ $d = 0.365209 + 0.112658I$	$-1.00554 - 1.45329I$	$-3.70692 + 4.69342I$
$u = 1.195800 + 0.230197I$ $a = 0.28063 - 1.44187I$ $b = -0.310268 + 1.162650I$ $c = 1.94455 - 0.47579I$ $d = -2.43482 + 0.12132I$	$0.294538 + 1.243650I$	$-3.92766 - 2.52803I$
$u = 1.195800 - 0.230197I$ $a = 0.28063 + 1.44187I$ $b = -0.310268 - 1.162650I$ $c = 1.94455 + 0.47579I$ $d = -2.43482 - 0.12132I$	$0.294538 - 1.243650I$	$-3.92766 + 2.52803I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.512543 + 0.548760I$ $a = 0.810755 + 0.367303I$ $b = 0.214405 + 0.021676I$ $c = 1.012830 - 0.121876I$ $d = -0.586000 - 0.493336I$	$0.77284 + 1.38296I$	$2.12358 - 4.20585I$
$u = 0.512543 - 0.548760I$ $a = 0.810755 - 0.367303I$ $b = 0.214405 - 0.021676I$ $c = 1.012830 + 0.121876I$ $d = -0.586000 + 0.493336I$	$0.77284 - 1.38296I$	$2.12358 + 4.20585I$
$u = 1.240340 + 0.558685I$ $a = -0.19285 - 1.48947I$ $b = -0.74229 + 1.43353I$ $c = -2.20653 - 0.25596I$ $d = 2.59385 + 1.55023I$	$-1.36469 + 9.34331I$	$-7.27750 - 7.90351I$
$u = 1.240340 - 0.558685I$ $a = -0.19285 + 1.48947I$ $b = -0.74229 - 1.43353I$ $c = -2.20653 + 0.25596I$ $d = 2.59385 - 1.55023I$	$-1.36469 - 9.34331I$	$-7.27750 + 7.90351I$
$u = -0.306891 + 1.332240I$ $a = 0.448937 + 0.172706I$ $b = -0.32703 + 1.40380I$ $c = -0.489703 - 0.253197I$ $d = -0.487603 + 0.574696I$	$2.80790 + 2.77377I$	$-2.82329 - 2.35775I$
$u = -0.306891 - 1.332240I$ $a = 0.448937 - 0.172706I$ $b = -0.32703 - 1.40380I$ $c = -0.489703 + 0.253197I$ $d = -0.487603 - 0.574696I$	$2.80790 - 2.77377I$	$-2.82329 + 2.35775I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.599185+0.160658I$ $a=\ 1.279080-0.454824I$ $b=-0.032693+0.151013I$ $c=\ 0.283924-1.075350I$ $d=-0.002639-0.689945I$	$-0.29820+2.58448I$	$1.60498-4.48843I$
$u=-0.599185-0.160658I$ $a=\ 1.279080+0.454824I$ $b=-0.032693-0.151013I$ $c=\ 0.283924+1.075350I$ $d=-0.002639+0.689945I$	$-0.29820-2.58448I$	$1.60498+4.48843I$
$u=\ 0.449039+1.329150I$ $a=\ 0.437109-0.156367I$ $b=-0.53079-1.49203I$ $c=\ 0.884456+0.900024I$ $d=\ 0.79911-1.57972I$	$2.18074-8.77807I$	$-4.21049+7.13120I$
$u=\ 0.449039-1.329150I$ $a=\ 0.437109+0.156367I$ $b=-0.53079+1.49203I$ $c=\ 0.884456-0.900024I$ $d=\ 0.79911+1.57972I$	$2.18074+8.77807I$	$-4.21049-7.13120I$
$u=-1.36520+0.37405I$ $a=\ 0.022772+1.320010I$ $b=-0.40047-1.49490I$ $c=-0.019011+0.257960I$ $d=\ 0.070537+0.359277I$	$3.38586-5.92225I$	$-1.05943+5.53498I$
$u=-1.36520-0.37405I$ $a=\ 0.022772-1.320010I$ $b=-0.40047+1.49490I$ $c=-0.019011-0.257960I$ $d=\ 0.070537-0.359277I$	$3.38586+5.92225I$	$-1.05943-5.53498I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.128781 + 0.527754I$ $a = 0.536628 - 0.033094I$ $b = -0.720363 - 0.196098I$ $c = 0.53943 + 1.55105I$ $d = 0.749102 - 0.484434I$	$-2.91457 + 1.71407I$	$-11.28016 - 2.34859I$
$u = 0.128781 - 0.527754I$ $a = 0.536628 + 0.033094I$ $b = -0.720363 + 0.196098I$ $c = 0.53943 - 1.55105I$ $d = 0.749102 + 0.484434I$	$-2.91457 - 1.71407I$	$-11.28016 + 2.34859I$
$u = 1.36013 + 0.80195I$ $a = -0.423558 - 1.271240I$ $b = -1.02615 + 1.75013I$ $c = 1.77646 + 0.86372I$ $d = -1.72355 - 2.59940I$	$5.1047 + 16.3284I$	$-4.49305 - 9.50798I$
$u = 1.36013 - 0.80195I$ $a = -0.423558 + 1.271240I$ $b = -1.02615 - 1.75013I$ $c = 1.77646 - 0.86372I$ $d = -1.72355 + 2.59940I$	$5.1047 - 16.3284I$	$-4.49305 + 9.50798I$
$u = -1.41454 + 0.73498I$ $a = -0.342095 + 1.249650I$ $b = -0.89493 - 1.79229I$ $c = 0.231981 - 0.161062I$ $d = 0.209770 - 0.398331I$	$6.34910 - 10.12380I$	$-2.60535 + 5.05088I$
$u = -1.41454 - 0.73498I$ $a = -0.342095 - 1.249650I$ $b = -0.89493 + 1.79229I$ $c = 0.231981 + 0.161062I$ $d = 0.209770 + 0.398331I$	$6.34910 + 10.12380I$	$-2.60535 - 5.05088I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.57578 + 0.34473I$ $a = 0.317772 + 0.829753I$ $b = 0.74767 - 1.25595I$ $c = -1.012250 - 0.840874I$ $d = 1.30521 + 1.67398I$	$9.40632 + 3.24641I$	$0.187126 - 1.202849I$
$u = 1.57578 - 0.34473I$ $a = 0.317772 - 0.829753I$ $b = 0.74767 + 1.25595I$ $c = -1.012250 + 0.840874I$ $d = 1.30521 - 1.67398I$	$9.40632 - 3.24641I$	$0.187126 + 1.202849I$
$u = -1.61547 + 0.19947I$ $a = 0.265518 - 0.890486I$ $b = 0.58401 + 1.42833I$ $c = -0.318722 + 0.271187I$ $d = -0.460792 + 0.501668I$	$9.82407 + 3.16258I$	$0.50415 - 3.81889I$
$u = -1.61547 - 0.19947I$ $a = 0.265518 + 0.890486I$ $b = 0.58401 - 1.42833I$ $c = -0.318722 - 0.271187I$ $d = -0.460792 - 0.501668I$	$9.82407 - 3.16258I$	$0.50415 + 3.81889I$

II. $I_2^u = \langle -7.78\times10^{9}au^{19} + 2.11\times10^{10}u^{19} + \cdots + 3.71\times10^{10}a - 7.07\times10^{10},\ 1.86\times10^{10}au^{19} - 3.38\times10^{10}u^{19} + \cdots - 2.67\times10^{11}a + 2.10\times10^{11},\ 4.18\times10^{9}au^{19} + 3.08\times10^{9}u^{19} + \cdots - 2.94\times10^{10}a + 2.81\times10^{10},\ 4.91\times10^{10}au^{19} - 3.32\times10^{10}u^{19} + \cdots - 2.05\times10^{11}a + 7.53\times10^{10},\ u^{20} + u^{19} + \cdots - 8u - 4\rangle$

(i) Arc colorings

$$a_4 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} a \\ -0.154609au^{19} - 0.113711u^{19} + \cdots + 1.08808a - 1.03762 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} a \\ 0.154609au^{19} + 0.113711u^{19} + \cdots - 1.08808a + 1.03762 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u \\ u \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -0.171490au^{19} + 0.312807u^{19} + \cdots + 2.46682a - 1.94394 \\ 0.143768au^{19} - 0.389735u^{19} + \cdots - 0.685959a + 1.30752 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -0.272020au^{19} + 0.0220200u^{19} + \cdots + 2.18366a - 0.183663 \\ 0.227980u^{19} + 0.382589u^{18} + \cdots - 1.74114u - 1.81634 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 0.272020au^{19} - 0.250000u^{19} + \cdots - 2.18366a + 2 \\ 0.227980u^{19} + 0.382589u^{18} + \cdots - 1.74114u - 1.81634 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 0.392720au^{19} - 0.370700u^{19} + \cdots - 2.80210a + 2.61843 \\ -0.120700au^{19} + 0.348680u^{19} + \cdots + 0.618434a - 2.43477 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -0.486024au^{19} + 0.312807u^{19} + \cdots + 3.53102a - 1.94394 \\ 0.345654au^{19} - 0.0895665u^{19} + \cdots - 1.54407a + 0.431179 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -0.154609au^{19} - 0.113711u^{19} + \cdots + 2.08808a - 1.03762 \\ 0.409919au^{19} + 0.367791u^{19} + \cdots - 1.57088a + 0.0883006 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{4263121051}{13525530286}u^{19} - \frac{7308875275}{13525530286}u^{18} + \cdots + \frac{12379392387}{13525530286}u - \frac{17100277556}{6762765143}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_9	$u^{40} + 19u^{39} + \cdots + 288u + 256$
c_2, c_4, c_6 c_8	$u^{40} - 3u^{39} + \cdots + 40u - 16$
c_3, c_7	$(u^{20} + u^{19} + \cdots - 8u - 4)^2$
c_5, c_{11}	$(u^{20} + 2u^{19} + \cdots - 2u + 1)^2$
c_{10}	$(u^{20} - 2u^{19} + \cdots + 36u + 17)^2$
c_{12}	$(u^{20} + 6u^{19} + \cdots - 2u + 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_9	$y^{40} + y^{39} + \cdots - 4022784y + 65536$
c_2, c_4, c_6 c_8	$y^{40} - 19y^{39} + \cdots - 288y + 256$
c_3, c_7	$(y^{20} - 15y^{19} + \cdots - 24y + 16)^2$
c_5, c_{11}	$(y^{20} + 6y^{19} + \cdots - 2y + 1)^2$
c_{10}	$(y^{20} + 30y^{19} + \cdots + 1254y + 289)^2$
c_{12}	$(y^{20} + 18y^{19} + \cdots - 86y + 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.685016 + 0.443026I$ $a = 0.458140 - 0.042470I$ $b = -1.314980 - 0.467098I$ $c = -1.19123 - 1.35374I$ $d = 1.34492 + 3.28525I$	$-4.73160 + 1.82256I$	$-11.12541 - 5.12436I$
$u = 0.685016 + 0.443026I$ $a = -0.09245 - 3.22238I$ $b = -0.921725 + 0.625666I$ $c = -3.57126 - 2.48620I$ $d = 0.21627 + 1.45508I$	$-4.73160 + 1.82256I$	$-11.12541 - 5.12436I$
$u = 0.685016 - 0.443026I$ $a = 0.458140 + 0.042470I$ $b = -1.314980 + 0.467098I$ $c = -1.19123 + 1.35374I$ $d = 1.34492 - 3.28525I$	$-4.73160 - 1.82256I$	$-11.12541 + 5.12436I$
$u = 0.685016 - 0.443026I$ $a = -0.09245 + 3.22238I$ $b = -0.921725 - 0.625666I$ $c = -3.57126 + 2.48620I$ $d = 0.21627 - 1.45508I$	$-4.73160 - 1.82256I$	$-11.12541 + 5.12436I$
$u = -1.176520 + 0.244065I$ $a = 0.577483 - 0.947538I$ $b = 0.310218 + 0.817249I$ $c = 1.70100 - 0.02090I$ $d = -1.82568 + 1.36744I$	$0.28251 - 3.88098I$	$-3.93502 + 4.02252I$
$u = -1.176520 + 0.244065I$ $a = 0.27911 + 1.47852I$ $b = -0.342116 - 1.145120I$ $c = -1.71890 + 0.80569I$ $d = 1.99616 - 0.43974I$	$0.28251 - 3.88098I$	$-3.93502 + 4.02252I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -1.176520 - 0.244065I$ $a = 0.577483 + 0.947538I$ $b = 0.310218 - 0.817249I$ $c = 1.70100 + 0.02090I$ $d = -1.82568 - 1.36744I$	$0.28251 + 3.88098I$	$-3.93502 - 4.02252I$
$u = -1.176520 - 0.244065I$ $a = 0.27911 - 1.47852I$ $b = -0.342116 + 1.145120I$ $c = -1.71890 - 0.80569I$ $d = 1.99616 + 0.43974I$	$0.28251 + 3.88098I$	$-3.93502 - 4.02252I$
$u = -1.256010 + 0.124886I$ $a = 0.339080 + 1.286040I$ $b = -0.124777 - 1.175340I$ $c = 0.00787 - 1.59574I$ $d = 0.528809 + 0.982333I$	$1.249910 + 0.191668I$	$-2.26430 + 0.22109I$
$u = -1.256010 + 0.124886I$ $a = 0.408592 + 0.009946I$ $b = -2.08731 + 0.17219I$ $c = 0.339897 + 0.815901I$ $d = -0.18941 - 2.00525I$	$1.249910 + 0.191668I$	$-2.26430 + 0.22109I$
$u = -1.256010 - 0.124886I$ $a = 0.339080 - 1.286040I$ $b = -0.124777 + 1.175340I$ $c = 0.00787 + 1.59574I$ $d = 0.528809 - 0.982333I$	$1.249910 - 0.191668I$	$-2.26430 - 0.22109I$
$u = -1.256010 - 0.124886I$ $a = 0.408592 - 0.009946I$ $b = -2.08731 - 0.17219I$ $c = 0.339897 - 0.815901I$ $d = -0.18941 + 2.00525I$	$1.249910 - 0.191668I$	$-2.26430 - 0.22109I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.268400 + 0.295253I$ $a = 0.150939 - 1.397650I$ $b = -0.352887 + 1.306450I$ $c = 0.00100 + 1.90027I$ $d = -0.322075 - 1.194470I$	$0.89345 + 5.67427I$	$-3.40403 - 5.66395I$
$u = 1.268400 + 0.295253I$ $a = 0.406505 - 0.023413I$ $b = -2.08796 - 0.41006I$ $c = 0.448812 + 0.837239I$ $d = 0.55980 - 2.41060I$	$0.89345 + 5.67427I$	$-3.40403 - 5.66395I$
$u = 1.268400 - 0.295253I$ $a = 0.150939 + 1.397650I$ $b = -0.352887 - 1.306450I$ $c = 0.00100 - 1.90027I$ $d = -0.322075 + 1.194470I$	$0.89345 - 5.67427I$	$-3.40403 + 5.66395I$
$u = 1.268400 - 0.295253I$ $a = 0.406505 + 0.023413I$ $b = -2.08796 + 0.41006I$ $c = 0.448812 - 0.837239I$ $d = 0.55980 + 2.41060I$	$0.89345 - 5.67427I$	$-3.40403 + 5.66395I$
$u = -0.439566 + 0.534727I$ $a = 0.820860 - 0.314763I$ $b = 0.162005 - 0.050556I$ $c = 1.70038 - 0.48109I$ $d = 0.255350 + 0.690923I$	$-2.07115 + 0.86143I$	$-6.44675 + 0.99952I$
$u = -0.439566 + 0.534727I$ $a = 0.487252 + 0.053221I$ $b = -1.007970 + 0.455517I$ $c = -0.536806 + 0.918810I$ $d = 0.490181 - 1.120710I$	$-2.07115 + 0.86143I$	$-6.44675 + 0.99952I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.439566 - 0.534727I$ $a = 0.820860 + 0.314763I$ $b = 0.162005 + 0.050556I$ $c = 1.70038 + 0.48109I$ $d = 0.255350 - 0.690923I$	$-2.07115 - 0.86143I$	$-6.44675 - 0.99952I$
$u = -0.439566 - 0.534727I$ $a = 0.487252 - 0.053221I$ $b = -1.007970 - 0.455517I$ $c = -0.536806 - 0.918810I$ $d = 0.490181 + 1.120710I$	$-2.07115 - 0.86143I$	$-6.44675 - 0.99952I$
$u = -0.089922 + 1.317200I$ $a = 0.481544 - 0.234697I$ $b = 0.209138 - 1.109080I$ $c = -0.377586 + 0.174434I$ $d = -0.78245 - 1.28050I$	$3.24441 + 2.97363I$	$-2.07664 - 2.68538I$
$u = -0.089922 + 1.317200I$ $a = 0.469189 + 0.202331I$ $b = -0.034817 + 1.235550I$ $c = 0.927267 - 0.657327I$ $d = 0.195810 + 0.513040I$	$3.24441 + 2.97363I$	$-2.07664 - 2.68538I$
$u = -0.089922 - 1.317200I$ $a = 0.481544 + 0.234697I$ $b = 0.209138 + 1.109080I$ $c = -0.377586 - 0.174434I$ $d = -0.78245 + 1.28050I$	$3.24441 - 2.97363I$	$-2.07664 + 2.68538I$
$u = -0.089922 - 1.317200I$ $a = 0.469189 - 0.202331I$ $b = -0.034817 - 1.235550I$ $c = 0.927267 + 0.657327I$ $d = 0.195810 - 0.513040I$	$3.24441 - 2.97363I$	$-2.07664 + 2.68538I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.36144$ $a = 0.339214 + 1.109820I$ $b = 0.119387 - 1.233010I$ $c = 0.299266 + 0.242908I$ $d = -0.407433 + 0.330704I$	4.11381	0.668270
$u = 1.36144$ $a = 0.339214 - 1.109820I$ $b = 0.119387 + 1.233010I$ $c = 0.299266 - 0.242908I$ $d = -0.407433 - 0.330704I$	4.11381	0.668270
$u = -0.610309$ $a = 0.465000$ $b = -1.32374$ $c = -0.750025$ $d = 1.42139$	-2.43031	-0.135410
$u = -0.610309$ $a = 2.94194$ $b = -0.435716$ $c = 2.32897$ $d = -0.457747$	-2.43031	-0.135410
$u = 0.078647 + 0.574169I$ $a = 0.556867 - 0.032704I$ $b = -0.612405 - 0.165972I$ $c = 2.18886 - 0.63265I$ $d = -3.72549 + 1.36694I$	$-2.82359 - 2.30782I$	$-10.11267 + 3.58910I$
$u = 0.078647 + 0.574169I$ $a = -7.02820 - 1.64334I$ $b = -1.287020 + 0.071600I$ $c = -1.46449 - 6.68908I$ $d = -0.535397 - 1.207020I$	$-2.82359 - 2.30782I$	$-10.11267 + 3.58910I$

Solutions to I_2^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.078647 - 0.574169I$ $a = 0.556867 + 0.032704I$ $b = -0.612405 + 0.165972I$ $c = 2.18886 + 0.63265I$ $d = -3.72549 - 1.36694I$	$-2.82359 + 2.30782I$	$-10.11267 - 3.58910I$
$u = 0.078647 - 0.574169I$ $a = -7.02820 + 1.64334I$ $b = -1.287020 - 0.071600I$ $c = -1.46449 + 6.68908I$ $d = -0.535397 + 1.207020I$	$-2.82359 + 2.30782I$	$-10.11267 - 3.58910I$
$u = -1.47182 + 0.62184I$ $a = 0.387142 - 0.708904I$ $b = 1.015300 + 0.883621I$ $c = -1.36735 + 0.63910I$ $d = 1.04280 - 2.20163I$	$7.69158 - 9.88458I$	$-1.61748 + 5.77638I$
$u = -1.47182 + 0.62184I$ $a = -0.227488 + 1.225540I$ $b = -0.69209 - 1.80855I$ $c = 1.13747 - 1.01527I$ $d = -1.61508 + 1.79092I$	$7.69158 - 9.88458I$	$-1.61748 + 5.77638I$
$u = -1.47182 - 0.62184I$ $a = 0.387142 + 0.708904I$ $b = 1.015300 - 0.883621I$ $c = -1.36735 - 0.63910I$ $d = 1.04280 + 2.20163I$	$7.69158 + 9.88458I$	$-1.61748 - 5.77638I$
$u = -1.47182 - 0.62184I$ $a = -0.227488 - 1.225540I$ $b = -0.69209 + 1.80855I$ $c = 1.13747 + 1.01527I$ $d = -1.61508 - 1.79092I$	$7.69158 + 9.88458I$	$-1.61748 - 5.77638I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.52621 + 0.50989I$ $a = 0.360132 + 0.757386I$ $b = 0.921521 - 1.050930I$ $c = -0.411289 + 0.112437I$ $d = 0.106033 - 0.813106I$	$8.58220 + 3.56941I$	$-0.284129 - 1.007355I$
$u = 1.52621 + 0.50989I$ $a = -0.127382 - 1.185430I$ $b = -0.49179 + 1.81736I$ $c = 0.097619 + 0.500148I$ $d = 0.685044 + 0.038109I$	$8.58220 + 3.56941I$	$-0.284129 - 1.007355I$
$u = 1.52621 - 0.50989I$ $a = 0.360132 - 0.757386I$ $b = 0.921521 + 1.050930I$ $c = -0.411289 - 0.112437I$ $d = 0.106033 + 0.813106I$	$8.58220 - 3.56941I$	$-0.284129 + 1.007355I$
$u = 1.52621 - 0.50989I$ $a = -0.127382 + 1.185430I$ $b = -0.49179 - 1.81736I$ $c = 0.097619 - 0.500148I$ $d = 0.685044 - 0.038109I$	$8.58220 - 3.56941I$	$-0.284129 + 1.007355I$

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

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

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

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

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -4v-5$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

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

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

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

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

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

(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_6	$u - 1$
c_3, c_5, c_7 c_{10}, c_{11}, c_{12}	u
c_4, c_8, c_9	$u + 1$

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

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

VI.

$\boldsymbol{I_4^v = \langle a,\ d^2v - dv + \cdots - d + 1,\ d^2v^2 - dv^2 + \cdots + 2v + 1,\ cdv - dv + \cdots - a + 1,\ cdv^2 - dv^2 + \cdots - 2av - a,\ adv + dv + \cdots + c - 1,\ c^2v^2 + acv^2 + \cdots + av + a^2,\ b + 1\rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -d^2c + d^2 + 2dc - v^2 - 4c - 9$

(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
$v = \cdots$		
$a = \cdots$		
$b = \cdots$	$-3.28987 + 2.02988I$	$-8.38377 - 3.11850I$
$c = \cdots$		
$d = \cdots$		

VII. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$u^2(u-1)^3(u^{28}+9u^{27}+\cdots+u+1)(u^{40}+19u^{39}+\cdots+288u+256)$
c_2, c_6	$u^2(u-1)^3(u^{28}-5u^{27}+\cdots-3u+1)(u^{40}-3u^{39}+\cdots+40u-16)$
c_3, c_7	$u^5(u^{20}+u^{19}+\cdots-8u-4)^2(u^{28}-3u^{27}+\cdots-64u+32)$
c_4, c_8	$u^2(u+1)^3(u^{28}-5u^{27}+\cdots-3u+1)(u^{40}-3u^{39}+\cdots+40u-16)$
c_5, c_{11}	$u(u^2-u+1)(u^2+u+1)(u^{20}+2u^{19}+\cdots-2u+1)^2$ $\cdot(u^{28}+u^{27}+\cdots+8u+4)$
c_9	$u^2(u+1)^3(u^{28}+9u^{27}+\cdots+u+1)(u^{40}+19u^{39}+\cdots+288u+256)$
c_{10}	$u(u^2-u+1)(u^2+u+1)(u^{20}-2u^{19}+\cdots+36u+17)^2$ $\cdot(u^{28}-u^{27}+\cdots+1736u+1252)$
c_{12}	$u(u^2+u+1)^2(u^{20}+6u^{19}+\cdots-2u+1)^2$ $\cdot(u^{28}+9u^{27}+\cdots-56u+16)$

VIII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_9	$y^2(y-1)^3(y^{28}+31y^{27}+\cdots+39y+1)$ $\cdot(y^{40}+y^{39}+\cdots-4022784y+65536)$
c_2, c_4, c_6 c_8	$y^2(y-1)^3(y^{28}-9y^{27}+\cdots-y+1)(y^{40}-19y^{39}+\cdots-288y+256)$
c_3, c_7	$y^5(y^{20}-15y^{19}+\cdots-24y+16)^2$ $\cdot(y^{28}-15y^{27}+\cdots+3072y+1024)$
c_5, c_{11}	$y(y^2+y+1)^2(y^{20}+6y^{19}+\cdots-2y+1)^2$ $\cdot(y^{28}+9y^{27}+\cdots-56y+16)$
c_{10}	$y(y^2+y+1)^2(y^{20}+30y^{19}+\cdots+1254y+289)^2$ $\cdot(y^{28}+33y^{27}+\cdots-17874936y+1567504)$
c_{12}	$y(y^2+y+1)^2(y^{20}+18y^{19}+\cdots-86y+1)^2$ $\cdot(y^{28}+21y^{27}+\cdots-6432y+256)$