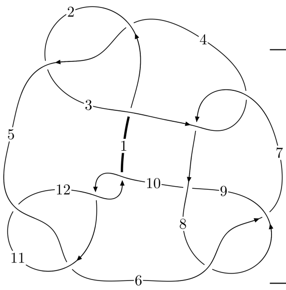
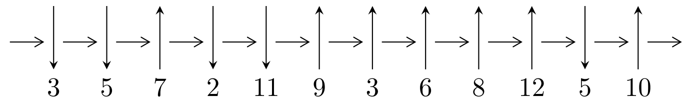
$12n_{0224}$ ($K12n_{0224}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$
\begin{aligned}
I_1^u = \langle & 9.65958 \times 10^{65} u^{40} + 1.97140 \times 10^{66} u^{39} + \cdots + 1.18987 \times 10^{68} d - 9.62857 \times 10^{67}, \\
& 1.07299 \times 10^{66} u^{40} + 1.97354 \times 10^{66} u^{39} + \cdots + 1.18987 \times 10^{68} c + 6.68255 \times 10^{67}, \\
& -1.37658 \times 10^{65} u^{40} - 4.47424 \times 10^{65} u^{39} + \cdots + 1.06596 \times 10^{68} b - 6.96533 \times 10^{67}, \\
& 5.90486 \times 10^{65} u^{40} + 1.83524 \times 10^{66} u^{39} + \cdots + 4.26385 \times 10^{68} a - 3.18493 \times 10^{67}, \\
& u^{41} + 2u^{40} + \cdots - 512u^2 - 512\rangle \\
I_2^u = \langle & u^3a^2 + 5u^3a + 2a^2u - 4u^2a - 4u^3 + 11au + 4u^2 + d - 8a - 10u + 8, \\
& u^3a^2 + 3u^3a + a^2u - 2u^2a - 2u^3 + 4au + 2u^2 + c - 4a - 4u + 4,\ -a^2u^2 + b + 2a - 2, \\
& 4u^3a^2 - 2a^2u^2 - 6u^3a + a^3 + 10a^2u + 3u^2a + 2u^3 - 2a^2 - 15au - u^2 + 3a + 5u - 1,\ u^4 - u^3 + 3u^2 - 2u + 1
\end{aligned}
$$

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

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 58 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.

$$\boldsymbol{I_1^u = \langle 9.66 \times 10^{65} u^{40} + 1.97 \times 10^{66} u^{39} + \cdots + 1.19 \times 10^{68} d - 9.63 \times 10^{67},\ 1.07 \times 10^{66} u^{40} + 1.97 \times 10^{66} u^{39} + \cdots + 1.19 \times 10^{68} c + 6.68 \times 10^{67},\ -1.38 \times 10^{65} u^{40} - 4.47 \times 10^{65} u^{39} + \cdots + 1.07 \times 10^{68} b - 6.97 \times 10^{67},\ 5.90 \times 10^{65} u^{40} + 1.84 \times 10^{66} u^{39} + \cdots + 4.26 \times 10^{68} a - 3.18 \times 10^{67},\ u^{41} + 2u^{40} + \cdots - 512u^2 - 512 \rangle}$$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -0.00138487u^{40} - 0.00430419u^{39} + \cdots - 1.07263u + 0.0746961 \\ 0.00129140u^{40} + 0.00419737u^{39} + \cdots + 1.25599u + 0.653432 \end{pmatrix}$$

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

$$a_2 = \begin{pmatrix} -0.00138487u^{40} - 0.00430419u^{39} + \cdots - 1.07263u + 0.0746961 \\ -0.000383620u^{40} - 0.00160154u^{39} + \cdots - 0.546942u + 0.132211 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} -0.00176849u^{40} - 0.00590573u^{39} + \cdots - 1.61957u + 0.206907 \\ -0.000383620u^{40} - 0.00160154u^{39} + \cdots - 0.546942u + 0.132211 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -0.00901765u^{40} - 0.0165861u^{39} + \cdots + 12.4282u - 0.561619 \\ -0.00811817u^{40} - 0.0165681u^{39} + \cdots + 8.57387u + 0.809210 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -0.00756180u^{40} - 0.0140634u^{39} + \cdots + 11.9677u + 0.350233 \\ -0.00666231u^{40} - 0.0140454u^{39} + \cdots + 8.11334u + 1.72106 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 0.000899485u^{40} + 0.0000180094u^{39} + \cdots - 3.85437u + 1.37083 \\ -0.00666231u^{40} - 0.0140454u^{39} + \cdots + 8.11334u + 1.72106 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -0.00898279u^{40} - 0.0228872u^{39} + \cdots + 6.35254u + 2.83155 \\ -0.00602820u^{40} - 0.0101798u^{39} + \cdots + 8.49552u - 2.03570 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -0.00761817u^{40} - 0.0171648u^{39} + \cdots + 9.71421u + 2.83352 \\ -0.00515696u^{40} - 0.00747593u^{39} + \cdots + 7.91840u - 3.20299 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 0.00750642u^{40} + 0.0137245u^{39} + \cdots + 0.520985u + 10.6626$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^{41}+50u^{40}+\cdots+8224u+256$
c_2, c_4	$u^{41}-8u^{40}+\cdots-8u-16$
c_3, c_7	$u^{41}+2u^{40}+\cdots-512u^2-512$
c_5, c_{11}	$u^{41}-2u^{40}+\cdots+16u-4$
c_6, c_8	$u^{41}+8u^{40}+\cdots-8u-16$
c_9	$u^{41}-10u^{40}+\cdots+2080u-256$
c_{10}, c_{12}	$u^{41}-12u^{40}+\cdots+344u+16$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^{41} - 110y^{40} + \cdots + 25092608y - 65536$
c_2, c_4	$y^{41} - 50y^{40} + \cdots + 8224y - 256$
c_3, c_7	$y^{41} + 30y^{40} + \cdots - 524288y - 262144$
c_5, c_{11}	$y^{41} + 12y^{40} + \cdots + 344y - 16$
c_6, c_8	$y^{41} - 10y^{40} + \cdots + 2080y - 256$
c_9	$y^{41} + 50y^{40} + \cdots - 663040y - 65536$
c_{10}, c_{12}	$y^{41} + 36y^{40} + \cdots + 135968y - 256$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.280189 + 0.954581I$ $a = 0.590964 - 0.259086I$ $b = 0.419345 + 0.622257I$ $c = 0.0474799 - 0.0430603I$ $d = 1.033380 + 0.229578I$	$1.60252 - 4.55290I$	$4.51064 + 8.08001I$
$u = -0.280189 - 0.954581I$ $a = 0.590964 + 0.259086I$ $b = 0.419345 - 0.622257I$ $c = 0.0474799 + 0.0430603I$ $d = 1.033380 - 0.229578I$	$1.60252 + 4.55290I$	$4.51064 - 8.08001I$
$u = -0.942111 + 0.024266I$ $a = 0.91333 - 1.27170I$ $b = -0.627424 + 0.518765I$ $c = -0.499993 + 0.079611I$ $d = -0.315261 + 0.806428I$	$-0.87865 + 4.07350I$	$1.48942 - 7.36111I$
$u = -0.942111 - 0.024266I$ $a = 0.91333 + 1.27170I$ $b = -0.627424 - 0.518765I$ $c = -0.499993 - 0.079611I$ $d = -0.315261 - 0.806428I$	$-0.87865 - 4.07350I$	$1.48942 + 7.36111I$
$u = -0.100000 + 0.892301I$ $a = 0.541244 + 0.141055I$ $b = 0.730090 - 0.450883I$ $c = 0.004841 + 0.674193I$ $d = -0.587647 + 0.795464I$	$-1.46086 + 1.42227I$	$-3.88823 - 3.83998I$
$u = -0.100000 - 0.892301I$ $a = 0.541244 - 0.141055I$ $b = 0.730090 + 0.450883I$ $c = 0.004841 - 0.674193I$ $d = -0.587647 - 0.795464I$	$-1.46086 - 1.42227I$	$-3.88823 + 3.83998I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.687957 + 0.421229I$ $a = 0.457946 + 0.040164I$ $b = 1.167000 - 0.190055I$ $c = -0.728909 + 0.390845I$ $d = -0.849961 + 0.066792I$	$-2.43397 + 0.55461I$	$-3.61478 + 1.21885I$
$u = -0.687957 - 0.421229I$ $a = 0.457946 - 0.040164I$ $b = 1.167000 + 0.190055I$ $c = -0.728909 - 0.390845I$ $d = -0.849961 - 0.066792I$	$-2.43397 - 0.55461I$	$-3.61478 - 1.21885I$
$u = -0.586118 + 0.499909I$ $a = 0.841488 - 0.427556I$ $b = -0.055470 + 0.479911I$ $c = 0.061137 - 1.346250I$ $d = 0.633993 + 0.071971I$	$3.14860 + 0.97270I$	$10.27133 - 0.16493I$
$u = -0.586118 - 0.499909I$ $a = 0.841488 + 0.427556I$ $b = -0.055470 - 0.479911I$ $c = 0.061137 + 1.346250I$ $d = 0.633993 - 0.071971I$	$3.14860 - 0.97270I$	$10.27133 + 0.16493I$
$u = 0.757570 + 0.057431I$ $a = 1.57773 - 1.54774I$ $b = -0.677009 + 0.316853I$ $c = 0.629935 + 0.107949I$ $d = 0.369651 - 0.357039I$	$-0.834104 - 1.057860I$	$1.84303 - 1.72199I$
$u = 0.757570 - 0.057431I$ $a = 1.57773 + 1.54774I$ $b = -0.677009 - 0.316853I$ $c = 0.629935 - 0.107949I$ $d = 0.369651 + 0.357039I$	$-0.834104 + 1.057860I$	$1.84303 + 1.72199I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.748122 + 0.099272I$ $a = 0.452596 - 0.009005I$ $b = 1.208600 + 0.043942I$ $c = 0.532023 - 0.239529I$ $d = 0.043520 + 0.421796I$	$-0.52179 - 2.81355I$	$3.88749 + 5.15717I$
$u = 0.748122 - 0.099272I$ $a = 0.452596 + 0.009005I$ $b = 1.208600 - 0.043942I$ $c = 0.532023 + 0.239529I$ $d = 0.043520 - 0.421796I$	$-0.52179 + 2.81355I$	$3.88749 - 5.15717I$
$u = -0.004283 + 0.652626I$ $a = 0.629363 - 0.061738I$ $b = 0.573765 + 0.154381I$ $c = -0.00038 - 2.68044I$ $d = 0.006876 - 0.589549I$	$0.70242 - 2.36927I$	$-0.82941 + 4.59716I$
$u = -0.004283 - 0.652626I$ $a = 0.629363 + 0.061738I$ $b = 0.573765 - 0.154381I$ $c = -0.00038 + 2.68044I$ $d = 0.006876 + 0.589549I$	$0.70242 + 2.36927I$	$-0.82941 - 4.59716I$
$u = -0.076846 + 0.625583I$ $a = 0.695357 - 0.090908I$ $b = 0.413943 + 0.184853I$ $c = 0.282886 + 0.791726I$ $d = 0.74226 + 1.57829I$	$0.85500 + 1.57570I$	$0.179374 + 0.776646I$
$u = -0.076846 - 0.625583I$ $a = 0.695357 + 0.090908I$ $b = 0.413943 - 0.184853I$ $c = 0.282886 - 0.791726I$ $d = 0.74226 - 1.57829I$	$0.85500 - 1.57570I$	$0.179374 - 0.776646I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.01326 + 1.47518I$ $a = -1.81673 + 0.02079I$ $b = -1.55037 - 0.00630I$ $c = 1.42698 + 0.86838I$ $d = 0.490726 + 0.727578I$	$-5.83509 - 1.34899I$	$-0.977007 + 0.716014I$
$u = -0.01326 - 1.47518I$ $a = -1.81673 - 0.02079I$ $b = -1.55037 + 0.00630I$ $c = 1.42698 - 0.86838I$ $d = 0.490726 - 0.727578I$	$-5.83509 + 1.34899I$	$-0.977007 - 0.716014I$
$u = 0.45410 + 1.44756I$ $a = -1.59641 - 0.64255I$ $b = -1.53907 + 0.21697I$ $c = 1.49469 - 0.92353I$ $d = 0.355963 - 0.961859I$	$-4.95290 + 7.65933I$	$2.00000 - 5.62562I$
$u = 0.45410 - 1.44756I$ $a = -1.59641 + 0.64255I$ $b = -1.53907 - 0.21697I$ $c = 1.49469 + 0.92353I$ $d = 0.355963 + 0.961859I$	$-4.95290 - 7.65933I$	$2.00000 + 5.62562I$
$u = 0.466919$ $a = 1.29906$ $b = -0.230214$ $c = 1.50297$ $d = -0.0988292$	1.25610	8.53770
$u = 0.35061 + 1.53639I$ $a = 0.443886 + 0.289097I$ $b = 0.581850 - 1.030240I$ $c = 1.88732 - 0.49585I$ $d = 0.784306 - 0.583648I$	$-6.34261 + 3.42138I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.35061 - 1.53639I$ $a = 0.443886 - 0.289097I$ $b = 0.581850 + 1.030240I$ $c = 1.88732 + 0.49585I$ $d = 0.784306 + 0.583648I$	$-6.34261 - 3.42138I$	0
$u = -0.51610 + 1.49655I$ $a = 0.446462 - 0.321741I$ $b = 0.474223 + 1.062390I$ $c = -1.68030 - 1.21373I$ $d = -0.511523 - 1.269150I$	$-5.66064 - 9.73522I$	$0. + 7.05049I$
$u = -0.51610 - 1.49655I$ $a = 0.446462 + 0.321741I$ $b = 0.474223 - 1.062390I$ $c = -1.68030 + 1.21373I$ $d = -0.511523 + 1.269150I$	$-5.66064 + 9.73522I$	$0. - 7.05049I$
$u = -1.62020 + 0.13077I$ $a = 0.381574 + 0.008996I$ $b = 1.61926 - 0.06175I$ $c = -0.47751 + 2.12520I$ $d = -0.63777 + 3.15512I$	$-8.89854 + 0.19005I$	0
$u = -1.62020 - 0.13077I$ $a = 0.381574 - 0.008996I$ $b = 1.61926 + 0.06175I$ $c = -0.47751 - 2.12520I$ $d = -0.63777 - 3.15512I$	$-8.89854 - 0.19005I$	0
$u = 1.59450 + 0.33027I$ $a = 0.382027 - 0.022906I$ $b = 1.60824 + 0.15639I$ $c = -0.39612 + 2.13768I$ $d = -0.28184 + 3.24036I$	$-8.54414 - 6.61454I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.59450 - 0.33027I$ $a = 0.382027 + 0.022906I$ $b = 1.60824 - 0.15639I$ $c = -0.39612 - 2.13768I$ $d = -0.28184 - 3.24036I$	$-8.54414 + 6.61454I$	0
$u = -0.23388 + 1.65276I$ $a = -1.52839 + 0.26544I$ $b = -1.63512 - 0.11031I$ $c = -2.35058 + 0.06091I$ $d = -1.275640 - 0.091209I$	$-9.70458 - 3.47853I$	0
$u = -0.23388 - 1.65276I$ $a = -1.52839 - 0.26544I$ $b = -1.63512 + 0.11031I$ $c = -2.35058 - 0.06091I$ $d = -1.275640 + 0.091209I$	$-9.70458 + 3.47853I$	0
$u = 0.86658 + 1.51028I$ $a = -1.140130 - 0.820998I$ $b = -1.57759 + 0.41592I$ $c = 1.38502 - 2.89598I$ $d = 0.08526 - 2.95483I$	$-12.2320 + 15.1490I$	0
$u = 0.86658 - 1.51028I$ $a = -1.140130 + 0.820998I$ $b = -1.57759 - 0.41592I$ $c = 1.38502 + 2.89598I$ $d = 0.08526 + 2.95483I$	$-12.2320 - 15.1490I$	0
$u = -0.78943 + 1.61251I$ $a = -1.175700 + 0.706741I$ $b = -1.62479 - 0.37558I$ $c = -2.01798 - 2.64036I$ $d = -0.74497 - 2.73152I$	$-13.5026 - 8.6555I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.78943 - 1.61251I$ $a = -1.175700 - 0.706741I$ $b = -1.62479 + 0.37558I$ $c = -2.01798 + 2.64036I$ $d = -0.74497 + 2.73152I$	$-13.5026 + 8.6555I$	0
$u = -0.64330 + 1.72758I$ $a = -1.231740 + 0.552038I$ $b = -1.67606 - 0.30300I$ $c = 0.70493 + 3.45324I$ $d = -0.14309 + 3.02959I$	$-14.7932 - 7.9945I$	0
$u = -0.64330 - 1.72758I$ $a = -1.231740 - 0.552038I$ $b = -1.67606 + 0.30300I$ $c = 0.70493 - 3.45324I$ $d = -0.14309 - 3.02959I$	$-14.7932 + 7.9945I$	0
$u = 0.48873 + 1.82349I$ $a = -1.264400 - 0.401956I$ $b = -1.71830 + 0.22835I$ $c = -1.55696 + 3.30101I$ $d = -0.64880 + 2.90927I$	$-15.6167 + 1.2657I$	0
$u = 0.48873 - 1.82349I$ $a = -1.264400 + 0.401956I$ $b = -1.71830 - 0.22835I$ $c = -1.55696 - 3.30101I$ $d = -0.64880 - 2.90927I$	$-15.6167 - 1.2657I$	0

II. $\boldsymbol{I^u_2 = \langle u^3a^2 + 5u^3a + \cdots - 8a + 8,\ u^3a^2 + 3u^3a + \cdots - 4a + 4,\ -a^2u^2 + b + 2a - 2,\ 4u^3a^2 - 6u^3a + \cdots + 3a - 1,\ u^4 - u^3 + 3u^2 - 2u + 1\rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} a \\ a^2u^2 - 2a + 2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} a \\ -a^2u^2 - u^2a + 2a - 2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -a^2u^2 - u^2a + 3a - 2 \\ -a^2u^2 - u^2a + 2a - 2 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -u^3a^2 - 3u^3a - a^2u + 2u^2a + 2u^3 - 4au - 2u^2 + 4a + 4u - 4 \\ -u^3a^2 - 5u^3a - 2a^2u + 4u^2a + 4u^3 - 11au - 4u^2 + 8a + 10u - 8 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -2u^3a - a^2u + 2u^2a + 2u^3 - 6au - 2u^2 + 4a + 6u - 4 \\ -4u^3a - 2a^2u + 4u^2a + 4u^3 - 13au - 4u^2 + 8a + 12u - 8 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -2u^3a - a^2u + 2u^2a + 2u^3 - 7au - 2u^2 + 4a + 6u - 4 \\ -4u^3a - 2a^2u + 4u^2a + 4u^3 - 13au - 4u^2 + 8a + 12u - 8 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -u^3a^2 + a^2u^2 - u^3a - 2a^2u + 4u^2a + a^2 - 2au - 2u^2 + 6a - 4 \\ -u^3a^2 - u^3a - 2a^2u + 3u^2a + a^2 - 2au - 2u^2 + 7a - 6 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -u^3a^2 + a^2u^2 - 2a^2u + 3u^2a + a^2 - 2u^2 + 5a - 4 \\ -2u^3a^2 - 3u^3a + \cdots + 9a - 8 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^3 + 4u^2 - 12u + 6$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_9	$y^{12} - 8y^{11} + \cdots - 78y + 1$
c_2, c_4, c_6 c_8	$y^{12} - 8y^{11} + \cdots + 10y + 1$
c_3, c_7, c_{10} c_{12}	$(y^4 + 5y^3 + 7y^2 + 2y + 1)^3$
c_5, c_{11}	$(y^4 + y^3 + 3y^2 + 2y + 1)^3$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.395123 + 0.506844I$ $a = 0.837889 + 0.280931I$ $b = 0.072869 - 0.359716I$ $c = 0.394185 + 0.517164I$ $d = 0.577230 + 0.415041I$	$0.21101 + 1.41510I$	$1.82674 - 4.90874I$
$u = 0.395123 + 0.506844I$ $a = 0.492884 - 0.048733I$ $b = 1.009230 + 0.198659I$ $c = -1.39293 + 0.39378I$ $d = -2.82169 + 1.21168I$	$0.21101 + 1.41510I$	$1.82674 - 4.90874I$
$u = 0.395123 + 0.506844I$ $a = -2.51225 - 4.92832I$ $b = -1.082100 + 0.161058I$ $c = 0.20850 - 1.92463I$ $d = -0.459158 - 0.186039I$	$0.21101 + 1.41510I$	$1.82674 - 4.90874I$
$u = 0.395123 - 0.506844I$ $a = 0.837889 - 0.280931I$ $b = 0.072869 + 0.359716I$ $c = 0.394185 - 0.517164I$ $d = 0.577230 - 0.415041I$	$0.21101 - 1.41510I$	$1.82674 + 4.90874I$
$u = 0.395123 - 0.506844I$ $a = 0.492884 + 0.048733I$ $b = 1.009230 - 0.198659I$ $c = -1.39293 - 0.39378I$ $d = -2.82169 - 1.21168I$	$0.21101 - 1.41510I$	$1.82674 + 4.90874I$
$u = 0.395123 - 0.506844I$ $a = -2.51225 + 4.92832I$ $b = -1.082100 - 0.161058I$ $c = 0.20850 + 1.92463I$ $d = -0.459158 + 0.186039I$	$0.21101 - 1.41510I$	$1.82674 + 4.90874I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.10488 + 1.55249I$ $a = 0.439878 + 0.246240I$ $b = 0.730940 - 0.968963I$ $c = -1.56704 + 1.28737I$ $d = -0.641253 + 1.089290I$	$-6.79074 + 3.16396I$	$-1.82674 - 2.56480I$
$u = 0.10488 + 1.55249I$ $a = 0.432622 - 0.214254I$ $b = 0.856215 + 0.919282I$ $c = 1.82916 + 0.51793I$ $d = 0.824626 + 0.377943I$	$-6.79074 + 3.16396I$	$-1.82674 - 2.56480I$
$u = 0.10488 + 1.55249I$ $a = -1.69102 - 0.14308I$ $b = -1.58715 + 0.04968I$ $c = -0.47187 - 4.91028I$ $d = -0.47976 - 3.28982I$	$-6.79074 + 3.16396I$	$-1.82674 - 2.56480I$
$u = 0.10488 - 1.55249I$ $a = 0.439878 - 0.246240I$ $b = 0.730940 + 0.968963I$ $c = -1.56704 - 1.28737I$ $d = -0.641253 - 1.089290I$	$-6.79074 - 3.16396I$	$-1.82674 + 2.56480I$
$u = 0.10488 - 1.55249I$ $a = 0.432622 + 0.214254I$ $b = 0.856215 - 0.919282I$ $c = 1.82916 - 0.51793I$ $d = 0.824626 - 0.377943I$	$-6.79074 - 3.16396I$	$-1.82674 + 2.56480I$
$u = 0.10488 - 1.55249I$ $a = -1.69102 + 0.14308I$ $b = -1.58715 - 0.04968I$ $c = -0.47187 + 4.91028I$ $d = -0.47976 + 3.28982I$	$-6.79074 - 3.16396I$	$-1.82674 + 2.56480I$

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

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -4v + 7$

(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_1^v	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$v = -0.500000 + 0.866025I$ $a = 1.00000$ $b = 0$ $c = 0$ $d = 0.500000 + 0.866025I$	$1.64493 + 2.02988I$	$9.00000 - 3.46410I$
$v = -0.500000 - 0.866025I$ $a = 1.00000$ $b = 0$ $c = 0$ $d = 0.500000 - 0.866025I$	$1.64493 - 2.02988I$	$9.00000 + 3.46410I$

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

(i) Arc colorings

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

(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_{12}	$u^2 - u + 1$
c_{10}, 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_2^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v =$	$0.500000 + 0.866025I$		
$a =$	0		
$b =$	1.00000	$-1.64493 + 2.02988I$	$-3.00000 - 3.46410I$
$c =$	$0.500000 + 0.866025I$		
$d =$	0		
$v =$	$0.500000 - 0.866025I$		
$a =$	0		
$b =$	1.00000	$-1.64493 - 2.02988I$	$-3.00000 + 3.46410I$
$c =$	$0.500000 - 0.866025I$		
$d =$	0		

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

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(iv) u-Polynomials at the component

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

(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	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$v = 1.00000$		
$a = 0$		
$b = 1.00000$	0	0
$c = 0$		
$d = -1.00000$		

VI.

$\boldsymbol{I_4^v = \langle a,\ -c^2v + cv + \cdots - 2ca + a,\ dv + 1,\ c^2v^2 - v^2c + \cdots + a^2 - av,\ b - 1\rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

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

(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
$v = \cdots$		
$a = \cdots$		
$b = \cdots$	$-2.02988I$	$2.25553 + 3.87325I$
$c = \cdots$		
$d = \cdots$		

VII. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$u^2(u-1)^3(u^{12}+8u^{11}+\cdots-10u+1)$ $\cdot(u^{41}+50u^{40}+\cdots+8224u+256)$
c_2	$u^2(u-1)^3(u^{12}-4u^{10}+\cdots+2u+1)(u^{41}-8u^{40}+\cdots-8u-16)$
c_3, c_7	$u^5(u^4-u^3+3u^2-2u+1)^3(u^{41}+2u^{40}+\cdots-512u^2-512)$
c_4	$u^2(u+1)^3(u^{12}-4u^{10}+\cdots+2u+1)(u^{41}-8u^{40}+\cdots-8u-16)$
c_5, c_{11}	$u(u^2-u+1)(u^2+u+1)(u^4-u^3+u^2+1)^3(u^{41}-2u^{40}+\cdots+16u-4)$
c_6	$u^2(u+1)^3(u^{12}-4u^{10}+\cdots+2u+1)(u^{41}+8u^{40}+\cdots-8u-16)$
c_8	$u^2(u-1)^3(u^{12}-4u^{10}+\cdots+2u+1)(u^{41}+8u^{40}+\cdots-8u-16)$
c_9	$u^2(u-1)^3(u^{12}-8u^{11}+\cdots+10u+1)$ $\cdot(u^{41}-10u^{40}+\cdots+2080u-256)$
c_{10}	$u(u^2+u+1)^2(u^4-u^3+3u^2-2u+1)^3$ $\cdot(u^{41}-12u^{40}+\cdots+344u+16)$
c_{12}	$u(u^2-u+1)^2(u^4-u^3+3u^2-2u+1)^3$ $\cdot(u^{41}-12u^{40}+\cdots+344u+16)$

VIII. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$y^2(y-1)^3(y^{12}-8y^{11}+\cdots-78y+1)$ $\cdot\,(y^{41}-110y^{40}+\cdots+25092608y-65536)$
c_2, c_4	$y^2(y-1)^3(y^{12}-8y^{11}+\cdots+10y+1)$ $\cdot\,(y^{41}-50y^{40}+\cdots+8224y-256)$
c_3, c_7	$y^5(y^4+5y^3+\cdots+2y+1)^3(y^{41}+30y^{40}+\cdots-524288y-262144)$
c_5, c_{11}	$y(y^2+y+1)^2(y^4+y^3+3y^2+2y+1)^3$ $\cdot\,(y^{41}+12y^{40}+\cdots+344y-16)$
c_6, c_8	$y^2(y-1)^3(y^{12}-8y^{11}+\cdots+10y+1)$ $\cdot\,(y^{41}-10y^{40}+\cdots+2080y-256)$
c_9	$y^2(y-1)^3(y^{12}-8y^{11}+\cdots-78y+1)$ $\cdot\,(y^{41}+50y^{40}+\cdots-663040y-65536)$
c_{10}, c_{12}	$y(y^2+y+1)^2(y^4+5y^3+7y^2+2y+1)^3$ $\cdot\,(y^{41}+36y^{40}+\cdots+135968y-256)$