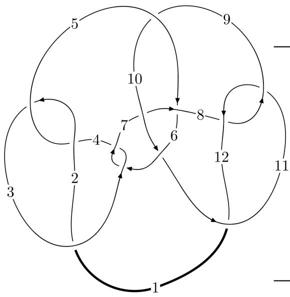
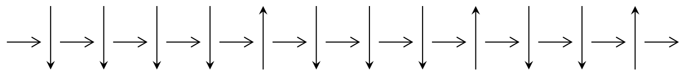
# $12n_{0125}$ ($K12n_{0125}$)




A knot diagram[1]

**Linearized knot diagam**




**Solving Sequence**

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

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

$$\begin{aligned}
I_1^u = \langle &-5.24906 \times 10^{251} u^{61} - 2.63379 \times 10^{252} u^{60} + \cdots + 3.44441 \times 10^{254} b + 2.69575 \times 10^{254}, \\
&1.32614 \times 10^{254} u^{61} + 8.14465 \times 10^{254} u^{60} + \cdots + 2.75553 \times 10^{255} a + 1.08450 \times 10^{257}, \\
&u^{62} + 6u^{61} + \cdots + 1248u + 64 \rangle \\
I_2^u = \langle &-u^3 - u^2 + b - u,\ -u^3 + a + 2,\ u^4 + u^2 - u + 1 \rangle \\
I_3^u = \langle &2u^5 + u^4 + 3u^3 + 2u^2 + b + 2u + 2,\ -2u^5 - 4u^3 - u^2 + a - 3u - 2,\ u^6 + u^5 + 2u^4 + 2u^3 + 2u^2 + 2u + 1 \rangle
\end{aligned}$$

$$I_1^v = \langle a,\ 186v^5 + 1767v^4 + 16759v^3 + 279v^2 + 385b + 93v + 306,\ v^6 + 10v^5 + 95v^4 + 48v^3 + 15v^2 + 5v + 1 \rangle$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 78 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.** $\boldsymbol{I_1^u = \langle -5.25 \times 10^{251} u^{61} - 2.63 \times 10^{252} u^{60} + \cdots + 3.44 \times 10^{254} b + 2.70 \times 10^{254},\ 1.33 \times 10^{254} u^{61} + 8.14 \times 10^{254} u^{60} + \cdots + 2.76 \times 10^{255} a + 1.08 \times 10^{257},\ u^{62} + 6u^{61} + \cdots + 1248u + 64 \rangle}$

**(i) Arc colorings**

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -0.0481264u^{61} - 0.295575u^{60} + \cdots - 637.661u - 39.3574 \\ 0.00152394u^{61} + 0.00764656u^{60} + \cdots - 7.07240u - 0.782645 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -0.0507184u^{61} - 0.309962u^{60} + \cdots - 642.175u - 39.0110 \\ 0.00177774u^{61} + 0.00929252u^{60} + \cdots - 5.78492u - 0.708113 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} -0.0290606u^{61} - 0.178730u^{60} + \cdots - 379.788u - 22.2184 \\ 0.000355637u^{61} + 0.000276515u^{60} + \cdots - 9.59505u - 0.781127 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 0.165545u^{61} + 0.979872u^{60} + \cdots + 380.906u - 1.53739 \\ 0.00433759u^{61} + 0.0238765u^{60} + \cdots + 4.60076u + 0.0296773 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -0.0294163u^{61} - 0.179007u^{60} + \cdots - 370.193u - 21.4373 \\ 0.000355637u^{61} + 0.000276515u^{60} + \cdots - 9.59505u - 0.781127 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -0.0294071u^{61} - 0.179875u^{60} + \cdots - 373.738u - 23.7994 \\ -0.000269202u^{61} - 0.00331814u^{60} + \cdots - 10.7470u - 0.840234 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -0.00835458u^{61} - 0.0484189u^{60} + \cdots - 50.9506u - 3.17945 \\ -u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 0.160433u^{61} + 0.951245u^{60} + \cdots + 378.382u - 1.35204 \\ 0.000774875u^{61} + 0.00475004u^{60} + \cdots - 0.0771139u - 0.215021 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 0.0505800u^{61} + 0.275509u^{60} + \cdots - 864.856u - 57.5492 \\ 0.00229093u^{61} + 0.0128560u^{60} + \cdots - 5.13956u - 0.334034 \end{pmatrix}$$

**(ii) Obstruction class** $= -1$

**(iii) Cusp Shapes** $= -0.134110u^{61} - 0.834494u^{60} + \cdots - 2032.73u - 106.916$

**(iv) u-Polynomials at the component**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $u^{62} + 71u^{61} + \cdots + 267u + 1$ |
| $c_2, c_4$ | $u^{62} - 13u^{61} + \cdots + 15u - 1$ |
| $c_3, c_6$ | $u^{62} + 3u^{61} + \cdots - 8192u - 1024$ |
| $c_5$ | $u^{62} + 4u^{61} + \cdots - 10u^2 + 1$ |
| $c_7$ | $u^{62} - 6u^{61} + \cdots - 1248u + 64$ |
| $c_8, c_{11}$ | $u^{62} - 5u^{61} + \cdots + 113u + 1$ |
| $c_9$ | $u^{62} + 44u^{60} + \cdots + 9664u + 824$ |
| $c_{10}$ | $u^{62} + 4u^{61} + \cdots - 3025807u + 537503$ |
| $c_{12}$ | $u^{62} - 21u^{61} + \cdots + 12769u + 1$ |

**(v) Riley Polynomials at the component**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $y^{62} - 147y^{61} + \cdots - 20183y + 1$ |
| $c_2, c_4$ | $y^{62} - 71y^{61} + \cdots - 267y + 1$ |
| $c_3, c_6$ | $y^{62} - 57y^{61} + \cdots + 9961472y + 1048576$ |
| $c_5$ | $y^{62} - 4y^{61} + \cdots - 20y + 1$ |
| $c_7$ | $y^{62} - 30y^{61} + \cdots - 185344y + 4096$ |
| $c_8, c_{11}$ | $y^{62} + 21y^{61} + \cdots - 12769y + 1$ |
| $c_9$ | $y^{62} + 88y^{61} + \cdots + 13013520y + 678976$ |
| $c_{10}$ | $y^{62} + 16y^{61} + \cdots - 11200434939731y + 288909475009$ |
| $c_{12}$ | $y^{62} + 45y^{61} + \cdots - 163345321y + 1$ |

**(vi) Complex Volumes and Cusp Shapes**

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.966330$<br>$a=\ 2.06084$<br>$b=-0.132404$ | $-10.3258$ | $-5.46580$ |
| $u=\ 0.225473+1.012430I$<br>$a=\ 0.68800-2.63426I$<br>$b=-0.10147-2.38732I$ | $-2.91907-1.90864I$ | $-12.3927+9.8412I$ |
| $u=\ 0.225473-1.012430I$<br>$a=\ 0.68800+2.63426I$<br>$b=-0.10147+2.38732I$ | $-2.91907+1.90864I$ | $-12.3927-9.8412I$ |
| $u=\ 0.906197+0.566629I$<br>$a=\ 0.898820-1.059170I$<br>$b=-0.080489-0.151302I$ | $-6.85055-2.44704I$ | $0$ |
| $u=\ 0.906197-0.566629I$<br>$a=\ 0.898820+1.059170I$<br>$b=-0.080489+0.151302I$ | $-6.85055+2.44704I$ | $0$ |
| $u=\ 0.630967+0.873245I$<br>$a=-0.0480953+0.0962373I$<br>$b=\ 0.066678-0.565097I$ | $-0.54827-2.57263I$ | $0$ |
| $u=\ 0.630967-0.873245I$<br>$a=-0.0480953-0.0962373I$<br>$b=\ 0.066678+0.565097I$ | $-0.54827+2.57263I$ | $0$ |
| $u=-0.428788+0.808171I$<br>$a=\ 0.166658+0.166436I$<br>$b=\ 0.144316+0.950356I$ | $3.58947+0.62301I$ | $3.36345-2.22600I$ |
| $u=-0.428788-0.808171I$<br>$a=\ 0.166658-0.166436I$<br>$b=\ 0.144316-0.950356I$ | $3.58947-0.62301I$ | $3.36345+2.22600I$ |
| $u=\ 0.175720+0.877651I$<br>$a=-1.87346-0.71678I$<br>$b=\ 0.1068970-0.0427277I$ | $-9.63287+2.57588I$ | $-1.03891+4.65048I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.175720 - 0.877651I$<br>$a = -1.87346 + 0.71678I$<br>$b = 0.1068970 + 0.0427277I$ | $-9.63287 - 2.57588I$ | $-1.03891 - 4.65048I$ |
| $u = -0.613756 + 1.022410I$<br>$a = -0.0631222 + 0.0157113I$<br>$b = -0.017254 + 0.535087I$ | $1.46847 + 7.47551I$ | $0$ |
| $u = -0.613756 - 1.022410I$<br>$a = -0.0631222 - 0.0157113I$<br>$b = -0.017254 - 0.535087I$ | $1.46847 - 7.47551I$ | $0$ |
| $u = 1.148340 + 0.333874I$<br>$a = 1.27542 + 0.77535I$<br>$b = -0.26412 - 2.34055I$ | $-3.40045 - 1.02073I$ | $0$ |
| $u = 1.148340 - 0.333874I$<br>$a = 1.27542 - 0.77535I$<br>$b = -0.26412 + 2.34055I$ | $-3.40045 + 1.02073I$ | $0$ |
| $u = -0.768297 + 0.223225I$<br>$a = -1.92583 + 0.47346I$<br>$b = 0.61700 - 1.55498I$ | $-0.90689 + 2.60619I$ | $-4.21909 - 1.98730I$ |
| $u = -0.768297 - 0.223225I$<br>$a = -1.92583 - 0.47346I$<br>$b = 0.61700 + 1.55498I$ | $-0.90689 - 2.60619I$ | $-4.21909 + 1.98730I$ |
| $u = -0.625920 + 0.391100I$<br>$a = 1.359350 - 0.293081I$<br>$b = -0.217590 + 0.449117I$ | $0.16449 - 2.80931I$ | $-2.02619 + 2.03045I$ |
| $u = -0.625920 - 0.391100I$<br>$a = 1.359350 + 0.293081I$<br>$b = -0.217590 - 0.449117I$ | $0.16449 + 2.80931I$ | $-2.02619 - 2.03045I$ |
| $u = -0.569996 + 0.465415I$<br>$a = -2.68911 - 0.37051I$<br>$b = -0.345079 - 0.969509I$ | $-0.271555 + 0.561550I$ | $-5.56822 - 2.77116I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.569996-0.465415I$<br>$a=-2.68911+0.37051I$<br>$b=-0.345079+0.969509I$ | $-0.271555-0.561550I$ | $-5.56822+2.77116I$ |
| $u=\ \ 1.269210+0.022101I$<br>$a=-1.118240-0.162406I$<br>$b=\ \ 0.125530+0.806401I$ | $-5.71401+2.41800I$ | $0$ |
| $u=\ \ 1.269210-0.022101I$<br>$a=-1.118240+0.162406I$<br>$b=\ \ 0.125530-0.806401I$ | $-5.71401-2.41800I$ | $0$ |
| $u=-1.268290+0.189716I$<br>$a=-1.227750+0.054676I$<br>$b=\ \ 0.107949-0.868842I$ | $-5.53536+3.45054I$ | $0$ |
| $u=-1.268290-0.189716I$<br>$a=-1.227750-0.054676I$<br>$b=\ \ 0.107949+0.868842I$ | $-5.53536-3.45054I$ | $0$ |
| $u=-1.187220+0.502909I$<br>$a=\ \ 1.52617-0.01474I$<br>$b=-0.80672+1.64220I$ | $1.17723+4.19224I$ | $0$ |
| $u=-1.187220-0.502909I$<br>$a=\ \ 1.52617+0.01474I$<br>$b=-0.80672-1.64220I$ | $1.17723-4.19224I$ | $0$ |
| $u=\ \ 0.568930+0.416577I$<br>$a=\ \ 0.120281+1.074160I$<br>$b=\ \ 0.045387-0.507767I$ | $-0.76460-1.25688I$ | $-5.53847+5.17379I$ |
| $u=\ \ 0.568930-0.416577I$<br>$a=\ \ 0.120281-1.074160I$<br>$b=\ \ 0.045387+0.507767I$ | $-0.76460+1.25688I$ | $-5.53847-5.17379I$ |
| $u=-0.453256+1.217240I$<br>$a=\ \ 0.90351+1.13576I$<br>$b=\ \ 0.71700+2.26803I$ | $-2.25042-3.70807I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.453256-1.217240I$<br>$a=\ \ 0.90351-1.13576I$<br>$b=\ \ 0.71700-2.26803I$ | $-2.25042+3.70807I$ | $0$ |
| $u=-0.042454+0.695928I$<br>$a=-0.025549+0.219032I$<br>$b=-0.276487+1.114370I$ | $3.47148+0.76506I$ | $5.05392-1.67806I$ |
| $u=-0.042454-0.695928I$<br>$a=-0.025549-0.219032I$<br>$b=-0.276487-1.114370I$ | $3.47148-0.76506I$ | $5.05392+1.67806I$ |
| $u=\ \ 0.384833+0.475726I$<br>$a=\ \ 1.82484+0.76996I$<br>$b=-0.016778-0.470642I$ | $-0.75966-1.41499I$ | $-4.04897+4.67258I$ |
| $u=\ \ 0.384833-0.475726I$<br>$a=\ \ 1.82484-0.76996I$<br>$b=-0.016778+0.470642I$ | $-0.75966+1.41499I$ | $-4.04897-4.67258I$ |
| $u=-1.33070+0.53202I$<br>$a=\ \ 1.058240+0.373107I$<br>$b=-0.234697+0.167699I$ | $-13.75470+2.34725I$ | $0$ |
| $u=-1.33070-0.53202I$<br>$a=\ \ 1.058240-0.373107I$<br>$b=-0.234697-0.167699I$ | $-13.75470-2.34725I$ | $0$ |
| $u=-0.468299+0.280082I$<br>$a=-0.059976-0.302032I$<br>$b=-0.276860-1.385290I$ | $2.81830-4.57708I$ | $-11.91750-5.21602I$ |
| $u=-0.468299-0.280082I$<br>$a=-0.059976+0.302032I$<br>$b=-0.276860+1.385290I$ | $2.81830+4.57708I$ | $-11.91750+5.21602I$ |
| $u=\ \ 1.30977+0.65145I$<br>$a=\ \ 0.967015-0.381842I$<br>$b=-0.229472-0.212903I$ | $-12.7715-8.3839I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.30977 - 0.65145I$<br>$a = 0.967015 + 0.381842I$<br>$b = -0.229472 + 0.212903I$ | $-12.7715 + 8.3839I$ | 0 |
| $u = 1.43373 + 0.32544I$<br>$a = 0.1365400 - 0.0114578I$<br>$b = -0.05979 + 1.64995I$ | $-8.50399 - 1.01711I$ | 0 |
| $u = 1.43373 - 0.32544I$<br>$a = 0.1365400 + 0.0114578I$<br>$b = -0.05979 - 1.64995I$ | $-8.50399 + 1.01711I$ | 0 |
| $u = -1.40066 + 0.45878I$<br>$a = 0.0626733 - 0.1057400I$<br>$b = -0.04777 - 1.57885I$ | $-7.87011 + 7.16358I$ | 0 |
| $u = -1.40066 - 0.45878I$<br>$a = 0.0626733 + 0.1057400I$<br>$b = -0.04777 + 1.57885I$ | $-7.87011 - 7.16358I$ | 0 |
| $u = 1.39279 + 0.63989I$<br>$a = 1.172420 - 0.173984I$<br>$b = -0.44372 - 1.75238I$ | $-6.43547 - 4.60616I$ | 0 |
| $u = 1.39279 - 0.63989I$<br>$a = 1.172420 + 0.173984I$<br>$b = -0.44372 + 1.75238I$ | $-6.43547 + 4.60616I$ | 0 |
| $u = -1.35459 + 0.72187I$<br>$a = 1.220540 + 0.275631I$<br>$b = -0.42983 + 1.70660I$ | $-5.32588 + 10.75820I$ | 0 |
| $u = -1.35459 - 0.72187I$<br>$a = 1.220540 - 0.275631I$<br>$b = -0.42983 - 1.70660I$ | $-5.32588 - 10.75820I$ | 0 |
| $u = -0.032223 + 0.152731I$<br>$a = 36.7699 - 20.1859I$<br>$b = 0.421858 - 0.101939I$ | $-1.08843 + 2.05155I$ | $143.754 - 62.581I$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.032223-0.152731I$<br>$a=\ \ 36.7699+20.1859I$<br>$b=\ \ 0.421858+0.101939I$ | $-1.08843-2.05155I$ | $143.754+62.581I$ |
| $u=-1.46857+1.15578I$<br>$a=-1.018750-0.533372I$<br>$b=\ \ 0.95221-2.16134I$ | $-12.7985+16.4675I$ | $0$ |
| $u=-1.46857-1.15578I$<br>$a=-1.018750+0.533372I$<br>$b=\ \ 0.95221+2.16134I$ | $-12.7985-16.4675I$ | $0$ |
| $u=-0.0940543$<br>$a=-7.89489$<br>$b=-0.510696$ | $-1.10354$ | $-8.74860$ |
| $u=\ \ 1.57350+1.21978I$<br>$a=-0.928353+0.487034I$<br>$b=\ \ 0.99889+2.35016I$ | $-14.6014-9.8690I$ | $0$ |
| $u=\ \ 1.57350-1.21978I$<br>$a=-0.928353-0.487034I$<br>$b=\ \ 0.99889-2.35016I$ | $-14.6014+9.8690I$ | $0$ |
| $u=-1.98204+1.05164I$<br>$a=-0.878361-0.248375I$<br>$b=\ \ 1.90729-2.58093I$ | $-6.11414+6.99153I$ | $0$ |
| $u=-1.98204-1.05164I$<br>$a=-0.878361+0.248375I$<br>$b=\ \ 1.90729+2.58093I$ | $-6.11414-6.99153I$ | $0$ |
| $u=-1.49547+2.13069I$<br>$a=-0.493036-0.217503I$<br>$b=-1.52334-3.84431I$ | $-11.14940-5.54057I$ | $0$ |
| $u=-1.49547-2.13069I$<br>$a=-0.493036+0.217503I$<br>$b=-1.52334+3.84431I$ | $-11.14940+5.54057I$ | $0$ |

| Solutions to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
| --- | --- | --- |
| $u = 2.00127 + 1.81072I$<br>$a = -0.633745 + 0.258104I$<br>$b = 0.48201 + 4.34193I$ | $-13.40670 - 2.05335I$ | 0 |
| $u = 2.00127 - 1.81072I$<br>$a = -0.633745 - 0.258104I$<br>$b = 0.48201 - 4.34193I$ | $-13.40670 + 2.05335I$ | 0 |

## II. $I_2^u = \langle -u^3 - u^2 + b - u,\ -u^3 + a + 2,\ u^4 + u^2 - u + 1 \rangle$

**(i) Arc colorings**

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u^3 - 2 \\ u^3 + u^2 + u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} u^3 - 2 \\ u^3 + u^2 + u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$
$$a_5 = \begin{pmatrix} u^2 + 1 \\ -u^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^3 - u^2 - 3 \\ u^3 + 2u^2 + u \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -u^2 - 1 \\ u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^3 - u^2 \\ u^2 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} u^3 - u^2 - 1 \\ u \end{pmatrix}$$

**(ii) Obstruction class** $= 1$

**(iii) Cusp Shapes** $= -u^3 + 6u^2 - 2u - 5$

**(iv) u-Polynomials at the component**

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

**(v) Riley Polynomials at the component**

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

**(vi) Complex Volumes and Cusp Shapes**

| Solutions to $I_2^u$ | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.547424 + 0.585652I$<br>$a = -2.39923 + 0.32564I$<br>$b = 0.10488 + 1.55249I$ | $-2.62503 - 1.39709I$ | $-5.95551 + 2.35025I$ |
| $u = 0.547424 - 0.585652I$<br>$a = -2.39923 - 0.32564I$<br>$b = 0.10488 - 1.55249I$ | $-2.62503 + 1.39709I$ | $-5.95551 - 2.35025I$ |
| $u = -0.547424 + 1.120870I$<br>$a = -0.100768 - 0.400532I$<br>$b = 0.395123 - 0.506844I$ | $0.98010 + 7.64338I$ | $-11.5445 - 9.2043I$ |
| $u = -0.547424 - 1.120870I$<br>$a = -0.100768 + 0.400532I$<br>$b = 0.395123 + 0.506844I$ | $0.98010 - 7.64338I$ | $-11.5445 + 9.2043I$ |

**III.** $\boldsymbol{I_3^u = \langle 2u^5 + u^4 + 3u^3 + 2u^2 + b + 2u + 2,\ -2u^5 - 4u^3 - u^2 + a - 3u - 2,\ u^6 + u^5 + 2u^4 + 2u^3 + 2u^2 + 2u + 1\rangle}$

**(i) Arc colorings**

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 2u^5 + 4u^3 + u^2 + 3u + 2 \\ -2u^5 - u^4 - 3u^3 - 2u^2 - 2u - 2 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 2u^5 + 4u^3 + u^2 + 3u + 2 \\ -2u^5 - u^4 - 3u^3 - 2u^2 - 2u - 2 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$
$$a_5 = \begin{pmatrix} u^2 + 1 \\ -u^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 2u^5 + 4u^3 + 3u + 1 \\ -2u^5 - u^4 - 3u^3 - u^2 - 2u - 2 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -u^2 - 1 \\ u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u^5 - 2u^3 - u \\ u^5 + u^3 + u \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} -u^5 - u^4 - 2u^3 - 2u^2 - 2u - 2 \\ u^5 + 2u^3 + u^2 + u + 1 \end{pmatrix}$$

**(ii) Obstruction class** $= 1$

**(iii) Cusp Shapes** $= -3u^5 - u^4 - 4u^2 + 3u - 13$

**(iv) u-Polynomials at the component**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_2$ | $(u-1)^6$ |
| $c_3, c_6$ | $u^6$ |
| $c_4$ | $(u+1)^6$ |
| $c_5$ | $u^6 + 3u^5 + 4u^4 + 2u^3 + 1$ |
| $c_7, c_8$ | $u^6 + u^5 + 2u^4 + 2u^3 + 2u^2 + 2u + 1$ |
| $c_9$ | $(u^3 - u^2 + 1)^2$ |
| $c_{10}, c_{11}$ | $u^6 - u^5 + 2u^4 - 2u^3 + 2u^2 - 2u + 1$ |
| $c_{12}$ | $u^6 - 3u^5 + 4u^4 - 2u^3 + 1$ |

**(v) Riley Polynomials at the component**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_2, c_4$ | $(y-1)^6$ |
| $c_3, c_6$ | $y^6$ |
| $c_5, c_{12}$ | $y^6 - y^5 + 4y^4 - 2y^3 + 8y^2 + 1$ |
| $c_7, c_8, c_{10}$ $c_{11}$ | $y^6 + 3y^5 + 4y^4 + 2y^3 + 1$ |
| $c_9$ | $(y^3 - y^2 + 2y - 1)^2$ |

**(vi) Complex Volumes and Cusp Shapes**

| Solutions to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.498832 + 1.001300I$<br>$a = -0.175218 + 0.614017I$<br>$b = 0.481306 + 0.637866I$ | $-1.37919 - 2.82812I$ | $-11.93937 + 4.05868I$ |
| $u = 0.498832 - 1.001300I$<br>$a = -0.175218 - 0.614017I$<br>$b = 0.481306 - 0.637866I$ | $-1.37919 + 2.82812I$ | $-11.93937 - 4.05868I$ |
| $u = -0.284920 + 1.115140I$<br>$a = 0.307599 - 0.479689I$<br>$b = 0.662359 - 0.362106I$ | $2.75839$ | $-4.40089 + 2.50363I$ |
| $u = -0.284920 - 1.115140I$<br>$a = 0.307599 + 0.479689I$<br>$b = 0.662359 + 0.362106I$ | $2.75839$ | $-4.40089 - 2.50363I$ |
| $u = -0.713912 + 0.305839I$<br>$a = -0.13238 + 2.74513I$<br>$b = -1.14366 - 1.20015I$ | $-1.37919 - 2.82812I$ | $-17.1597 + 2.2654I$ |
| $u = -0.713912 - 0.305839I$<br>$a = -0.13238 - 2.74513I$<br>$b = -1.14366 + 1.20015I$ | $-1.37919 + 2.82812I$ | $-17.1597 - 2.2654I$ |

**IV.**

$\boldsymbol{I_1^v = \langle a,\ 186v^5{+}1767v^4{+}\cdots{+}385b{+}306,\ v^6{+}10v^5{+}95v^4{+}48v^3{+}15v^2{+}5v{+}1\rangle}$

**(i) Arc colorings**

$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} v \\ 0 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} 0 \\ -0.483117v^5 - 4.58961v^4 + \cdots - 0.241558v - 0.794805 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} 0.483117v^5 + 4.58961v^4 + \cdots + 0.241558v + 0.794805 \\ -0.483117v^5 - 4.58961v^4 + \cdots - 0.241558v - 0.794805 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 1 \\ -0.207792v^5 - 1.97403v^4 + \cdots - 0.103896v + 1.41299 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} 0.103896v^5 + 1.01558v^4 + \cdots + 3.45195v + 0.207792 \\ 0.345455v^5 + 3.38182v^4 + \cdots + 5.07273v + 0.690909 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 0.207792v^5 + 1.97403v^4 + \cdots + 0.103896v - 0.412987 \\ -0.207792v^5 - 1.97403v^4 + \cdots - 0.103896v + 1.41299 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} -1 \\ -0.207792v^5 - 1.97403v^4 + \cdots - 0.103896v + 1.41299 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -0.241558v^5 - 2.36623v^4 + \cdots - 1.62078v - 0.483117 \\ 0.345455v^5 + 3.38182v^4 + \cdots + 5.07273v + 0.690909 \end{pmatrix}$$
$$a_{12} = \begin{pmatrix} 0.244156v^5 + 2.34805v^4 + \cdots + 3.52208v + 0.174026 \\ 0.345455v^5 + 3.38182v^4 + \cdots + 5.07273v + 1.69091 \end{pmatrix}$$

**(ii) Obstruction class** $= 1$

**(iii) Cusp Shapes** $= \frac{2881}{385}v^5 + \frac{28101}{385}v^4 + \frac{266701}{385}v^3 + \frac{72274}{385}v^2 + \frac{18419}{385}v + \frac{4464}{385}$

**(iv) u-Polynomials at the component**

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1, c_3$ | $(u^3 - u^2 + 2u - 1)^2$ |
| $c_2$ | $(u^3 + u^2 - 1)^2$ |
| $c_4$ | $(u^3 - u^2 + 1)^2$ |
| $c_5$ | $(u^3 + 3u^2 + 2u - 1)^2$ |
| $c_6$ | $(u^3 + u^2 + 2u + 1)^2$ |
| $c_7$ | $u^6$ |
| $c_8, c_{12}$ | $(u^2 - u + 1)^3$ |
| $c_9, c_{10}$ | $u^6 - 2u^5 + 7u^4 + 8u^3 + 7u^2 + 3u + 1$ |
| $c_{11}$ | $(u^2 + u + 1)^3$ |

**(v) Riley Polynomials at the component**

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1, c_3, c_6$ | $(y^3 + 3y^2 + 2y - 1)^2$ |
| $c_2, c_4$ | $(y^3 - y^2 + 2y - 1)^2$ |
| $c_5$ | $(y^3 - 5y^2 + 10y - 1)^2$ |
| $c_7$ | $y^6$ |
| $c_8, c_{11}, c_{12}$ | $(y^2 + y + 1)^3$ |
| $c_9, c_{10}$ | $y^6 + 10y^5 + 95y^4 + 48y^3 + 15y^2 + 5y + 1$ |

**(vi) Complex Volumes and Cusp Shapes**

| Solutions to $I_1^v$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $v = 0.041684 + 0.322031I$<br>$a = 0$<br>$b = -0.215080 + 1.307140I$ | $3.02413 + 0.79824I$ | $-13.76355 - 1.90324I$ |
| $v = 0.041684 - 0.322031I$<br>$a = 0$<br>$b = -0.215080 - 1.307140I$ | $3.02413 - 0.79824I$ | $-13.76355 + 1.90324I$ |
| $v = -0.299729 + 0.124916I$<br>$a = 0$<br>$b = -0.215080 - 1.307140I$ | $3.02413 - 4.85801I$ | $2.26089 + 13.10391I$ |
| $v = -0.299729 - 0.124916I$<br>$a = 0$<br>$b = -0.215080 + 1.307140I$ | $3.02413 + 4.85801I$ | $2.26089 - 13.10391I$ |
| $v = -4.74195 + 8.21331I$<br>$a = 0$<br>$b = -0.569840$ | $-1.11345 - 2.02988I$ | $-55.9973 - 74.4205I$ |
| $v = -4.74195 - 8.21331I$<br>$a = 0$<br>$b = -0.569840$ | $-1.11345 + 2.02988I$ | $-55.9973 + 74.4205I$ |

## V. u-Polynomials

| Crossings | u-Polynomials at each crossing |
|---|---|
| $c_1$ | $((u-1)^{10})(u^3-u^2+2u-1)^2(u^{62}+71u^{61}+\cdots+267u+1)$ |
| $c_2$ | $((u-1)^{10})(u^3+u^2-1)^2(u^{62}-13u^{61}+\cdots+15u-1)$ |
| $c_3$ | $u^{10}(u^3-u^2+2u-1)^2(u^{62}+3u^{61}+\cdots-8192u-1024)$ |
| $c_4$ | $((u+1)^{10})(u^3-u^2+1)^2(u^{62}-13u^{61}+\cdots+15u-1)$ |
| $c_5$ | $((u^3+3u^2+2u-1)^2)(u^4+2u^3+3u^2+u+1)(u^6+3u^5+\cdots+2u^3+1)$ <br> $\cdot(u^{62}+4u^{61}+\cdots-10u^2+1)$ |
| $c_6$ | $u^{10}(u^3+u^2+2u+1)^2(u^{62}+3u^{61}+\cdots-8192u-1024)$ |
| $c_7$ | $u^6(u^4+u^2-u+1)(u^6+u^5+2u^4+2u^3+2u^2+2u+1)$ <br> $\cdot(u^{62}-6u^{61}+\cdots-1248u+64)$ |
| $c_8$ | $(u^2-u+1)^3(u^4+u^2-u+1)(u^6+u^5+2u^4+2u^3+2u^2+2u+1)$ <br> $\cdot(u^{62}-5u^{61}+\cdots+113u+1)$ |
| $c_9$ | $(u^3-u^2+1)^2(u^4+3u^3+4u^2+3u+2)$ <br> $\cdot(u^6-2u^5+\cdots+3u+1)(u^{62}+44u^{60}+\cdots+9664u+824)$ |
| $c_{10}$ | $(u^4+u^2+u+1)(u^6-2u^5+7u^4+8u^3+7u^2+3u+1)$ <br> $\cdot(u^6-u^5+2u^4-2u^3+2u^2-2u+1)$ <br> $\cdot(u^{62}+4u^{61}+\cdots-3025807u+537503)$ |
| $c_{11}$ | $(u^2+u+1)^3(u^4+u^2+u+1)(u^6-u^5+2u^4-2u^3+2u^2-2u+1)$ <br> $\cdot(u^{62}-5u^{61}+\cdots+113u+1)$ |
| $c_{12}$ | $(u^2-u+1)^3(u^4-2u^3+3u^2-u+1)(u^6-3u^5+4u^4-2u^3+1)$ <br> $\cdot(u^{62}-21u^{61}+\cdots+12769u+1)$ |

## VI. Riley Polynomials

| Crossings | Riley Polynomials at each crossing |
|---|---|
| $c_1$ | $((y-1)^{10})(y^3+3y^2+2y-1)^2(y^{62}-147y^{61}+\cdots-20183y+1)$ |
| $c_2, c_4$ | $((y-1)^{10})(y^3-y^2+2y-1)^2(y^{62}-71y^{61}+\cdots-267y+1)$ |
| $c_3, c_6$ | $y^{10}(y^3+3y^2+2y-1)^2(y^{62}-57y^{61}+\cdots+9961472y+1048576)$ |
| $c_5$ | $(y^3-5y^2+10y-1)^2(y^4+2y^3+7y^2+5y+1)$ $\cdot(y^6-y^5+4y^4-2y^3+8y^2+1)(y^{62}-4y^{61}+\cdots-20y+1)$ |
| $c_7$ | $y^6(y^4+2y^3+3y^2+y+1)(y^6+3y^5+4y^4+2y^3+1)$ $\cdot(y^{62}-30y^{61}+\cdots-185344y+4096)$ |
| $c_8, c_{11}$ | $(y^2+y+1)^3(y^4+2y^3+3y^2+y+1)(y^6+3y^5+4y^4+2y^3+1)$ $\cdot(y^{62}+21y^{61}+\cdots-12769y+1)$ |
| $c_9$ | $(y^3-y^2+2y-1)^2(y^4-y^3+2y^2+7y+4)$ $\cdot(y^6+10y^5+95y^4+48y^3+15y^2+5y+1)$ $\cdot(y^{62}+88y^{61}+\cdots+13013520y+678976)$ |
| $c_{10}$ | $(y^4+2y^3+3y^2+y+1)(y^6+3y^5+4y^4+2y^3+1)$ $\cdot(y^6+10y^5+95y^4+48y^3+15y^2+5y+1)$ $\cdot(y^{62}+16y^{61}+\cdots-11200434939731y+288909475009)$ |
| $c_{12}$ | $((y^2+y+1)^3)(y^4+2y^3+\cdots+5y+1)(y^6-y^5+\cdots+8y^2+1)$ $\cdot(y^{62}+45y^{61}+\cdots-163345321y+1)$ |