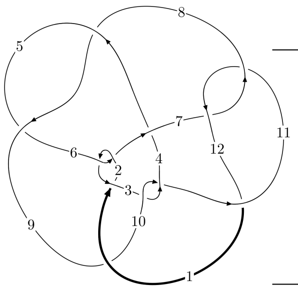
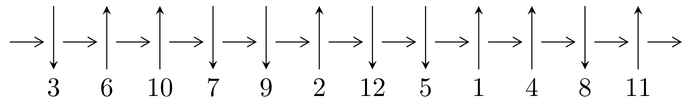
$12a_{0427}$ ($K12a_{0427}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned}
I^u_1 &= \langle 575260u^{67} + 2605705u^{66} + \cdots + 248832b - 26005926, \\
&\quad\; 563467900u^{67} + 2831326125u^{66} + \cdots + 212253696a + 11136298543, \\
&\quad\; 5u^{68} + 30u^{67} + \cdots + 5054u + 853\rangle \\
I^u_2 &= \langle -a^2u + au + b - 2a + 2,\ a^3 - 2a^2u + 2a^2 + au - 2a + 3u - 1,\ u^2 - u + 1\rangle \\
I^u_3 &= \langle u^4 + b,\ -u^2 + a - 1,\ u^5 + u^3 + u + 1\rangle \\
I^u_4 &= \langle b + u,\ a + u,\ u^5 + u^3 + u - 1\rangle \\
I^u_5 &= \langle b^2au - 2a^2bu + a^3u + b^3 - 3b^2a + 3a^2b - a^3 + 2bu - au - a + u - 1,\ u^2 - u + 1\rangle \\
I^u_6 &= \langle bau - a^2u + b^2 - 2ba + bu + a^2 - au - b + u,\ u^2 - u + 1\rangle \\
I^u_7 &= \langle u^2a + au + b,\ u^3a + u^2a + au - 1\rangle \\
I^u_8 &= \langle b - a - u + 1,\ u^2 - u + 1\rangle
\end{aligned}$$

$$I^v_1 = \langle a,\ b^6 - 2b^4 - b^3 + b^2 + b + 1,\ v - 1\rangle$$

* 5 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 90 representations.
* 4 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.

$\boldsymbol{I_1^u = \langle 5.75\times10^5u^{67}+2.61\times10^6u^{66}+\cdots+2.49\times10^5b-2.60\times10^7,\ 5.63\times10^8u^{67}+2.83\times10^9u^{66}+\cdots+2.12\times10^8a+1.11\times10^{10},\ 5u^{68}+30u^{67}+\cdots+5054u+853\rangle}$

(i) Arc colorings

$$a_8 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_{12} = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_4 = \begin{pmatrix}-2.65469u^{67} - 13.3393u^{66} + \cdots - 582.171u - 52.4669\\-2.31184u^{67} - 10.4717u^{66} + \cdots + 255.745u + 104.512\end{pmatrix}$$
$$a_7 = \begin{pmatrix}1\\-u^2\end{pmatrix}$$
$$a_5 = \begin{pmatrix}-1.24736u^{67} - 3.35352u^{66} + \cdots + 1325.95u + 284.669\\1.92813u^{67} + 11.8675u^{66} + \cdots + 2054.31u + 367.547\end{pmatrix}$$
$$a_9 = \begin{pmatrix}-0.313259u^{67} - 1.69428u^{66} + \cdots - 190.456u - 28.1702\\0.0108507u^{67} + 0.221354u^{66} + \cdots + 85.6145u + 16.6233\end{pmatrix}$$
$$a_{11} = \begin{pmatrix}u\\u\end{pmatrix}$$
$$a_1 = \begin{pmatrix}u^3\\u^3+u\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}0.103137u^{67} + 0.458229u^{66} + \cdots - 55.5265u - 13.1298\\0.158691u^{67} + 0.674371u^{66} + \cdots - 92.1597u - 23.0834\end{pmatrix}$$
$$a_3 = \begin{pmatrix}-1.97519u^{67} - 5.35349u^{66} + \cdots + 1993.77u + 439.517\\2.40346u^{67} + 18.6888u^{66} + \cdots + 4616.08u + 863.329\end{pmatrix}$$
$$a_2 = \begin{pmatrix}3.36495u^{67} + 16.0548u^{66} + \cdots + 184.845u - 49.3617\\1.33590u^{67} + 2.51799u^{66} + \cdots - 2210.43u - 464.485\end{pmatrix}$$
$$a_6 = \begin{pmatrix}2.83094u^{67} + 10.9767u^{66} + \cdots - 906.631u - 247.880\\-2.22960u^{67} - 16.9831u^{66} + \cdots - 4002.13u - 746.999\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -\frac{327295}{186624}u^{67} - \frac{1808905}{124416}u^{66} + \cdots - \frac{177580613}{46656}u - \frac{269328401}{373248}$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$25(25u^{68} + 680u^{67} + \cdots + 7437476u + 727609)$
c_2, c_6	$5(5u^{68} + 30u^{67} + \cdots + 5054u + 853)$
c_3, c_{10}	$81(81u^{68} + 648u^{67} + \cdots + 29832u + 4477)$
c_4	$64(64u^{68} - 256u^{67} + \cdots - 4.94845 \times 10^7 u + 9687600)$
c_5, c_8	$81(81u^{68} - 648u^{67} + \cdots - 29832u + 4477)$
c_7, c_{11}	$5(5u^{68} - 30u^{67} + \cdots - 5054u + 853)$
c_9	$64(64u^{68} + 256u^{67} + \cdots + 4.94845 \times 10^7 u + 9687600)$
c_{12}	$25(25u^{68} - 680u^{67} + \cdots - 7437476u + 727609)$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_{12}	625 $\cdot(625y^{68} + 16300y^{67} + \cdots + 11609525524248y + 529414856881)$
c_2, c_6, c_7 c_{11}	$25(25y^{68} + 680y^{67} + \cdots + 7437476y + 727609)$
c_3, c_5, c_8 c_{10}	$6561(6561y^{68} - 279936y^{67} + \cdots - 3.61575 \times 10^7 y + 2.00435 \times 10^7)$
c_4, c_9	4096 $\cdot(4096y^{68} - 8192y^{67} + \cdots - 815469037963200y + 93849593760000)$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.702519 + 0.717277I$ $a = -0.75644 - 1.31522I$ $b = -1.296900 - 0.451791I$	$1.29111 - 5.34461I$	0
$u = 0.702519 - 0.717277I$ $a = -0.75644 + 1.31522I$ $b = -1.296900 + 0.451791I$	$1.29111 + 5.34461I$	0
$u = -0.772722 + 0.614454I$ $a = -0.904625 - 0.687185I$ $b = -0.34299 - 1.42396I$	$-3.93086 - 2.25762I$	0
$u = -0.772722 - 0.614454I$ $a = -0.904625 + 0.687185I$ $b = -0.34299 + 1.42396I$	$-3.93086 + 2.25762I$	0
$u = -0.787880 + 0.588901I$ $a = 1.094050 + 0.575479I$ $b = 0.45000 + 1.53766I$	$-5.97017 - 7.33663I$	0
$u = -0.787880 - 0.588901I$ $a = 1.094050 - 0.575479I$ $b = 0.45000 - 1.53766I$	$-5.97017 + 7.33663I$	0
$u = 0.112405 + 1.036780I$ $a = -0.685771 - 0.811514I$ $b = -0.008091 - 0.465537I$	$-0.02177 - 6.74730I$	0
$u = 0.112405 - 1.036780I$ $a = -0.685771 + 0.811514I$ $b = -0.008091 + 0.465537I$	$-0.02177 + 6.74730I$	0
$u = -0.833820 + 0.630175I$ $a = 0.718590 + 0.298717I$ $b = 0.549137 + 1.181960I$	$-8.97416 + 0.22766I$	0
$u = -0.833820 - 0.630175I$ $a = 0.718590 - 0.298717I$ $b = 0.549137 - 1.181960I$	$-8.97416 - 0.22766I$	0

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.078667 + 0.947690I$ $a = 0.769173 + 0.818647I$ $b = 0.215986 + 0.247360I$	$1.67199 - 2.07344I$	$4.37435 + 4.03078I$
$u = 0.078667 - 0.947690I$ $a = 0.769173 - 0.818647I$ $b = 0.215986 - 0.247360I$	$1.67199 + 2.07344I$	$4.37435 - 4.03078I$
$u = 0.937214 + 0.495255I$ $a = 0.95339 - 1.23785I$ $b = -0.408666 - 1.113570I$	$-1.95572 + 13.26270I$	0
$u = 0.937214 - 0.495255I$ $a = 0.95339 + 1.23785I$ $b = -0.408666 + 1.113570I$	$-1.95572 - 13.26270I$	0
$u = 0.984482 + 0.423718I$ $a = 0.934550 - 0.721368I$ $b = -0.123632 - 0.785388I$	$-7.11233 + 4.71108I$	0
$u = 0.984482 - 0.423718I$ $a = 0.934550 + 0.721368I$ $b = -0.123632 + 0.785388I$	$-7.11233 - 4.71108I$	0
$u = 0.957820 + 0.502893I$ $a = -0.811297 + 1.154980I$ $b = 0.446758 + 0.985756I$	$7.23221I$	0
$u = 0.957820 - 0.502893I$ $a = -0.811297 - 1.154980I$ $b = 0.446758 - 0.985756I$	$-7.23221I$	0
$u = 0.526643 + 0.956182I$ $a = 0.65049 + 1.37033I$ $b = 1.06139 + 1.06704I$	$-0.45309 - 3.04384I$	0
$u = 0.526643 - 0.956182I$ $a = 0.65049 - 1.37033I$ $b = 1.06139 - 1.06704I$	$-0.45309 + 3.04384I$	0

Solutions to I_1^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.749817+0.415369I$ $a=-1.04809-1.17549I$ $b=\ \ 0.620776-1.056180I$	$2.68807-7.69227I$	$0.67631+5.85863I$
$u=-0.749817-0.415369I$ $a=-1.04809+1.17549I$ $b=\ \ 0.620776+1.056180I$	$2.68807+7.69227I$	$0.67631-5.85863I$
$u=-0.670154+0.937244I$ $a=-1.45327+0.06264I$ $b=-1.234960-0.202287I$	$-1.29111+5.34461I$	0
$u=-0.670154-0.937244I$ $a=-1.45327-0.06264I$ $b=-1.234960+0.202287I$	$-1.29111-5.34461I$	0
$u=-0.117684+1.148120I$ $a=\ \ 0.066271+0.344259I$ $b=-0.348380-0.848238I$	$7.75434-5.46492I$	0
$u=-0.117684-1.148120I$ $a=\ \ 0.066271-0.344259I$ $b=-0.348380+0.848238I$	$7.75434+5.46492I$	0
$u=-0.753289+0.380335I$ $a=\ \ 0.98818+1.05811I$ $b=-0.609854+0.844847I$	$3.93086-2.25762I$	$3.33892+0.57210I$
$u=-0.753289-0.380335I$ $a=\ \ 0.98818-1.05811I$ $b=-0.609854-0.844847I$	$3.93086+2.25762I$	$3.33892-0.57210I$
$u=-0.341284+0.760500I$ $a=-2.29641-0.77204I$ $b=-1.73365-0.13982I$	$0.45309+3.04384I$	$3.47317+0.77959I$
$u=-0.341284-0.760500I$ $a=-2.29641+0.77204I$ $b=-1.73365+0.13982I$	$0.45309-3.04384I$	$3.47317-0.77959I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.145225 + 0.813062I$ $a = 1.28772 + 0.60761I$ $b = 0.749993 - 0.175588I$	$1.65241 - 1.05941I$	$6.63964 + 4.57024I$
$u = -0.145225 - 0.813062I$ $a = 1.28772 - 0.60761I$ $b = 0.749993 + 0.175588I$	$1.65241 + 1.05941I$	$6.63964 - 4.57024I$
$u = 0.780665 + 0.269621I$ $a = 1.108650 + 0.142041I$ $b = 0.637811 - 0.389139I$	$-4.47467 - 4.39199I$	$-7.74935 + 3.75955I$
$u = 0.780665 - 0.269621I$ $a = 1.108650 - 0.142041I$ $b = 0.637811 + 0.389139I$	$-4.47467 + 4.39199I$	$-7.74935 - 3.75955I$
$u = -0.132701 + 1.176080I$ $a = 0.023962 - 0.238727I$ $b = 0.328720 + 0.927847I$	$8.97416 + 0.22766I$	0
$u = -0.132701 - 1.176080I$ $a = 0.023962 + 0.238727I$ $b = 0.328720 - 0.927847I$	$8.97416 - 0.22766I$	0
$u = -0.567585 + 1.053430I$ $a = -1.51541 - 0.77084I$ $b = -1.55197 - 1.72836I$	$0.02177 + 6.74730I$	0
$u = -0.567585 - 1.053430I$ $a = -1.51541 + 0.77084I$ $b = -1.55197 + 1.72836I$	$0.02177 - 6.74730I$	0
$u = -1.059300 + 0.560745I$ $a = 0.104792 - 0.286003I$ $b = 0.754560 + 0.357556I$	$-2.18567 + 7.77249I$	0
$u = -1.059300 - 0.560745I$ $a = 0.104792 + 0.286003I$ $b = 0.754560 - 0.357556I$	$-2.18567 - 7.77249I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.662387 + 1.025070I$ $a = -1.40530 - 0.89343I$ $b = -0.72294 - 1.44985I$	$-2.68807 + 7.69227I$	0
$u = -0.662387 - 1.025070I$ $a = -1.40530 + 0.89343I$ $b = -0.72294 + 1.44985I$	$-2.68807 - 7.69227I$	0
$u = -0.663727 + 1.037980I$ $a = 1.38765 + 1.08315I$ $b = 0.54606 + 1.68325I$	$-4.61883 + 12.81070I$	0
$u = -0.663727 - 1.037980I$ $a = 1.38765 - 1.08315I$ $b = 0.54606 - 1.68325I$	$-4.61883 - 12.81070I$	0
$u = -0.603158 + 1.083480I$ $a = -1.75432 - 0.31678I$ $b = -1.84792 - 1.60763I$	$4.61883 + 12.81070I$	0
$u = -0.603158 - 1.083480I$ $a = -1.75432 + 0.31678I$ $b = -1.84792 + 1.60763I$	$4.61883 - 12.81070I$	0
$u = -0.692945 + 1.028870I$ $a = 1.002200 + 0.844351I$ $b = 0.244445 + 1.103960I$	$-7.75434 + 5.46492I$	0
$u = -0.692945 - 1.028870I$ $a = 1.002200 - 0.844351I$ $b = 0.244445 - 1.103960I$	$-7.75434 - 5.46492I$	0
$u = -0.599314 + 0.464063I$ $a = -1.33435 - 1.16820I$ $b = -0.107178 - 1.031260I$	$-1.67199 - 2.07344I$	$-4.37435 + 4.03078I$
$u = -0.599314 - 0.464063I$ $a = -1.33435 + 1.16820I$ $b = -0.107178 + 1.031260I$	$-1.67199 + 2.07344I$	$-4.37435 - 4.03078I$

Solutions to I_1^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.595289 + 1.091030I$ $a = 1.59309 + 0.27206I$ $b = 1.76899 + 1.48931I$	$5.97017 + 7.33663I$	0
$u = -0.595289 - 1.091030I$ $a = 1.59309 - 0.27206I$ $b = 1.76899 - 1.48931I$	$5.97017 - 7.33663I$	0
$u = -0.532947 + 1.124330I$ $a = 0.912459 + 0.425272I$ $b = 1.19050 + 1.36318I$	$4.47467 + 4.39199I$	0
$u = -0.532947 - 1.124330I$ $a = 0.912459 - 0.425272I$ $b = 1.19050 - 1.36318I$	$4.47467 - 4.39199I$	0
$u = -0.029081 + 1.297740I$ $a = -0.435981 - 0.038934I$ $b = -0.178672 - 1.072860I$	$4.86026 + 10.75690I$	0
$u = -0.029081 - 1.297740I$ $a = -0.435981 + 0.038934I$ $b = -0.178672 + 1.072860I$	$4.86026 - 10.75690I$	0
$u = -0.073579 + 1.312560I$ $a = 0.338952 + 0.014268I$ $b = 0.224066 + 1.023900I$	$7.11233 + 4.71108I$	0
$u = -0.073579 - 1.312560I$ $a = 0.338952 - 0.014268I$ $b = 0.224066 - 1.023900I$	$7.11233 - 4.71108I$	0
$u = 0.687648 + 1.131730I$ $a = 1.67548 - 0.61053I$ $b = 1.85706 - 1.75220I$	$-19.2093I$	0
$u = 0.687648 - 1.131730I$ $a = 1.67548 + 0.61053I$ $b = 1.85706 + 1.75220I$	$19.2093I$	0

Solutions to I_1^u	$\sqrt{-1}(\text{vol}+\sqrt{-1}CS)$	Cusp shape
$u = \ 0.696018 + 1.135630I$ $a = -1.57600 + 0.50092I$ $b = -1.79380 + 1.58426I$	$1.95572 - 13.26270I$	0
$u = \ 0.696018 - 1.135630I$ $a = -1.57600 - 0.50092I$ $b = -1.79380 - 1.58426I$	$1.95572 + 13.26270I$	0
$u = \ 0.458183 + 0.480361I$ $a = -0.807160 - 1.060200I$ $b = -0.930879 - 0.136305I$	$-1.65241 - 1.05941I$	$-6.63964 + 4.57024I$
$u = \ 0.458183 - 0.480361I$ $a = -0.807160 + 1.060200I$ $b = -0.930879 + 0.136305I$	$-1.65241 + 1.05941I$	$-6.63964 - 4.57024I$
$u = \ 0.686607 + 1.164600I$ $a = \ 1.238110 - 0.659956I$ $b = \ 1.34714 - 1.61050I$	$-4.86026 - 10.75690I$	0
$u = \ 0.686607 - 1.164600I$ $a = \ 1.238110 + 0.659956I$ $b = \ 1.34714 + 1.61050I$	$-4.86026 + 10.75690I$	0
$u = \ 0.77502 + 1.18600I$ $a = -0.943171 + 0.128059I$ $b = -1.25289 + 0.90407I$	$2.18567 - 7.77249I$	0
$u = \ 0.77502 - 1.18600I$ $a = -0.943171 - 0.128059I$ $b = -1.25289 - 0.90407I$	$2.18567 + 7.77249I$	0

II.

$$\boldsymbol{I_2^u = \langle -a^2u + au + b - 2a + 2,\ a^3 - 2a^2u + 2a^2 + au - 2a + 3u - 1,\ u^2 - u + 1\rangle}$$

(i) Arc colorings

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

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

$$a_4 = \begin{pmatrix} a \\ a^2u - au + 2a - 2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1 \\ -u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -a^2u + 2 \\ a^2u - a^2 + a - 2u \end{pmatrix}$$

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

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

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

$$a_{10} = \begin{pmatrix} -2a^2u + a^2 - a + 2u + 2 \\ -2a^2u + au - 2a + 4 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 1 \\ -u + 1 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} 1 \\ -u + 1 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u - 2$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6	y^6
c_3, c_5, c_8 c_9, c_{10}	$y^6 - 4y^5 + 6y^4 - 3y^3 - y^2 + y + 1$
c_4	$y^6 - 4y^5 + 10y^4 - 11y^3 + 19y^2 - 3y + 1$
c_7, c_{11}, c_{12}	$(y^2 + y + 1)^3$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \ \ 0.500000 + 0.866025I$ $a = \ \ 1.137010 - 0.340420I$ $b = \ \ 0.669552 - 0.863143I$	$-2.02988I$	$0. + 3.46410I$
$u = \ \ 0.500000 + 0.866025I$ $a = -1.072830 + 0.640783I$ $b = -1.49343 + 1.84400I$	$-2.02988I$	$0. + 3.46410I$
$u = \ \ 0.500000 + 0.866025I$ $a = -1.06417 + 1.43169I$ $b = -0.176126 + 0.751194I$	$-2.02988I$	$0. + 3.46410I$
$u = \ \ 0.500000 - 0.866025I$ $a = \ \ 1.137010 + 0.340420I$ $b = \ \ 0.669552 + 0.863143I$	$2.02988I$	$0. - 3.46410I$
$u = \ \ 0.500000 - 0.866025I$ $a = -1.072830 - 0.640783I$ $b = -1.49343 - 1.84400I$	$2.02988I$	$0. - 3.46410I$
$u = \ \ 0.500000 - 0.866025I$ $a = -1.06417 - 1.43169I$ $b = -0.176126 - 0.751194I$	$2.02988I$	$0. - 3.46410I$

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

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 6$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4, c_{12}	$y^5 + 2y^4 + 3y^3 + 6y^2 + 5y - 1$
c_2, c_6, c_7 c_{11}	$y^5 + 2y^4 + 3y^3 + 2y^2 + y - 1$
c_3, c_{10}	$(y-1)^5$
c_5, c_8	y^5
c_9	$y^5 + 2y^4 - y^3 - 6y^2 + 9y - 4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.707729 + 0.841955I$ $a = 0.79199 + 1.19175I$ $b = 1.37700 + 0.49579I$	1.64493	6.00000
$u = 0.707729 - 0.841955I$ $a = 0.79199 - 1.19175I$ $b = 1.37700 - 0.49579I$	1.64493	6.00000
$u = -0.389287 + 1.070680I$ $a = 0.005198 - 0.833601I$ $b = -0.29474 - 1.65854I$	1.64493	6.00000
$u = -0.389287 - 1.070680I$ $a = 0.005198 + 0.833601I$ $b = -0.29474 + 1.65854I$	1.64493	6.00000
$u = -0.636883$ $a = 1.40562$ $b = -0.164527$	1.64493	6.00000

IV. $I_4^u = \langle b+u,\ a+u,\ u^5+u^3+u-1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -6$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_9, c_{12}	$y^5 + 2y^4 + 3y^3 + 6y^2 + 5y - 1$
c_2, c_6, c_7 c_{11}	$y^5 + 2y^4 + 3y^3 + 2y^2 + y - 1$
c_3, c_{10}	y^5
c_4	$y^5 + 2y^4 - y^3 - 6y^2 + 9y - 4$
c_5, c_8	$(y-1)^5$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.707729 + 0.841955I$ $a = 0.707729 - 0.841955I$ $b = 0.707729 - 0.841955I$	-1.64493	-6.00000
$u = -0.707729 - 0.841955I$ $a = 0.707729 + 0.841955I$ $b = 0.707729 + 0.841955I$	-1.64493	-6.00000
$u = 0.389287 + 1.070680I$ $a = -0.389287 - 1.070680I$ $b = -0.389287 - 1.070680I$	-1.64493	-6.00000
$u = 0.389287 - 1.070680I$ $a = -0.389287 + 1.070680I$ $b = -0.389287 + 1.070680I$	-1.64493	-6.00000
$u = 0.636883$ $a = -0.636883$ $b = -0.636883$	-1.64493	-6.00000

V.

$$\boldsymbol{I^u_5 = \langle b^2au-2a^2bu+a^3u+b^3-3b^2a+3a^2b-a^3+2bu-au-a+u-1,\ u^2-u+1\rangle}$$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 8u-4$

(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_5^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \cdots$ $a = \cdots$ $b = \cdots$	$4.05977I$	$6.92820I$

VI. $I_6^u = \langle bau - a^2u + b^2 - 2ba + bu + a^2 - au - b + u,\ u^2 - u + 1\rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(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_6^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \cdots$		
$a = \cdots$	0	0
$b = \cdots$		

VII. $I_7^u = \langle u^2a + au + b,\ u^3a + u^2a + au - 1 \rangle$

(i) Arc colorings

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

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

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

$$a_7 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} au + a \\ -1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -au - a + 1 \\ 1 \end{pmatrix}$$

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

$$a_1 = \begin{pmatrix} u^3 \\ u^3 + u \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -a + u \\ u^2a + au + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} u \\ u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(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_7^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \cdots$ $a = \cdots$ $b = \cdots$	0	0

VIII. $I_8^u = \langle b - a - u + 1,\ u^2 - u + 1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 0$

(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_8^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=\cdots$ $a=\cdots$ $b=\cdots$	0	0

IX. $I_1^v = \langle a,\ b^6 - 2b^4 - b^3 + b^2 + b + 1,\ v - 1\rangle$

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

$$a_2 = \begin{pmatrix} b^4 - b^2 + 1 \\ b^3 - b - 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} b^3 - 2b \\ -b^3 + b \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4b^3 - 4b - 2$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_6	$(y^2+y+1)^3$
c_3, c_4, c_5 c_8, c_{10}	$y^6-4y^5+6y^4-3y^3-y^2+y+1$
c_7, c_{11}, c_{12}	y^6
c_9	$y^6-4y^5+10y^4-11y^3+19y^2-3y+1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$v = 1.00000$ $a = 0$ $b = -1.033350 + 0.428825I$	$-2.02988I$	$0. + 3.46410I$
$v = 1.00000$ $a = 0$ $b = -1.033350 - 0.428825I$	$2.02988I$	$0. - 3.46410I$
$v = 1.00000$ $a = 0$ $b = 1.252310 + 0.237364I$	$-2.02988I$	$0. + 3.46410I$
$v = 1.00000$ $a = 0$ $b = 1.252310 - 0.237364I$	$2.02988I$	$0. - 3.46410I$
$v = 1.00000$ $a = 0$ $b = -0.218964 + 0.666188I$	$2.02988I$	$0. - 3.46410I$
$v = 1.00000$ $a = 0$ $b = -0.218964 - 0.666188I$	$-2.02988I$	$0. + 3.46410I$

X. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$25u^6(u^2+u+1)^3(u^5+2u^4+3u^3+2u^2+u-1)^2$ $\cdot(25u^{68}+680u^{67}+\cdots+7437476u+727609)$
c_2, c_6	$5u^6(u^2-u+1)^3(u^5+u^3+u-1)(u^5+u^3+u+1)$ $\cdot(5u^{68}+30u^{67}+\cdots+5054u+853)$
c_3, c_{10}	$81u^5(u-1)^5(u^6-2u^4+\cdots+u+1)(u^6-2u^4+\cdots-u+1)$ $\cdot(81u^{68}+648u^{67}+\cdots+29832u+4477)$
c_4	$64(u^5+u^3-2u^2-u+2)(u^5+2u^4+3u^3+2u^2+u-1)$ $\cdot(u^6-2u^4-u^3+u^2+u+1)(u^6+4u^5+6u^4+3u^3-u^2-u+1)$ $\cdot(64u^{68}-256u^{67}+\cdots-49484520u+9687600)$
c_5, c_8	$81u^5(u+1)^5(u^6-2u^4+\cdots+u+1)(u^6-2u^4+\cdots-u+1)$ $\cdot(81u^{68}-648u^{67}+\cdots-29832u+4477)$
c_7, c_{11}	$5u^6(u^2+u+1)^3(u^5+u^3+u-1)(u^5+u^3+u+1)$ $\cdot(5u^{68}-30u^{67}+\cdots-5054u+853)$
c_9	$64(u^5+u^3+2u^2-u-2)(u^5-2u^4+3u^3-2u^2+u+1)$ $\cdot(u^6-2u^4+u^3+u^2-u+1)(u^6-4u^5+6u^4-3u^3-u^2+u+1)$ $\cdot(64u^{68}+256u^{67}+\cdots+49484520u+9687600)$
c_{12}	$25u^6(u^2-u+1)^3(u^5-2u^4+3u^3-2u^2+u+1)^2$ $\cdot(25u^{68}-680u^{67}+\cdots-7437476u+727609)$

XI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_{12}	$625y^6(y^2+y+1)^3(y^5+2y^4+3y^3+6y^2+5y-1)^2$ $\cdot\,(625y^{68}+16300y^{67}+\cdots+11609525524248y+529414856881)$
c_2, c_6, c_7 c_{11}	$25y^6(y^2+y+1)^3(y^5+2y^4+3y^3+2y^2+y-1)^2$ $\cdot\,(25y^{68}+680y^{67}+\cdots+7437476y+727609)$
c_3, c_5, c_8 c_{10}	$6561y^5(y-1)^5(y^6-4y^5+6y^4-3y^3-y^2+y+1)^2$ $\cdot\,(6561y^{68}-279936y^{67}+\cdots-36157462y+20043529)$
c_4, c_9	$4096(y^5+2y^4-y^3-6y^2+9y-4)(y^5+2y^4+3y^3+6y^2+5y-1)$ $\cdot\,(y^6-4y^5+6y^4-3y^3-y^2+y+1)$ $\cdot\,(y^6-4y^5+10y^4-11y^3+19y^2-3y+1)$ $\cdot\,(4096y^{68}-8192y^{67}+\cdots-815469037963200y+93849593760000)$