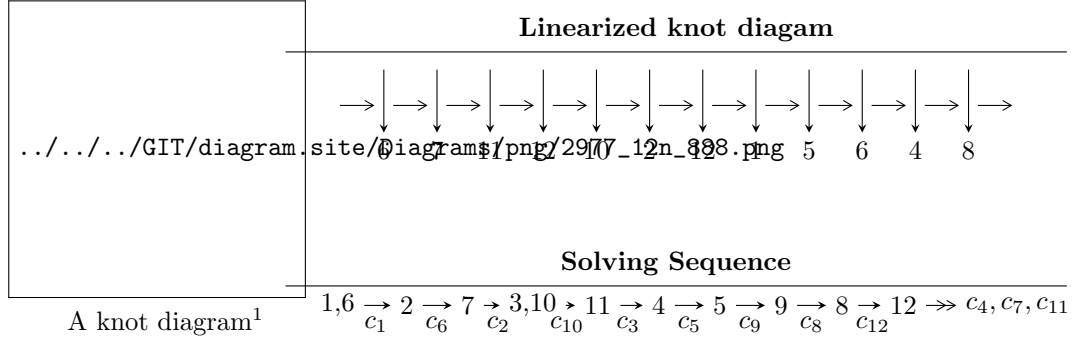


$12n_{0888} (K12n_{0888})$



Ideals for irreducible components² of X_{par}

$$\begin{aligned}
I_1^u &= \langle -u^3 + 2b + 2u + 1, a - 1, u^4 - u^3 - 2u^2 + 3u + 1 \rangle \\
I_2^u &= \langle u^3a - u^3 - 2u^2 + 2b + a + 1, -u^2a + 2u^3 + a^2 - au + 3u^2 + 2u - 2, u^4 + u^3 - u + 1 \rangle \\
I_3^u &= \langle -9u^7 + 18u^6 + 4u^5 - 32u^4 + 32u^3 - 7u^2 + 14b - 57u + 81, \\
&\quad 9u^7 - 27u^6 - 4u^5 + 36u^4 - 28u^3 + 12u^2 + 77a + 32u - 111, \\
&\quad u^8 - 3u^7 + 2u^6 + 4u^5 - 8u^4 + 5u^3 + 6u^2 - 16u + 11 \rangle \\
I_4^u &= \langle 2b - u - 1, 3a + u, u^2 - 3 \rangle \\
I_5^u &= \langle 2b + a - 1, a^2 - 3, u - 1 \rangle \\
I_6^u &= \langle b - 1, -u^3 + 2u^2 + 2a - u + 2, u^4 - 2u^3 + u^2 - 2 \rangle \\
I_7^u &= \langle 2b - 3, a + 1, u^2 + 2u + 1 \rangle \\
I_8^u &= \langle 2b + 1, a + 2u + 3, u^2 + 2u + 1 \rangle \\
I_9^u &= \langle -u^3 + b + u + 2, -u^3 + a + 2, u^4 + u^3 - 2u - 1 \rangle \\
I_{10}^u &= \langle 2u^3 + u^2 + b - 2, a - 1, u^4 + u^3 - 2u - 1 \rangle
\end{aligned}$$

¹The 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>).

$$I_{11}^u = \langle b+1, a, u-1 \rangle$$

$$I_{12}^u = \langle a+1, u+1 \rangle$$

$$I_1^v = \langle a, b+1, v+1 \rangle$$

$$I_2^v = \langle b, a-1, v-1 \rangle$$

* 13 irreducible components with 43 representations.

* 1 irreducible components of $\dim_{\mathbb{C}} = 1$ for $12n_{0888}$

²The rational coefficients of polynomials are approximated in decimal forms since there is not enough space to write down all the coefficients.

$$\text{I. } I_1^u = \langle -u^3 + 2b + 2u + 1, a - 1, u^4 - u^3 - 2u^2 + 3u + 1 \rangle$$

(i) Arc colorings

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

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

$$a_2 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^2 + 1 \\ -u^3 + 3u + 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 1 \\ \frac{1}{2}u^3 - u - \frac{1}{2} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 1 \\ \frac{1}{2}u^3 + u^2 - u - \frac{1}{2} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u^2 + u + 1 \\ \frac{1}{2}u^3 + u + \frac{1}{2} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u \\ \frac{1}{2}u^3 - u - \frac{1}{2} \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} -u^2 + u + 1 \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} u^3 - u^2 - u + 1 \\ -u^2 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = $2(u^3 - 10)$

(iv) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.45873$ $a = 1.00000$ $b = -0.593286$	-18.4021	-26.2080
$u = 1.37348 + 0.70139I$ $a = 1.00000$ $b = -1.59149 + 1.11079I$	$-2.06772 - 13.64080I$	$-18.8720 + 7.2487I$
$u = 1.37348 - 0.70139I$ $a = 1.00000$ $b = -1.59149 - 1.11079I$	$-2.06772 + 13.64080I$	$-18.8720 - 7.2487I$
$u = -0.288231$ $a = 1.00000$ $b = -0.223742$	-0.491481	-20.0480

$$\text{II. } I_2^u = \langle u^3a - u^3 - 2u^2 + 2b + a + 1, -u^2a + 2u^3 + a^2 - au + 3u^2 + 2u - 2, u^4 + u^3 - u + 1 \rangle$$

(i) Arc colorings

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

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

$$a_2 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^2 + 1 \\ u^3 + 2u^2 - u + 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} a \\ -\frac{1}{2}u^3a + \frac{1}{2}u^3 + \dots - \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} a \\ -\frac{1}{2}u^3a + \frac{1}{2}u^3 + \dots - \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^3 + u^2 - 1 \\ -\frac{1}{2}u^3a - \frac{1}{2}u^3 + \frac{1}{2}a - u + \frac{1}{2} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u^3a + u^2a - u^3 - 2u^2 + 2 \\ -\frac{1}{2}u^3a + \frac{1}{2}u^3 + \dots - \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u^3 - u^2 - 2u \\ u \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u^3 - u^2 - u \\ u \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} u^2 + u \\ -u^2 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = $2(u^3 + 3u^2 + u - 9)$

(iv) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.566121 + 0.458821I$ $a = 1.69837 - 0.55270I$ $b = -1.27294 + 0.62687I$	$-3.95056 - 1.45022I$	$-16.5601 + 4.7237I$
$u = 0.566121 + 0.458821I$ $a = -1.02228 + 1.53102I$ $b = 0.206818 + 0.237188I$	$-3.95056 - 1.45022I$	$-16.5601 + 4.7237I$
$u = 0.566121 - 0.458821I$ $a = 1.69837 + 0.55270I$ $b = -1.27294 - 0.62687I$	$-3.95056 + 1.45022I$	$-16.5601 - 4.7237I$
$u = 0.566121 - 0.458821I$ $a = -1.02228 - 1.53102I$ $b = 0.206818 - 0.237188I$	$-3.95056 + 1.45022I$	$-16.5601 - 4.7237I$
$u = -1.066121 + 0.864054I$ $a = 0.424245 - 0.799184I$ $b = -0.903065 - 0.310360I$	$1.48316 + 6.78371I$	$-15.4399 - 4.7237I$
$u = -1.066121 + 0.864054I$ $a = -1.100342 - 0.179134I$ $b = 1.46919 + 0.76918I$	$1.48316 + 6.78371I$	$-15.4399 - 4.7237I$
$u = -1.066121 - 0.864054I$ $a = 0.424245 + 0.799184I$ $b = -0.903065 + 0.310360I$	$1.48316 - 6.78371I$	$-15.4399 + 4.7237I$
$u = -1.066121 - 0.864054I$ $a = -1.100342 + 0.179134I$ $b = 1.46919 - 0.76918I$	$1.48316 - 6.78371I$	$-15.4399 + 4.7237I$

$$\text{III. } I_3^u = \langle -9u^7 + 18u^6 + \cdots + 14b + 81, 9u^7 - 27u^6 + \cdots + 77a - 111, u^8 - 3u^7 + \cdots - 16u + 11 \rangle$$

(i) Arc colorings

$$\begin{aligned} a_1 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_6 &= \begin{pmatrix} 0 \\ u \end{pmatrix} \\ a_2 &= \begin{pmatrix} 1 \\ u^2 \end{pmatrix} \\ a_7 &= \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix} \\ a_3 &= \begin{pmatrix} -u^2 + 1 \\ -u^4 + 2u^2 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -0.116883u^7 + 0.350649u^6 + \cdots - 0.415584u + 1.44156 \\ \frac{9}{14}u^7 - \frac{9}{7}u^6 + \cdots + \frac{57}{14}u - \frac{81}{14} \end{pmatrix} \\ a_{11} &= \begin{pmatrix} -0.116883u^7 + 0.350649u^6 + \cdots - 0.415584u + 1.44156 \\ \frac{13}{14}u^7 - \frac{9}{7}u^6 + \cdots + \frac{75}{14}u - \frac{81}{14} \end{pmatrix} \\ a_4 &= \begin{pmatrix} 0.0129870u^7 - 0.0389610u^6 + \cdots - 0.0649351u + 0.506494 \\ -\frac{3}{14}u^7 + \frac{1}{7}u^6 + \cdots - \frac{13}{14}u + \frac{9}{14} \end{pmatrix} \\ a_5 &= \begin{pmatrix} 0.0129870u^7 - 0.0389610u^6 + \cdots - 0.0649351u - 0.493506 \\ -\frac{1}{14}u^7 + \frac{1}{7}u^6 + \cdots + \frac{3}{14}u + \frac{9}{14} \end{pmatrix} \\ a_9 &= \begin{pmatrix} -0.480519u^7 + 0.870130u^6 + \cdots - 2.74026u + 2.68831 \\ \frac{4}{7}u^7 - \frac{8}{7}u^6 + \cdots + \frac{23}{7}u - \frac{29}{7} \end{pmatrix} \\ a_8 &= \begin{pmatrix} 0.0909091u^7 - 0.272727u^6 + \cdots + 0.545455u - 1.45455 \\ \frac{4}{7}u^7 - \frac{8}{7}u^6 + \cdots + \frac{23}{7}u - \frac{29}{7} \end{pmatrix} \\ a_{12} &= \begin{pmatrix} 0.376623u^7 - 0.558442u^6 + \cdots + 2.25974u - 1.74026 \\ \frac{4}{7}u^7 - \frac{9}{7}u^6 + \cdots + 5u - \frac{51}{7} \end{pmatrix} \end{aligned}$$

(ii) Obstruction class = -1

$$\text{(iii) Cusp Shapes} = \frac{2}{7}(4u^7 - 8u^6 - u^5 + 15u^4 - 8u^3 + 23u - 85)$$

(iv) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.238242 + 1.218598I$ $a = 0.518207 + 0.976187I$ $b = -0.903065 - 0.310360I$	$1.48316 + 6.78371I$	$-15.4399 - 4.7237I$
$u = 0.238242 - 1.218598I$ $a = 0.518207 - 0.976187I$ $b = -0.903065 + 0.310360I$	$1.48316 - 6.78371I$	$-15.4399 + 4.7237I$
$u = 1.215075 + 0.466358I$ $a = 0.532414 + 0.173262I$ $b = -1.27294 + 0.62687I$	$-3.95056 - 1.45022I$	$-16.5601 + 4.7237I$
$u = 1.215075 - 0.466358I$ $a = 0.532414 - 0.173262I$ $b = -1.27294 - 0.62687I$	$-3.95056 + 1.45022I$	$-16.5601 - 4.7237I$
$u = -1.281196 + 0.397697I$ $a = -0.301641 - 0.451752I$ $b = 0.206818 + 0.237188I$	$-3.95056 - 1.45022I$	$-16.5601 + 4.7237I$
$u = -1.281196 - 0.397697I$ $a = -0.301641 + 0.451752I$ $b = 0.206818 - 0.237188I$	$-3.95056 + 1.45022I$	$-16.5601 - 4.7237I$
$u = 1.32788 + 0.75978I$ $a = -0.885344 - 0.144133I$ $b = 1.46919 - 0.76918I$	$1.48316 - 6.78371I$	$-15.4399 + 4.7237I$
$u = 1.32788 - 0.75978I$ $a = -0.885344 + 0.144133I$ $b = 1.46919 + 0.76918I$	$1.48316 + 6.78371I$	$-15.4399 - 4.7237I$

$$\text{IV. } I_4^u = \langle 2b - u - 1, 3a + u, u^2 - 3 \rangle$$

(i) Arc colorings

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

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

$$a_2 = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} -2 \\ -3 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -\frac{1}{3}u \\ \frac{1}{2}u + \frac{1}{2} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -\frac{1}{3}u \\ -\frac{1}{2}u + \frac{1}{2} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} \frac{1}{3}u - 2 \\ \frac{1}{2}u - \frac{7}{2} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} \frac{1}{3}u \\ \frac{1}{2}u - \frac{1}{2} \end{pmatrix}$$

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

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

$$a_{12} = \begin{pmatrix} -2 \\ -3 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = -24

(iv) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.73205$	-16.4493	-24.0000
$a = -0.577350$		
$b = 1.36603$		
$u = -1.73205$	-16.4493	-24.0000
$a = 0.577350$		
$b = -0.366025$		

$$\mathbf{V}. I_5^u = \langle 2b + a - 1, a^2 - 3, u - 1 \rangle$$

(i) Arc colorings

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

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

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

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

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

$$a_{10} = \begin{pmatrix} a \\ -\frac{1}{2}a + \frac{1}{2} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} a \\ \frac{1}{2}a + \frac{1}{2} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -3 \\ -\frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 3 \\ \frac{1}{2}a - \frac{1}{2} \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -2a \\ -1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -2a - 1 \\ -1 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -2a \\ -1 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = -24

(iv) Complex Volumes and Cusp Shapes

Solutions to I_5^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = 1.73205$ $b = -0.366025$	-16.4493	-24.0000
$u = 1.00000$ $a = -1.73205$ $b = 1.36603$	-16.4493	-24.0000

$$\text{VI. } I_6^u = \langle b - 1, -u^3 + 2u^2 + 2a - u + 2, u^4 - 2u^3 + u^2 - 2 \rangle$$

(i) Arc colorings

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

(ii) Obstruction class = -1

(iii) Cusp Shapes = -12

(iv) Complex Volumes and Cusp Shapes

Solutions to I_6^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.500000 + 1.078987I$ $a = -0.646447 - 0.762959I$ $b = 1.00000$	4.11234	-12.0000
$u = 0.500000 - 1.078987I$ $a = -0.646447 + 0.762959I$ $b = 1.00000$	4.11234	-12.0000
$u = -0.790044$ $a = -2.26575$ $b = 1.00000$	-15.6269	-12.0000
$u = 1.79004$ $a = -0.441355$ $b = 1.00000$	-15.6269	-12.0000

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

(i) Arc colorings

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

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

$$a_2 = \begin{pmatrix} 1 \\ -2u - 1 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} 2u + 2 \\ 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -1 \\ 1.5 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -1 \\ 2u + \frac{5}{2} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u \\ \frac{5}{2}u + 4 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u \\ -\frac{1}{2}u \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} -u \\ u + 2 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} 0 \\ -2u - 3 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = -24

(iv) Complex Volumes and Cusp Shapes

Solutions to I_7^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.00000$ $a = -1.00000$ $b = 1.50000$	-6.57974	-24.0000
$u = -1.00000$ $a = -1.00000$ $b = 1.50000$	-6.57974	-24.0000

$$\text{VIII. } I_8^u = \langle 2b + 1, a + 2u + 3, u^2 + 2u + 1 \rangle$$

(i) Arc colorings

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

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

$$a_2 = \begin{pmatrix} 1 \\ -2u - 1 \end{pmatrix}$$

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

$$a_3 = \begin{pmatrix} 2u + 2 \\ 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -2u - 3 \\ -0.5 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -2u - 3 \\ -1.5 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u \\ \frac{3}{2}u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -3u - 4 \\ \frac{1}{2}u - 1 \end{pmatrix}$$

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

$$a_8 = \begin{pmatrix} 3u + 4 \\ u + 2 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} -4u - 4 \\ -2u - 3 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = -24

(iv) Complex Volumes and Cusp Shapes

Solutions to I_8^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.00000$	-6.57974	-24.0000
$a = -1.00000$		
$b = -0.500000$		
$u = -1.00000$	-6.57974	-24.0000
$a = -1.00000$		
$b = -0.500000$		

$$\text{IX. } I_9^u = \langle -u^3 + b + u + 2, -u^3 + a + 2, u^4 + u^3 - 2u - 1 \rangle$$

(i) Arc colorings

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

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

$$a_2 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^2 + 1 \\ u^3 + 2u^2 - 2u - 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} u^3 - 2 \\ u^3 - u - 2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} u^3 - 2 \\ 2u^3 - 2u - 3 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u^3 - u^2 + 2 \\ -u^3 - u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 2u^3 + u^2 - u - 3 \\ u^3 + u^2 + u - 2 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u^2 + 1 \\ -u^3 + 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u^3 - u^2 + 2 \\ -u^3 + 1 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} u^3 - 1 \\ u^3 + u^2 - u - 2 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = -14

(iv) Complex Volumes and Cusp Shapes

Solutions to I_9^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.15372$ $a = -0.464313$ $b = -1.61803$	-5.59278	-14.0000
$u = -0.809017 + 0.981593I$ $a = -0.190983 + 0.981593I$ $b = 0.618034$	2.30291	-14.0000
$u = -0.809017 - 0.981593I$ $a = -0.190983 - 0.981593I$ $b = 0.618034$	2.30291	-14.0000
$u = -0.535687$ $a = -2.15372$ $b = -1.61803$	-5.59278	-14.0000

$$\mathbf{X}. I_{10}^u = \langle 2u^3 + u^2 + b - 2, a - 1, u^4 + u^3 - 2u - 1 \rangle$$

(i) Arc colorings

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

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

$$a_2 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^2 + 1 \\ u^3 + 2u^2 - 2u - 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 1 \\ -2u^3 - u^2 + 2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 1 \\ -2u^3 + 2 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -u^3 - u^2 + 2 \\ -u^3 + 3 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u \\ u^3 - u - 2 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -u^2 + 1 \\ -u^3 + 1 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -u^3 - u^2 + 2 \\ -u^3 + 1 \end{pmatrix}$$

$$a_{12} = \begin{pmatrix} u^3 - 1 \\ u^3 + u^2 - u - 2 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = -14

(iv) Complex Volumes and Cusp Shapes

Solutions to I_{10}^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.15372$ $a = 1.00000$ $b = -2.40245$	-5.59278	-14.0000
$u = -0.809017 + 0.981593I$ $a = 1.00000$ $b = -1.309017 - 0.374935I$	2.30291	-14.0000
$u = -0.809017 - 0.981593I$ $a = 1.00000$ $b = -1.309017 + 0.374935I$	2.30291	-14.0000
$u = -0.535687$ $a = 1.00000$ $b = 2.02048$	-5.59278	-14.0000

$$\text{XI. } I_{11}^u = \langle b + 1, a, u - 1 \rangle$$

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

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

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

(ii) Obstruction class = 1

(iii) Cusp Shapes = -12

(iv) Complex Volumes and Cusp Shapes

Solutions to I_{11}^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$	-3.28987	-12.0000
$a = 0$		
$b = -1.00000$		

XII. $I_{12}^u = \langle a + 1, u + 1 \rangle$

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

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

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

(ii) Obstruction class = 1

(iii) Cusp Shapes = -24

(iv) Complex Volumes and Cusp Shapes

Solution to I_{12}^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = \dots$		
$a = \dots$	-6.57974	-24.0000
$b = \dots$		

XIII. $I_1^v = \langle a, b + 1, v + 1 \rangle$

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

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

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

(ii) Obstruction class = 1

(iii) Cusp Shapes = -12

(iv) Complex Volumes and Cusp Shapes

Solutions to I_1^v	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$v = -1.00000$		
$a = 0$	-3.28987	-12.0000
$b = -1.00000$		

$$\text{XIV. } I_2^v = \langle b, a - 1, v - 1 \rangle$$

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

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

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

(ii) Obstruction class = 1

(iii) Cusp Shapes = 0

(iv) Complex Volumes and Cusp Shapes

Solutions to I_2^v	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$v = 1.00000$	0	0
$a = 1.00000$		
$b = 0$		

XV. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_2, c_5 c_7, c_8, c_{11}	$(u)(u-1)^3(u+1)^4(u^2-3)(u^4-2u^3+u^2-2)(u^4-u^3+\dots+3u+1)$ $\cdot (u^4+u^3-2u-1)^2(u^4+u^3-u+1)^2$ $\cdot (u^8-3u^7+2u^6+4u^5-8u^4+5u^3+6u^2-16u+11)$
c_3, c_4, c_6 c_9, c_{10}, c_{12}	$(u)(u-1)^4(u+1)^3(u^2-3)(u^4-2u^3+u^2-2)(u^4-u^3+\dots+3u+1)$ $\cdot (u^4+u^3-2u-1)^2(u^4+u^3-u+1)^2$ $\cdot (u^8-3u^7+2u^6+4u^5-8u^4+5u^3+6u^2-16u+11)$

XVI. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_2, c_3	
c_4, c_5, c_6	$(y)(y-3)^2(y-1)^7(y^4-5y^3+\cdots-13y+1)(y^4-2y^3+\cdots-4y+4)$
c_7, c_8, c_9	$\cdot (y^4-y^3+2y^2-4y+1)^2(y^4-y^3+4y^2-y+1)^2$
c_{10}, c_{11}, c_{12}	$\cdot (y^8-5y^7+12y^6-6y^5-26y^4+51y^3+20y^2-124y+121)$