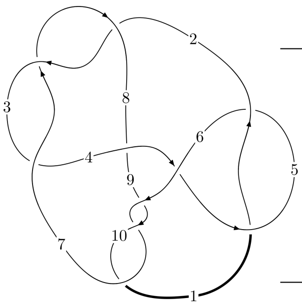
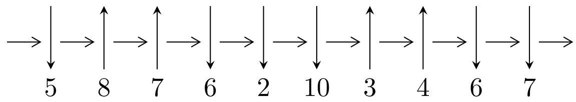
10_{144} $(K10n_{28})$



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$\begin{aligned} I_1^u = \langle & u^8 - 2u^7 + 5u^6 - 6u^5 + 7u^4 - 5u^3 + 3u^2 + b - 2u + 1, \\ & u^9 - u^8 + 5u^7 - 4u^6 + 8u^5 - 5u^4 + 3u^3 - 2u^2 + 2a - 2u, \\ & u^{10} - 3u^9 + 9u^8 - 16u^7 + 24u^6 - 27u^5 + 23u^4 - 16u^3 + 8u^2 - 4u + 2\rangle \\ I_2^u = \langle & u^4a + u^3a - u^4 + 2u^2a - u^3 + au - 2u^2 + b - a - u,\ -u^5 - u^4 + u^2a - 4u^3 + a^2 - 3u^2 + a - 4u - 2, \\ & u^6 + u^5 + 3u^4 + 2u^3 + 2u^2 + u - 1\rangle \\ I_3^u = \langle & b + 2u - 1,\ 2a + u,\ u^2 + 2\rangle \end{aligned}$$

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

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 25 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.

$$\boldsymbol{I^u_1 = \langle u^8 - 2u^7 + \cdots + b + 1,\ u^9 - u^8 + \cdots + 2a - 2u,\ u^{10} - 3u^9 + \cdots - 4u + 2\rangle}$$

(i) Arc colorings

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

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

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

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

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

$$a_{10} = \begin{pmatrix} -\frac{1}{2}u^9 + \frac{1}{2}u^8 + \cdots + u^2 + u \\ -u^8 + 2u^7 - 5u^6 + 6u^5 - 7u^4 + 5u^3 - 3u^2 + 2u - 1 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -\frac{1}{2}u^9 + \frac{3}{2}u^8 + \cdots - 2u + 2 \\ u^8 - 2u^7 + 5u^6 - 7u^5 + 7u^4 - 6u^3 + 2u^2 - u + 1 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} \frac{1}{2}u^9 - \frac{3}{2}u^8 + \cdots + 2u - 1 \\ u^7 - 2u^6 + 4u^5 - 5u^4 + 4u^3 - 3u^2 + u - 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} \frac{1}{2}u^9 - \frac{1}{2}u^8 + \cdots - u^2 - u \\ u^9 - 2u^8 + 6u^7 - 8u^6 + 11u^5 - 9u^4 + 6u^3 - 3u^2 + u - 1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u^3 + 2u \\ -u^5 - u^3 + u \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -2u^9 + 6u^8 - 18u^7 + 26u^6 - 38u^5 + 28u^4 - 18u^3 + 4u^2 + 2u$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_5, c_6 c_9, c_{10}	$u^{10} + u^9 - u^8 - 2u^7 + 3u^6 + 4u^5 - 4u^3 + u + 1$
c_2, c_3, c_7	$u^{10} + 3u^9 + 9u^8 + 16u^7 + 24u^6 + 27u^5 + 23u^4 + 16u^3 + 8u^2 + 4u + 2$
c_4	$u^{10} + 3u^9 + 11u^8 + 18u^7 + 33u^6 + 32u^5 + 34u^4 + 18u^3 + 8u^2 + u + 1$
c_8	$u^{10} - 3u^9 + 3u^8 - 8u^6 + 17u^5 + 17u^4 - 58u^3 + 48u^2 - 16u + 10$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_5, c_6 c_9, c_{10}	$y^{10} - 3y^9 + 11y^8 - 18y^7 + 33y^6 - 32y^5 + 34y^4 - 18y^3 + 8y^2 - y + 1$
c_2, c_3, c_7	$y^{10} + 9y^9 + \cdots + 16y + 4$
c_4	$y^{10} + 13y^9 + \cdots + 15y + 1$
c_8	$y^{10} - 3y^9 + \cdots + 704y + 100$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.880108 + 0.189454I$ $a = 0.91534 - 1.10455I$ $b = -0.474443 - 0.824770I$	$3.61170 + 6.23908I$	$-1.40880 - 5.42921I$
$u = 0.880108 - 0.189454I$ $a = 0.91534 + 1.10455I$ $b = -0.474443 + 0.824770I$	$3.61170 - 6.23908I$	$-1.40880 + 5.42921I$
$u = 0.453532 + 1.055340I$ $a = -0.931418 + 0.352143I$ $b = -0.363378 + 0.743264I$	$0.94791 - 1.45588I$	$-3.02190 + 1.71983I$
$u = 0.453532 - 1.055340I$ $a = -0.931418 - 0.352143I$ $b = -0.363378 - 0.743264I$	$0.94791 + 1.45588I$	$-3.02190 - 1.71983I$
$u = -0.246909 + 0.578012I$ $a = -0.485195 + 0.815685I$ $b = -0.178372 + 0.508008I$	$-0.143235 - 1.179710I$	$-1.77268 + 5.86187I$
$u = -0.246909 - 0.578012I$ $a = -0.485195 - 0.815685I$ $b = -0.178372 - 0.508008I$	$-0.143235 + 1.179710I$	$-1.77268 - 5.86187I$
$u = 0.38382 + 1.39954I$ $a = 0.279302 + 0.892816I$ $b = 0.00363 + 3.07096I$	$-1.41581 + 10.79660I$	$-5.84814 - 6.97307I$
$u = 0.38382 - 1.39954I$ $a = 0.279302 - 0.892816I$ $b = 0.00363 - 3.07096I$	$-1.41581 - 10.79660I$	$-5.84814 + 6.97307I$
$u = 0.02945 + 1.49900I$ $a = 0.221969 - 0.511453I$ $b = 0.51256 - 2.49603I$	$-7.11290 - 1.33139I$	$-5.94848 + 5.33149I$
$u = 0.02945 - 1.49900I$ $a = 0.221969 + 0.511453I$ $b = 0.51256 + 2.49603I$	$-7.11290 + 1.33139I$	$-5.94848 - 5.33149I$

II. $\boldsymbol{I_2^u = \langle u^4 a - u^4 + \cdots + b - a,\ -u^5 - u^4 + u^2 a - 4u^3 + a^2 - 3u^2 + a - 4u - 2,\ u^6 + u^5 + 3u^4 + 2u^3 + 2u^2 + u - 1\rangle}$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u^4 + 4u^3 + 8u^2 + 4u - 2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_5, c_6 c_9, c_{10}	$u^{12} + u^{11} - 2u^{10} - 4u^9 + u^8 + 5u^7 - u^6 - 7u^5 - u^4 + 9u^3 + 6u^2 - 2u - 3$
c_2, c_3, c_7	$(u^6 - u^5 + 3u^4 - 2u^3 + 2u^2 - u - 1)^2$
c_4	$u^{12} + 5u^{11} + \cdots + 40u + 9$
c_8	$(u^6 + u^5 - 3u^4 - 2u^3 + 2u^2 - u - 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_5, c_6 c_9, c_{10}	$y^{12} - 5y^{11} + \cdots - 40y + 9$
c_2, c_3, c_7	$(y^6 + 5y^5 + 9y^4 + 4y^3 - 6y^2 - 5y + 1)^2$
c_4	$y^{12} + 3y^{11} + \cdots - 196y + 81$
c_8	$(y^6 - 7y^5 + 17y^4 - 16y^3 + 6y^2 - 5y + 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.873214$ $a = -0.881252 + 1.009130I$ $b = 0.186123 + 0.436575I$	4.37022	0.269500
$u = -0.873214$ $a = -0.881252 - 1.009130I$ $b = 0.186123 - 0.436575I$	4.37022	0.269500
$u = 0.138835 + 1.234450I$ $a = 0.185128 - 1.031140I$ $b = 0.02999 - 3.18010I$	$-6.25011 + 1.97241I$	$-7.42428 - 3.68478I$
$u = 0.138835 + 1.234450I$ $a = 0.319451 + 0.688377I$ $b = -1.23755 + 0.99495I$	$-6.25011 + 1.97241I$	$-7.42428 - 3.68478I$
$u = 0.138835 - 1.234450I$ $a = 0.185128 + 1.031140I$ $b = 0.02999 + 3.18010I$	$-6.25011 - 1.97241I$	$-7.42428 + 3.68478I$
$u = 0.138835 - 1.234450I$ $a = 0.319451 - 0.688377I$ $b = -1.23755 - 0.99495I$	$-6.25011 - 1.97241I$	$-7.42428 + 3.68478I$
$u = -0.408802 + 1.276380I$ $a = -0.340041 + 0.871835I$ $b = -0.11686 + 2.25474I$	$0.40571 - 4.59213I$	$-3.41886 + 3.20482I$
$u = -0.408802 + 1.276380I$ $a = 0.802059 + 0.171737I$ $b = 0.869443 + 0.391246I$	$0.40571 - 4.59213I$	$-3.41886 + 3.20482I$
$u = -0.408802 - 1.276380I$ $a = -0.340041 - 0.871835I$ $b = -0.11686 - 2.25474I$	$0.40571 + 4.59213I$	$-3.41886 - 3.20482I$
$u = -0.408802 - 1.276380I$ $a = 0.802059 - 0.171737I$ $b = 0.869443 - 0.391246I$	$0.40571 + 4.59213I$	$-3.41886 - 3.20482I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.413150$ $a = 1.61251$ $b = 1.08931$	-2.55102	1.41680
$u = 0.413150$ $a = -2.78320$ $b = 0.448389$	-2.55102	1.41680

III. $I_3^u = \langle b + 2u - 1,\ 2a + u,\ u^2 + 2 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

	Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u =$	$1.414210I$		
$a =$	$-0.707107I$	-8.22467	-12.0000
$b =$	$1.00000-2.82843I$		
$u =$	$-1.414210I$		
$a =$	$0.707107I$	-8.22467	-12.0000
$b =$	$1.00000+2.82843I$		

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

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

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

V. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1, c_6	$(u-1)(u+1)^2(u^{10}+u^9-u^8-2u^7+3u^6+4u^5-4u^3+u+1)$ $\cdot(u^{12}+u^{11}-2u^{10}-4u^9+u^8+5u^7-u^6-7u^5-u^4+9u^3+6u^2-2u-3)$
c_2, c_3, c_7	$u(u^2+2)(u^6-u^5+3u^4-2u^3+2u^2-u-1)^2$ $\cdot(u^{10}+3u^9+9u^8+16u^7+24u^6+27u^5+23u^4+16u^3+8u^2+4u+2)$
c_4	$(u-1)^3$ $\cdot(u^{10}+3u^9+11u^8+18u^7+33u^6+32u^5+34u^4+18u^3+8u^2+u+1)$ $\cdot(u^{12}+5u^{11}+\cdots+40u+9)$
c_5, c_9, c_{10}	$(u-1)^2(u+1)(u^{10}+u^9-u^8-2u^7+3u^6+4u^5-4u^3+u+1)$ $\cdot(u^{12}+u^{11}-2u^{10}-4u^9+u^8+5u^7-u^6-7u^5-u^4+9u^3+6u^2-2u-3)$
c_8	$u(u^2+2)(u^6+u^5-3u^4-2u^3+2u^2-u-1)^2$ $\cdot(u^{10}-3u^9+3u^8-8u^6+17u^5+17u^4-58u^3+48u^2-16u+10)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_5, c_6 c_9, c_{10}	$(y-1)^3$ $\cdot (y^{10} - 3y^9 + 11y^8 - 18y^7 + 33y^6 - 32y^5 + 34y^4 - 18y^3 + 8y^2 - y + 1)$ $\cdot (y^{12} - 5y^{11} + \cdots - 40y + 9)$
c_2, c_3, c_7	$y(y+2)^2(y^6 + 5y^5 + 9y^4 + 4y^3 - 6y^2 - 5y + 1)^2$ $\cdot (y^{10} + 9y^9 + \cdots + 16y + 4)$
c_4	$((y-1)^3)(y^{10} + 13y^9 + \cdots + 15y + 1)(y^{12} + 3y^{11} + \cdots - 196y + 81)$
c_8	$y(y+2)^2(y^6 - 7y^5 + 17y^4 - 16y^3 + 6y^2 - 5y + 1)^2$ $\cdot (y^{10} - 3y^9 + \cdots + 704y + 100)$