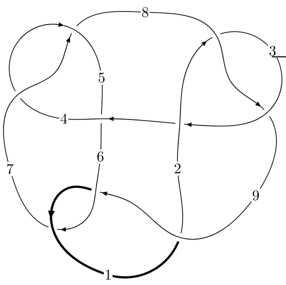
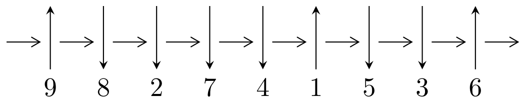
9_{28} ($K9a_5$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

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

$$I_1^u = \langle u^3 + b - u + 1,\ -2u^2 + a - u + 1,\ u^4 + u^3 - u^2 - u + 1 \rangle$$

$$\begin{aligned} I_2^u = \langle & -2u^{15} + 8u^{13} + 3u^{12} - 14u^{11} - 10u^{10} + 8u^9 + 14u^8 + 6u^7 - 6u^6 - 11u^5 - 3u^4 + 3u^3 + 2u^2 + b + u + 2, \\ & -2u^{15} + 8u^{13} + 4u^{12} - 14u^{11} - 13u^{10} + 6u^9 + 17u^8 + 10u^7 - 4u^6 - 13u^5 - 7u^4 + 3u^2 + a + 3u + 3, \\ & u^{16} + u^{15} - 4u^{14} - 6u^{13} + 5u^{12} + 13u^{11} + 3u^{10} - 11u^9 - 12u^8 - 2u^7 + 8u^6 + 8u^5 + 2u^4 - 2u^3 - 2u^2 - 2u - \end{aligned}$$

$$I_3^u = \langle u^5 - u^3 + b + u,\ u^2 + a,\ u^6 - u^4 - u^3 + u^2 + u + 1 \rangle$$

$$I_4^u = \langle b + 1,\ a + 1,\ u - 1 \rangle$$

* 4 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 27 representations.

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

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 8u^2 + 4u - 10$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	u^4+2u^2+3u+1
c_2,c_4,c_7 c_8	$u^4-u^3-u^2+u+1$
c_3,c_5	$u^4+3u^3+5u^2+3u+1$
c_6,c_9	$u^4-2u^3+2u^2-u+1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^4 + 4y^3 + 6y^2 - 5y + 1$
c_2, c_4, c_7 c_8	$y^4 - 3y^3 + 5y^2 - 3y + 1$
c_3, c_5	$y^4 + y^3 + 9y^2 + y + 1$
c_6, c_9	$y^4 + 2y^2 + 3y + 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.692440 + 0.318148I$ $a = 0.448952 + 1.199340I$ $b = -0.429304 - 0.107280I$	$-1.07760 - 1.41376I$	$-4.20419 + 4.79737I$
$u = 0.692440 - 0.318148I$ $a = 0.448952 - 1.199340I$ $b = -0.429304 + 0.107280I$	$-1.07760 + 1.41376I$	$-4.20419 - 4.79737I$
$u = -1.192440 + 0.547877I$ $a = 0.05105 - 2.06537I$ $b = -1.57070 - 1.62477I$	$-3.85720 + 11.56320I$	$-5.79581 - 8.26147I$
$u = -1.192440 - 0.547877I$ $a = 0.05105 + 2.06537I$ $b = -1.57070 + 1.62477I$	$-3.85720 - 11.56320I$	$-5.79581 + 8.26147I$

II.

$\boldsymbol{I^u_2 = \langle -2u^{15}+8u^{13}+\cdots+b+2,\ -2u^{15}+8u^{13}+\cdots+a+3,\ u^{16}+u^{15}+\cdots-2u-1\rangle}$

(i) Arc colorings

$$a_3 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 1 \\ u^2 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u^3 \\ -u^3 + u \end{pmatrix}$$
$$a_1 = \begin{pmatrix} u^3 \\ u^5 - u^3 + u \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 2u^{15} - 8u^{13} + \cdots - 3u - 3 \\ 2u^{15} - 8u^{13} + \cdots - u - 2 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} 2u^{15} + u^{14} + \cdots - 2u - 3 \\ u^{15} - 4u^{13} - u^{12} + 7u^{11} + 3u^{10} - 5u^9 - 4u^8 + 2u^6 + 2u^5 - 1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 2u^{15} - 9u^{13} + \cdots - 3u - 3 \\ u^{15} - 5u^{13} + \cdots - u - 2 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} 2u^{15} - 9u^{13} + \cdots - 3u - 3 \\ u^{15} - 5u^{13} + \cdots - u - 2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 4u^{12} - 12u^{10} - 4u^9 + 16u^8 + 8u^7 - 4u^6 - 8u^5 - 4u^4 + 4u^2 - 2$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$(u^8 - 3u^7 + 7u^6 - 10u^5 + 11u^4 - 10u^3 + 6u^2 - 4u + 1)^2$
c_2, c_4, c_7 c_8	$u^{16} - u^{15} + \cdots + 2u - 1$
c_3, c_5	$u^{16} + 9u^{15} + \cdots - 8u^2 + 1$
c_6, c_9	$(u^8 + u^7 - u^6 - 2u^5 + u^4 + 2u^3 - 2u - 1)^2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$(y^8 + 5y^7 + 11y^6 + 6y^5 - 17y^4 - 34y^3 - 22y^2 - 4y + 1)^2$
c_2, c_4, c_7 c_8	$y^{16} - 9y^{15} + \cdots - 8y^2 + 1$
c_3, c_5	$y^{16} - 5y^{15} + \cdots - 16y + 1$
c_6, c_9	$(y^8 - 3y^7 + 7y^6 - 10y^5 + 11y^4 - 10y^3 + 6y^2 - 4y + 1)^2$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.685501 + 0.640105I$ $a = 0.436635 - 0.582879I$ $b = 0.612928 - 0.418261I$	3.21286	$1.86404 + 0.I$
$u = -0.685501 - 0.640105I$ $a = 0.436635 + 0.582879I$ $b = 0.612928 + 0.418261I$	3.21286	$1.86404 + 0.I$
$u = -0.203747 + 0.848147I$ $a = -0.171437 - 0.597846I$ $b = -1.12222 + 1.11997I$	$-0.91019 - 6.44354I$	$-2.57155 + 5.29417I$
$u = -0.203747 - 0.848147I$ $a = -0.171437 + 0.597846I$ $b = -1.12222 - 1.11997I$	$-0.91019 + 6.44354I$	$-2.57155 - 5.29417I$
$u = 1.082580 + 0.348383I$ $a = 0.921772 + 0.891806I$ $b = -0.275134 + 0.901574I$	$-2.24921 - 1.13123I$	$-4.58478 + 0.51079I$
$u = 1.082580 - 0.348383I$ $a = 0.921772 - 0.891806I$ $b = -0.275134 - 0.901574I$	$-2.24921 + 1.13123I$	$-4.58478 - 0.51079I$
$u = 1.14767$ $a = 0.848070$ $b = 0.513726$	-2.44483	-0.105540
$u = -1.134620 + 0.424735I$ $a = 0.45794 - 2.18496I$ $b = -0.74376 - 2.19413I$	$-5.44928 + 2.57849I$	$-7.72292 - 3.56796I$
$u = -1.134620 - 0.424735I$ $a = 0.45794 + 2.18496I$ $b = -0.74376 + 2.19413I$	$-5.44928 - 2.57849I$	$-7.72292 + 3.56796I$
$u = -1.130780 + 0.529217I$ $a = -0.20737 + 1.95558I$ $b = 1.10166 + 1.54556I$	$-0.91019 + 6.44354I$	$-2.57155 - 5.29417I$

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-1.130780-0.529217I$ $a=-0.20737-1.95558I$ $b=\ \ 1.10166-1.54556I$	$-0.91019-6.44354I$	$-2.57155+5.29417I$
$u=\ \ 1.242710+0.322774I$ $a=-1.21486-0.76329I$ $b=-0.28199-1.40795I$	$-5.44928+2.57849I$	$-7.72292-3.56796I$
$u=\ \ 1.242710-0.322774I$ $a=-1.21486+0.76329I$ $b=-0.28199+1.40795I$	$-5.44928-2.57849I$	$-7.72292+3.56796I$
$u=-0.684028$ $a=-2.18804$ $b=-1.62708$	-2.44483	-0.105540
$u=\ \ 0.097535+0.616980I$ $a=-0.552685-1.087970I$ $b=-0.234797+1.067950I$	$-2.24921+1.13123I$	$-4.58478-0.51079I$
$u=\ \ 0.097535-0.616980I$ $a=-0.552685+1.087970I$ $b=-0.234797-1.067950I$	$-2.24921-1.13123I$	$-4.58478+0.51079I$

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

(i) Arc colorings

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

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

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

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

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

$$a_1 = \begin{pmatrix} u^3 \\ u^5 - u^3 + u \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u^2 \\ -u^5 + u^3 - u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} u^5 - u^2 \\ -u \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u^4 - u^2 - u \\ -u^2 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} u^4 - u^2 - u \\ -u^2 \end{pmatrix}$$

(ii) Obstruction class $= -1$

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

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$u^6 - 3u^5 + 5u^4 - 7u^3 + 9u^2 - 8u + 4$
c_2, c_4, c_7 c_8	$u^6 - u^4 + u^3 + u^2 - u + 1$
c_3, c_5	$u^6 + 2u^5 + 3u^4 + u^3 + u^2 - u + 1$
c_6, c_9	$u^6 - u^5 - u^4 + 3u^3 - u^2 - 2u + 2$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1	$y^6 + y^5 + y^4 + y^3 + 9y^2 + 8y + 16$
c_2, c_4, c_7 c_8	$y^6 - 2y^5 + 3y^4 - y^3 + y^2 + y + 1$
c_3, c_5	$y^6 + 2y^5 + 7y^4 + 11y^3 + 9y^2 + y + 1$
c_6, c_9	$y^6 - 3y^5 + 5y^4 - 7y^3 + 9y^2 - 8y + 4$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_3^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.856601+0.623578I$ $a=-0.344917+1.068320I$ $b=-0.107958+0.512846I$	$2.72382+4.89103I$	$0.12173-6.59162I$
$u=-0.856601-0.623578I$ $a=-0.344917-1.068320I$ $b=-0.107958-0.512846I$	$2.72382-4.89103I$	$0.12173+6.59162I$
$u=\ \ 1.140590+0.471635I$ $a=-1.07851-1.07589I$ $b=\ \ 0.67021-1.38548I$	$-5.10856-5.32947I$	$-7.48262+4.54389I$
$u=\ \ 1.140590-0.471635I$ $a=-1.07851+1.07589I$ $b=\ \ 0.67021+1.38548I$	$-5.10856+5.32947I$	$-7.48262-4.54389I$
$u=-0.283992+0.709987I$ $a=\ \ 0.423430+0.403261I$ $b=\ \ 0.937752-0.810947I$	$1.56227-1.71504I$	$1.36090+1.32670I$
$u=-0.283992-0.709987I$ $a=\ \ 0.423430-0.403261I$ $b=\ \ 0.937752+0.810947I$	$1.56227+1.71504I$	$1.36090-1.32670I$

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

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= -12$

(iv) u-Polynomials at the component

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

(v) Riley Polynomials at the component

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

(vi) Complex Volumes and Cusp Shapes

Solutions to I_4^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 1.00000$ $a = -1.00000$ $b = -1.00000$	-3.28987	-12.0000

V. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$u(u^4+2u^2+3u+1)(u^6-3u^5+5u^4-7u^3+9u^2-8u+4)$ $\cdot(u^8-3u^7+7u^6-10u^5+11u^4-10u^3+6u^2-4u+1)^2$
c_2, c_7	$(u+1)(u^4-u^3-u^2+u+1)(u^6-u^4+u^3+u^2-u+1)$ $\cdot(u^{16}-u^{15}+\cdots+2u-1)$
c_3, c_5	$(u+1)(u^4+3u^3+5u^2+3u+1)(u^6+2u^5+3u^4+u^3+u^2-u+1)$ $\cdot(u^{16}+9u^{15}+\cdots-8u^2+1)$
c_4, c_8	$(u-1)(u^4-u^3-u^2+u+1)(u^6-u^4+u^3+u^2-u+1)$ $\cdot(u^{16}-u^{15}+\cdots+2u-1)$
c_6, c_9	$u(u^4-2u^3+2u^2-u+1)(u^6-u^5-u^4+3u^3-u^2-2u+2)$ $\cdot(u^8+u^7-u^6-2u^5+u^4+2u^3-2u-1)^2$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1	$y(y^4+4y^3+6y^2-5y+1)(y^6+y^5+y^4+y^3+9y^2+8y+16)$ $\cdot(y^8+5y^7+11y^6+6y^5-17y^4-34y^3-22y^2-4y+1)^2$
c_2, c_4, c_7 c_8	$(y-1)(y^4-3y^3+5y^2-3y+1)(y^6-2y^5+3y^4-y^3+y^2+y+1)$ $\cdot(y^{16}-9y^{15}+\cdots-8y^2+1)$
c_3, c_5	$(y-1)(y^4+y^3+9y^2+y+1)(y^6+2y^5+\cdots+y+1)$ $\cdot(y^{16}-5y^{15}+\cdots-16y+1)$
c_6, c_9	$y(y^4+2y^2+3y+1)(y^6-3y^5+5y^4-7y^3+9y^2-8y+4)$ $\cdot(y^8-3y^7+7y^6-10y^5+11y^4-10y^3+6y^2-4y+1)^2$