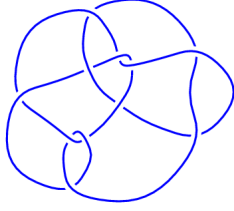
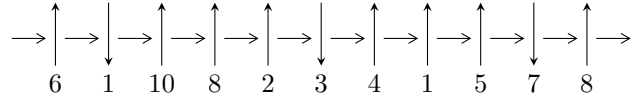


11n₈₇ (K11n₈₇)

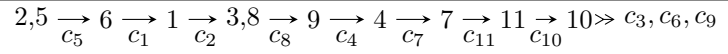


1

Arc Sequences



Solving Sequence



Representation Ideals

$$I = \bigcap_{i=1}^3 I_i^u \bigcap I_1^v$$

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

$$I_2^u = \langle a^{16} - 3a^{15} + 5a^{14} - 6a^{13} + 4a^{12} - 3a^{11} - 6a^{10} + a^9 - 2a^8 - 11a^7 + a^6 - 8a^5 + 6a^4 - 8a^3 - a^2 + 4a - 1, \\ 118830a^{15} + 38487u + \dots - 400157a + 270811, \\ - 308180a^{15} + 115461b + \dots + 1078224a - 840233 \rangle$$

$$I_3^u = \langle u^{16} - 3u^{15} + \dots - 6u + 2, \\ u^{14} - 2u^{13} + 5u^{12} - 7u^{11} + 10u^{10} - 12u^9 + 12u^8 - 11u^7 + 9u^6 - 6u^5 + 5u^4 - 3u^3 + 3u^2 + b - 3u + 1, \\ - u^{15} + 3u^{14} + \dots + 2a + 2 \rangle$$

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

There are 4 irreducible components with 37 representations.

¹The knot diagram image is adapter from “C. Livingston and A. H. Moore, KnotInfo: Table of Knot Invariants, <http://www.indiana.edu/~knotinfo>”

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

(i) Arc colorings

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

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

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

$$a_1 = \begin{pmatrix} u^2 + 1 \\ u^2 \end{pmatrix}$$

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

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

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

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

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

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

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

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

(ii) Obstruction class = 1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.455090 - 1.098684I$ $a = 0.321797 - 0.776887I$ $b = 1.09868 - 1.45509I$	$0.82247 + 3.66386I$	$8.00000 - 4.00000I$
$u = -0.455090 + 1.098684I$ $a = 0.321797 + 0.776887I$ $b = 1.09868 + 1.45509I$	$0.82247 - 3.66386I$	$8.00000 + 4.00000I$
$u = 0.455090 - 1.098684I$ $a = -0.321797 - 0.776887I$ $b = -1.098684 + 0.544910I$	$0.82247 - 3.66386I$	$8.00000 + 4.00000I$
$u = 0.455090 + 1.098684I$ $a = -0.321797 + 0.776887I$ $b = -1.098684 - 0.544910I$	$0.82247 + 3.66386I$	$8.00000 - 4.00000I$

$$\text{II. } I_2^u = \langle a^{16} - 3a^{15} + \dots + 4a - 1, 118830a^{15} + 38487u + \dots - 400157a + 270811, 1.15 \times 10^5 b - 3.08 \times 10^5 a^{15} + \dots + 1.08 \times 10^6 a - 8.40 \times 10^5 \rangle$$

(i) Arc colorings

$$\begin{aligned} a_2 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_5 &= \begin{pmatrix} 0 \\ -3.08754a^{15} + 7.69158a^{14} + \dots + 10.3972a - 7.03643 \end{pmatrix} \\ a_6 &= \begin{pmatrix} -3.08754a^{15} + 7.69158a^{14} + \dots + 10.3972a - 7.03643 \\ -3.08754a^{15} + 7.69158a^{14} + \dots + 10.3972a - 7.03643 \end{pmatrix} \\ a_1 &= \begin{pmatrix} -2.15121a^{15} + 6.00333a^{14} + \dots + 8.01260a - 6.09977 \\ -2.15121a^{15} + 6.00333a^{14} + \dots + 8.01260a - 7.09977 \end{pmatrix} \\ a_3 &= \begin{pmatrix} 2.53984a^{15} - 7.07201a^{14} + \dots - 11.4886a + 7.80982 \\ 4.69105a^{15} - 13.0753a^{14} + \dots - 19.5012a + 13.9096 \end{pmatrix} \\ a_8 &= \begin{pmatrix} a \\ 2.66913a^{15} - 6.91429a^{14} + \dots - 9.33843a + 7.27720 \end{pmatrix} \\ a_9 &= \begin{pmatrix} -2.48913a^{15} + 6.31317a^{14} + \dots + 8.20519a - 6.89545 \\ 0.727501a^{15} - 2.26520a^{14} + \dots - 5.48276a + 1.92159 \end{pmatrix} \\ a_4 &= \begin{pmatrix} 0.854574a^{15} - 2.42887a^{14} + \dots - 3.19656a + 1.57102 \\ -1.63455a^{15} + 3.88430a^{14} + \dots + 5.00863a - 5.32442 \end{pmatrix} \\ a_7 &= \begin{pmatrix} 0.359489a^{15} - 0.562770a^{14} + \dots + 0.457583a + 0.248179 \\ 3.10164a^{15} - 7.30795a^{14} + \dots - 9.44519a + 6.44568 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} -2.12964a^{15} + 5.75040a^{14} + \dots + 8.66277a - 6.64727 \\ 1.46709a^{15} - 3.42365a^{14} + \dots - 4.43656a + 1.12126 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -2.48913a^{15} + 6.31317a^{14} + \dots + 8.20519a - 6.89545 \\ -1.63455a^{15} + 3.88430a^{14} + \dots + 5.00863a - 5.32442 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -2.48913a^{15} + 6.31317a^{14} + \dots + 8.20519a - 6.89545 \\ -1.63455a^{15} + 3.88430a^{14} + \dots + 5.00863a - 5.32442 \end{pmatrix} \end{aligned}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.473514 + 1.273022I$ $a = -0.982629 - 0.371709I$ $b = -2.67280 - 0.68277I$	$-10.78258 - 4.93524I$	$1.01557 + 2.99422I$
$u = -0.473514 - 1.273022I$ $a = -0.982629 + 0.371709I$ $b = -2.67280 + 0.68277I$	$-10.78258 + 4.93524I$	$1.01557 - 2.99422I$
$u = 0.578577$ $a = -0.617583$ $b = 0.801052$	1.93558	4.99681
$u = 0.394459 - 1.112499I$ $a = -0.465116 - 0.844545I$ $b = -1.33580 - 0.60094I$	$-1.05533 - 3.63283I$	$1.57760 + 4.51802I$
$u = 0.394459 + 1.112499I$ $a = -0.465116 + 0.844545I$ $b = -1.33580 + 0.60094I$	$-1.05533 + 3.63283I$	$1.57760 - 4.51802I$
$u = -0.252896 + 0.819281I$ $a = -0.245877 - 1.350008I$ $b = -0.050903 + 0.938748I$	$2.79859 - 1.27532I$	$6.81947 + 5.08518I$
$u = -0.252896 - 0.819281I$ $a = -0.245877 + 1.350008I$ $b = -0.050903 - 0.938748I$	$2.79859 + 1.27532I$	$6.81947 - 5.08518I$
$u = 0.394459 - 1.112499I$ $a = 0.383061 - 0.033126I$ $b = 0.724062 + 0.960570I$	$-1.05533 - 3.63283I$	$1.57760 + 4.51802I$
$u = 0.394459 + 1.112499I$ $a = 0.383061 + 0.033126I$ $b = 0.724062 - 0.960570I$	$-1.05533 + 3.63283I$	$1.57760 - 4.51802I$
$u = -0.473514 + 1.273022I$ $a = 0.586259 - 0.833880I$ $b = 1.68418 - 1.18701I$	$-10.78258 - 4.93524I$	$1.01557 + 2.99422I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.473514 - 1.273022I$ $a = 0.586259 + 0.833880I$ $b = 1.68418 + 1.18701I$	$-10.78258 + 4.93524I$	$1.01557 - 2.99422I$
$u = -0.252896 - 0.819281I$ $a = 0.638611 - 0.935621I$ $b = 2.26358 - 1.10055I$	$2.79859 + 1.27532I$	$6.81947 - 5.08518I$
$u = -0.252896 + 0.819281I$ $a = 0.638611 + 0.935621I$ $b = 2.26358 + 1.10055I$	$2.79859 - 1.27532I$	$6.81947 + 5.08518I$
$u = -0.914675$ $a = 0.91831 - 1.15526I$ $b = 0.194501 + 0.440277I$	-6.88602	4.17790
$u = -0.914675$ $a = 0.91831 + 1.15526I$ $b = 0.194501 - 0.440277I$	-6.88602	4.17790
$u = 0.578577$ $a = 1.95233$ $b = 0.585296$	1.93558	4.99681

III.

$$I_3^u = \langle u^{16} - 3u^{15} + \dots - 6u + 2, u^{14} - 2u^{13} + \dots + b + 1, -u^{15} + 3u^{14} + \dots + 2a + 2 \rangle$$

(i) Arc colorings

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

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

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

$$a_1 = \begin{pmatrix} u^2 + 1 \\ u^2 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} u^4 + u^2 + 1 \\ u^4 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} \frac{1}{2}u^{15} - \frac{3}{2}u^{14} + \dots + 3u - 1 \\ -u^{14} + 2u^{13} + \dots + 3u - 1 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -\frac{1}{2}u^{15} + \frac{3}{2}u^{14} + \dots - 3u + 2 \\ -u^{13} + u^{12} + \dots - u + 1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} \frac{1}{2}u^{15} - \frac{1}{2}u^{14} + \dots + u - 1 \\ u^{14} - 2u^{13} + \dots - 2u + 1 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -u^7 - 2u^5 - 2u^3 \\ -u^7 - u^5 + u \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} \frac{1}{2}u^{15} - \frac{3}{2}u^{14} + \dots - 3u^2 + 3u \\ u^{13} - u^{12} + \dots + u - 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -\frac{1}{2}u^{15} + \frac{3}{2}u^{14} + \dots - 3u + 2 \\ u^{14} - 2u^{13} + \dots - 2u + 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -\frac{1}{2}u^{15} + \frac{3}{2}u^{14} + \dots - 3u + 2 \\ u^{14} - 2u^{13} + \dots - 2u + 1 \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.641580 - 0.478671I$ $a = -0.261902 + 1.077326I$ $b = -0.629700 - 0.297007I$	$0.96609 - 2.28706I$	$6.88422 + 4.18311I$
$u = -0.641580 + 0.478671I$ $a = -0.261902 - 1.077326I$ $b = -0.629700 + 0.297007I$	$0.96609 + 2.28706I$	$6.88422 - 4.18311I$
$u = -0.569839 - 0.991415I$ $a = 0.847460 - 0.348051I$ $b = 1.85072 + 0.46336I$	$-0.48607 + 7.00413I$	$4.93065 - 8.89860I$
$u = -0.569839 + 0.991415I$ $a = 0.847460 + 0.348051I$ $b = 1.85072 - 0.46336I$	$-0.48607 - 7.00413I$	$4.93065 + 8.89860I$
$u = -0.142689 - 1.132381I$ $a = -0.703529 - 0.463706I$ $b = -1.41732 - 0.31663I$	$-3.75188 - 0.61754I$	$-1.35608 + 1.57553I$
$u = -0.142689 + 1.132381I$ $a = -0.703529 + 0.463706I$ $b = -1.41732 + 0.31663I$	$-3.75188 + 0.61754I$	$-1.35608 - 1.57553I$
$u = 0.409686 - 1.284695I$ $a = -0.460627 + 0.987088I$ $b = -1.60185 + 1.06559I$	$-10.32592 + 2.59855I$	$1.50083 - 1.34763I$
$u = 0.409686 + 1.284695I$ $a = -0.460627 - 0.987088I$ $b = -1.60185 - 1.06559I$	$-10.32592 - 2.59855I$	$1.50083 + 1.34763I$
$u = 0.482015 - 1.060217I$ $a = -0.113993 - 0.507268I$ $b = -0.700496 - 0.004789I$	$-0.74617 - 3.29967I$	$2.58175 + 1.95258I$
$u = 0.482015 + 1.060217I$ $a = -0.113993 + 0.507268I$ $b = -0.700496 + 0.004789I$	$-0.74617 + 3.29967I$	$2.58175 - 1.95258I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.522071 - 1.247144I$		
$a = 0.951591 + 0.542924I$	$-9.4923 - 12.3434I$	$2.79056 + 7.18778I$
$b = 2.96708 + 0.68151I$		
$u = 0.522071 + 1.247144I$		
$a = 0.951591 - 0.542924I$	$-9.4923 + 12.3434I$	$2.79056 - 7.18778I$
$b = 2.96708 - 0.68151I$		
$u = 0.531551 - 0.451405I$		
$a = 0.835102 + 0.156457I$	$1.066483 - 0.823485I$	$7.17691 + 4.58909I$
$b = 0.484866 - 0.424635I$		
$u = 0.531551 + 0.451405I$		
$a = 0.835102 - 0.156457I$	$1.066483 + 0.823485I$	$7.17691 - 4.58909I$
$b = 0.484866 + 0.424635I$		
$u = 0.908785 - 0.099623I$		
$a = -1.09410 - 1.12213I$	$-6.01654 + 7.18776I$	$5.49115 - 4.28840I$
$b = -0.453304 + 0.669187I$		
$u = 0.908785 + 0.099623I$		
$a = -1.09410 + 1.12213I$	$-6.01654 - 7.18776I$	$5.49115 + 4.28840I$
$b = -0.453304 - 0.669187I$		

$$\text{IV. } I_1^v = \langle v + 1, b - 1, a \rangle$$

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

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

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

(ii) Obstruction class = 1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

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

V. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_5	$u(u^4 + 2u^2 + 2)(u^8 - u^7 + 3u^6 - 2u^5 + 3u^4 - 2u^3 - 1)^2$ $(u^{16} + 3u^{15} + \dots + 6u + 2)$
c_2	$u(u^2 + 2u + 2)^2(u^8 + 5u^7 + 11u^6 + 10u^5 - u^4 - 10u^3 - 6u^2 + 1)^2$ $(u^{16} + 9u^{15} + \dots + 4u + 4)$
c_3, c_7	$(u - 1)(u + 1)^4(u^{16} + u^{15} + \dots + 2u - 1)(u^{16} + u^{15} + \dots - 4u^2 + 1)$
c_4	$(u - 1)^4(u + 1)(u^{16} + u^{15} + \dots + 2u - 1)(u^{16} + u^{15} + \dots - 4u^2 + 1)$
c_6	$u(u^4 - 2u^2 + 2)(u^8 - u^7 - 5u^6 + 4u^5 + 7u^4 - 4u^3 - 2u^2 + 2u - 1)^2$ $(u^{16} + 3u^{15} + \dots - 22u + 10)$
c_8	$(u + 1)^5(u^{16} + 3u^{15} + \dots + 8u + 1)(u^{16} + 5u^{15} + \dots + 4u + 1)$
c_9	$(u - 1)(u^4 + 4u^3 + 4u^2 + 1)(u^{16} + u^{15} + \dots + 376u + 419)$ $(u^{16} + u^{15} + \dots + 2u^2 + 1)$
c_{10}	$(u - 1)(u + 1)^{16}(u^4 - 4u^3 + 4u^2 + 1)(u^{16} - 14u^{15} + \dots - 1024u + 256)$
c_{11}	$(u - 1)^5(u^{16} + 3u^{15} + \dots + 8u + 1)(u^{16} + 5u^{15} + \dots + 4u + 1)$

VI. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_5	$\frac{y(y^2 + 2y + 2)^2(y^8 + 5y^7 + 11y^6 + 10y^5 - y^4 - 10y^3 - 6y^2 + 1)^2}{(y^{16} + 9y^{15} + \dots + 4y + 4)}$
c_2	$\frac{y(y^2 + 4)^2}{(y^8 - 3y^7 + 19y^6 - 34y^5 + 71y^4 - 66y^3 + 34y^2 - 12y + 1)^2}$ $(y^{16} - 3y^{15} + \dots + 144y + 16)$
c_3, c_4, c_7	$(y - 1)^5(y^{16} - 5y^{15} + \dots - 4y + 1)(y^{16} - 3y^{15} + \dots - 8y + 1)$
c_6	$\frac{y(y^2 - 2y + 2)^2}{(y^8 - 11y^7 + 47y^6 - 98y^5 + 103y^4 - 50y^3 + 6y^2 + 1)^2}$ $(y^{16} - 15y^{15} + \dots - 364y + 100)$
c_8, c_{11}	$(y - 1)^5(y^{16} + 11y^{15} + \dots - 88y + 1)(y^{16} + 29y^{15} + \dots + 4y + 1)$
c_9	$(y - 1)(y^4 - 8y^3 + 18y^2 + 8y + 1)$ $(y^{16} + 15y^{15} + \dots - 846972y + 175561)(y^{16} + 33y^{15} + \dots + 4y + 1)$
c_{10}	$(y - 1)^{17}(y^4 - 8y^3 + 18y^2 + 8y + 1)$ $(y^{16} - 12y^{15} + \dots + 65536y + 65536)$