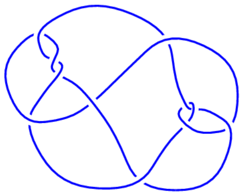
# $11a_{176}$ ($K11a_{176}$)



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**Arc Sequences**

| $\downarrow$ | $\downarrow$ | $\downarrow$ | $\downarrow$ | $\uparrow$ | $\downarrow$ | $\uparrow$ | $\downarrow$ | $\downarrow$ | $\uparrow$ | $\uparrow$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 1 | 10 | 9 | 11 | 2 | 3 | 4 | 5 | 8 | 7 |

**Solving Sequence**

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

**Representation Ideals**

$$I = \bigcap_{i=1}^{2} I_i^u$$

$$I_1^u = \langle u - 1 \rangle$$
$$I_2^u = \langle u^{54} + 2u^{53} + \cdots + u + 1 \rangle$$

There are 2 irreducible components with 55 representations.

[1]The knot diagram image is adapter from "C. Livingston and A. H. Moore, KnotInfo: Table of Knot Invariants, http://www.indiana.edu/ knotinfo"

## I. $I_1^u = \langle u - 1 \rangle$

**(i) Arc colorings**

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

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

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

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

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

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

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

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

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

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

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

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

**(ii) Obstruction class** $= -1$

**(iii) Cusp Shapes =unknown**

**(iv) Complex Volumes and Cusp Shapes**

| Solution to $I_1^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u =$ 1.00000 | −1.64493 | −6.00000 |

## II. $I_2^u = \langle u^{54} + 2u^{53} + \cdots + u + 1 \rangle$

**(i) Arc colorings**

$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_7 = \begin{pmatrix} -u \\ u \end{pmatrix}$$
$$a_1 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} -u^2 + 1 \\ u^4 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} -u^7 + 2u^5 - 2u^3 \\ u^9 - u^7 + u^5 + u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} u^4 - u^2 + 1 \\ -u^4 \end{pmatrix}$$
$$a_5 = \begin{pmatrix} -u^9 + 2u^7 - 3u^5 + 2u^3 - u \\ u^9 - u^7 + u^5 + u \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} -u^{20} + 5u^{18} - 13u^{16} + 20u^{14} - 20u^{12} + 13u^{10} - 7u^8 + 4u^6 - u^4 - u^2 + 1 \\ u^{22} - 4u^{20} + 9u^{18} - 12u^{16} + 12u^{14} - 10u^{12} + 9u^{10} - 6u^8 + 3u^6 - 2u^4 + u^2 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} u^{40} - 9u^{38} + \cdots - 3u^4 + 1 \\ -u^{40} + 8u^{38} + \cdots + 6u^6 - 2u^4 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u^{38} + 9u^{36} + \cdots - 5u^4 + 1 \\ u^{40} - 8u^{38} + \cdots - 6u^6 + 2u^4 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} -u^{38} + 9u^{36} + \cdots - 5u^4 + 1 \\ u^{40} - 8u^{38} + \cdots - 6u^6 + 2u^4 \end{pmatrix}$$

**(ii) Obstruction class** $= -1$

**(iii) Cusp Shapes =unknown**

### (iv) Complex Volumes and Cusp Shapes

| Solution to $I_2^u$ | $\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = -1.103822 - 0.601081I$ | $-2.1336 - 14.1348I$ | $-5.42152 + 9.37737I$ |
| $u = -1.103822 + 0.601081I$ | $-2.1336 + 14.1348I$ | $-5.42152 - 9.37737I$ |
| $u = -1.097975 - 0.388274I$ | $-8.77151 + 0.63321I$ | $-12.03225 + 0.38631I$ |
| $u = -1.097975 + 0.388274I$ | $-8.77151 - 0.63321I$ | $-12.03225 - 0.38631I$ |
| $u = -1.080999 - 0.596600I$ | $1.40844 - 6.51845I$ | $-3.38857 + 4.08750I$ |
| $u = -1.080999 + 0.596600I$ | $1.40844 + 6.51845I$ | $-3.38857 - 4.08750I$ |
| $u = -1.077949 - 0.450954I$ | $-2.75425 - 5.16303I$ | $-6.62576 + 8.31738I$ |
| $u = -1.077949 + 0.450954I$ | $-2.75425 + 5.16303I$ | $-6.62576 - 8.31738I$ |
| $u = -1.073583 - 0.116171I$ | $0.11288 + 3.24680I$ | $-3.97449 - 4.31964I$ |
| $u = -1.073583 + 0.116171I$ | $0.11288 - 3.24680I$ | $-3.97449 + 4.31964I$ |
| $u = -1.064752 - 0.232168I$ | $-7.31911 - 1.48659I$ | $-11.69621 + 1.05685I$ |
| $u = -1.064752 + 0.232168I$ | $-7.31911 + 1.48659I$ | $-11.69621 - 1.05685I$ |
| $u = -1.063550 - 0.603687I$ | $1.70219 - 6.38060I$ | $-2.45012 + 6.07310I$ |
| $u = -1.063550 + 0.603687I$ | $1.70219 + 6.38060I$ | $-2.45012 - 6.07310I$ |
| $u = -1.026963 - 0.612535I$ | $-0.833592 + 0.995204I$ | $-3.58557 + 0.09789I$ |
| $u = -1.026963 + 0.612535I$ | $-0.833592 - 0.995204I$ | $-3.58557 - 0.09789I$ |
| $u = -0.813292 - 0.457492I$ | $1.20313 - 1.95407I$ | $2.79385 + 4.45291I$ |
| $u = -0.813292 + 0.457492I$ | $1.20313 + 1.95407I$ | $2.79385 - 4.45291I$ |
| $u = -0.545423 - 0.733742I$ | $0.59736 - 6.12710I$ | $-1.42529 + 5.10753I$ |
| $u = -0.545423 + 0.733742I$ | $0.59736 + 6.12710I$ | $-1.42529 - 5.10753I$ |
| $u = -0.484808 - 0.741490I$ | $3.41733 + 1.25909I$ | $0.259004 - 1.112987I$ |
| $u = -0.484808 + 0.741490I$ | $3.41733 - 1.25909I$ | $0.259004 + 1.112987I$ |
| $u = -0.453732 - 0.747475I$ | $3.26830 + 1.40826I$ | $-0.268768 + 0.442670I$ |
| $u = -0.453732 + 0.747475I$ | $3.26830 - 1.40826I$ | $-0.268768 - 0.442670I$ |
| $u = -0.417796 - 0.781578I$ | $-0.09729 + 8.92706I$ | $-2.38304 - 5.21667I$ |
| $u = -0.417796 + 0.781578I$ | $-0.09729 - 8.92706I$ | $-2.38304 + 5.21667I$ |
| $u = -0.110946 - 0.513974I$ | $-0.243608 + 1.371008I$ | $-2.52596 - 5.06044I$ |
| $u = -0.110946 + 0.513974I$ | $-0.243608 - 1.371008I$ | $-2.52596 + 5.06044I$ |
| $u = 0.090303 - 0.613474I$ | $-5.56771 - 4.07219I$ | $-6.96248 + 3.87127I$ |
| $u = 0.090303 + 0.613474I$ | $-5.56771 + 4.07219I$ | $-6.96248 - 3.87127I$ |

| | Solution to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|---|
| $u=$ | $0.386339-0.688925I$ | $-3.09355-0.76124I$ | $-4.72747+0.80623I$ |
| $u=$ | $0.386339+0.688925I$ | $-3.09355+0.76124I$ | $-4.72747-0.80623I$ |
| $u=$ | $0.431777-0.772015I$ | $5.12841-5.22917I$ | $2.37428+4.44764I$ |
| $u=$ | $0.431777+0.772015I$ | $5.12841+5.22917I$ | $2.37428-4.44764I$ |
| $u=$ | $0.522597-0.736334I$ | $5.62286+2.45822I$ | $3.43259-3.89075I$ |
| $u=$ | $0.522597+0.736334I$ | $5.62286-2.45822I$ | $3.43259+3.89075I$ |
| $u=$ | $0.632564-0.508807I$ | $-2.32233-0.58829I$ | $-2.37061-0.50602I$ |
| $u=$ | $0.632564+0.508807I$ | $-2.32233+0.58829I$ | $-2.37061+0.50602I$ |
| $u=$ | $0.889638-0.519400I$ | $-3.00640+4.83893I$ | $-3.57705-6.36658I$ |
| $u=$ | $0.889638+0.519400I$ | $-3.00640-4.83893I$ | $-3.57705+6.36658I$ |
| $u=$ | $0.966367-0.158023I$ | $-1.48527+0.15164I$ | $-7.75648-0.91671I$ |
| $u=$ | $0.966367+0.158023I$ | $-1.48527-0.15164I$ | $-7.75648+0.91671I$ |
| $u=$ | $1.042307-0.608486I$ | $4.07878+2.66694I$ | $1.14279-1.40015I$ |
| $u=$ | $1.042307+0.608486I$ | $4.07878-2.66694I$ | $1.14279+1.40015I$ |
| $u=$ | $1.062023-0.405530I$ | $-3.08098+1.83888I$ | $-8.29710-0.16550I$ |
| $u=$ | $1.062023+0.405530I$ | $-3.08098-1.83888I$ | $-8.29710+0.16550I$ |
| $u=$ | $1.089611-0.565989I$ | $-5.12761+5.61169I$ | $-8.17583-5.02124I$ |
| $u=$ | $1.089611+0.565989I$ | $-5.12761-5.61169I$ | $-8.17583+5.02124I$ |
| $u=$ | $1.095684-0.601552I$ | $3.15875+10.41643I$ | $-0.77334-8.79469I$ |
| $u=$ | $1.095684+0.601552I$ | $3.15875-10.41643I$ | $-0.77334+8.79469I$ |
| $u=$ | $1.101111-0.130732I$ | $-5.13575-6.76281I$ | $-8.82931+4.64431I$ |
| $u=$ | $1.101111+0.130732I$ | $-5.13575+6.76281I$ | $-8.82931-4.64431I$ |
| $u=$ | $1.105269-0.453209I$ | $-8.33472+8.06621I$ | $-10.75532-7.48177I$ |
| $u=$ | $1.105269+0.453209I$ | $-8.33472-8.06621I$ | $-10.75532+7.48177I$ |

## III. u-Polynomials

| Crossings | u-Polynomials at each crossings |
|---|---|
| $c_1, c_6$ | $(u-1)(u^{54}+2u^{53}+\cdots+u+1)$ |
| $c_2$ | $(u+1)(u^{54}+24u^{53}+\cdots-u+1)$ |
| $c_3$ | $(u)(u^{54}+3u^{53}+\cdots+13u+5)$ |
| $c_4$ | $(u-1)(u^{54}+2u^{53}+\cdots-u+1)$ |
| $c_5, c_7$ | $(u+1)(u^{54}-20u^{52}+\cdots-23u+1)$ |
| $c_8, c_9$ | $(u-1)(u^{54}+2u^{53}+\cdots-u+1)$ |
| $c_{10}$ | $(u+1)(u^{54}+12u^{53}+\cdots+297u+23)$ |
| $c_{11}$ | $(u)(u^{54}+3u^{53}+\cdots-11u+5)$ |

## IV. Riley Polynomials

| Crossings | Riley Polynomials at each crossings |
|---|---|
| $c_1, c_6$ | $(y-1)(y^{54} - 24y^{53} + \cdots + y + 1)$ |
| $c_2$ | $(y-1)(y^{54} + 12y^{53} + \cdots - 11y + 1)$ |
| $c_3$ | $(y)(y^{54} + 3y^{53} + \cdots - 269y + 25)$ |
| $c_4$ | $(y-1)(y^{54} - 48y^{53} + \cdots + y + 1)$ |
| $c_5, c_7$ | $(y-1)(y^{54} - 40y^{53} + \cdots - 207y + 1)$ |
| $c_8, c_9$ | $(y-1)(y^{54} - 48y^{53} + \cdots + y + 1)$ |
| $c_{10}$ | $(y-1)(y^{54} + 8y^{53} + \cdots + 11749y + 529)$ |
| $c_{11}$ | $(y)(y^{54} + 3y^{53} + \cdots + 1139y + 25)$ |