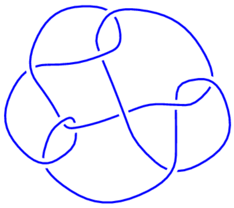
10_{73} $(K10a_3)$



[1]

Arc Sequences

$\rightarrow \uparrow 8 \rightarrow \uparrow 4 \rightarrow \uparrow 7 \rightarrow \downarrow 6 \rightarrow \uparrow 9 \rightarrow \uparrow 3 \rightarrow \downarrow 10 \rightarrow \uparrow 1 \rightarrow \uparrow 5 \rightarrow \downarrow 2 \rightarrow$

Solving Sequence

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

Representation Ideals

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

$$I_1^u = \langle u^2 + u + 1,\ a,\ b - u - 1\rangle$$
$$I_2^u = \langle u^{43} - 2u^{42} + \cdots - 813228u - 428849,$$
$$- 1.84827 \times 10^{177}u^{42} + 3.54553 \times 10^{177}u^{41} + \cdots + 2.81801 \times 10^{183}b + 2.62854 \times 10^{183},$$
$$1.01497 \times 10^{183}u^{42} - 1.38738 \times 10^{183}u^{41} + \cdots + 1.20850 \times 10^{189}a + 4.85011 \times 10^{188}\rangle$$

There are 2 irreducible components with 45 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. $I_1^u = \langle u^2 + u + 1,\ a,\ b - u - 1 \rangle$

(i) Arc colorings

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

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u + 7$

(iv) Complex Volumes and Cusp Shapes

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.500000 - 0.866025I$ $a = 0$ $b = 0.500000 - 0.866025I$	$1.64493 - 2.02988I$	$9.00000 + 3.46410I$
$u = -0.500000 + 0.866025I$ $a = 0$ $b = 0.500000 + 0.866025I$	$1.64493 + 2.02988I$	$9.00000 - 3.46410I$

II. $\boldsymbol{I_2^u = \langle u^{43} - 2u^{42} + \cdots - 813228u - 428849,\ -1.85 \times 10^{177}u^{42} + 3.55 \times 10^{177}u^{41} + \cdots + 2.82 \times 10^{183}b + 2.63 \times 10^{183},\ 1.01 \times 10^{183}u^{42} - 1.39 \times 10^{183}u^{41} + \cdots + 1.21 \times 10^{189}a + 4.85 \times 10^{188}\rangle}$

(i) Arc colorings

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

$$a_9 = \begin{pmatrix} -8.39862 \times 10^{-7}u^{42} + 1.14802 \times 10^{-6}u^{41} + \cdots + 4.12519u - 0.401332 \\ 6.55877 \times 10^{-7}u^{42} - 1.25817 \times 10^{-6}u^{41} + \cdots - 0.0602907u - 0.932762 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 3.42650 \times 10^{-6}u^{42} - 8.55461 \times 10^{-6}u^{41} + \cdots + 0.272303u - 3.05978 \\ -5.08591 \times 10^{-7}u^{42} + 1.18280 \times 10^{-6}u^{41} + \cdots + 0.173485u - 0.658325 \end{pmatrix}$$

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

$$a_4 = \begin{pmatrix} 3.42650 \times 10^{-6}u^{42} - 8.55461 \times 10^{-6}u^{41} + \cdots + 0.272303u - 3.05978 \\ -2.47916 \times 10^{-7}u^{42} + 1.82649 \times 10^{-6}u^{41} + \cdots + 0.0878404u + 0.0714126 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -1.49574 \times 10^{-6}u^{42} + 2.40618 \times 10^{-6}u^{41} + \cdots + 4.18548u + 0.531430 \\ 6.55877 \times 10^{-7}u^{42} - 1.25817 \times 10^{-6}u^{41} + \cdots - 0.0602907u - 0.932762 \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -1.75068 \times 10^{-6}u^{42} + 4.46313 \times 10^{-6}u^{41} + \cdots + 4.88064u + 2.28131 \\ 2.15587 \times 10^{-7}u^{42} - 1.90153 \times 10^{-6}u^{41} + \cdots - 0.773917u - 0.859439 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 7.64872 \times 10^{-7}u^{42} + 1.92098 \times 10^{-7}u^{41} + \cdots - 0.477426u + 2.82741 \\ -1.29802 \times 10^{-6}u^{42} + 1.65398 \times 10^{-6}u^{41} + \cdots + 0.202287u + 0.389904 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 1.38224 \times 10^{-6}u^{42} - 2.34990 \times 10^{-6}u^{41} + \cdots - 1.27253u + 0.0115168 \\ -1.30454 \times 10^{-6}u^{42} + 5.62307 \times 10^{-6}u^{41} + \cdots + 2.55131u + 1.14135 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} -1.22292 \times 10^{-6}u^{42} + 2.14658 \times 10^{-6}u^{41} + \cdots + 3.72108u - 0.539713 \\ 1.65165 \times 10^{-6}u^{42} - 3.21778 \times 10^{-6}u^{41} + \cdots - 0.0247512u - 0.828118 \end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= 5.27521 \times 10^{-6}u^{42} - 6.13996 \times 10^{-6}u^{41} + \cdots + 20.1634u + 8.06372$

(iv) Complex Volumes and Cusp Shapes

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -2.46900 - 1.69305I$ $a = -0.337297 - 0.122501I$ $b = -0.575309 - 1.058390I$	$3.01994 + 4.67918I$	$5.76826 - 5.37573I$
$u = -2.46900 + 1.69305I$ $a = -0.337297 + 0.122501I$ $b = -0.575309 + 1.058390I$	$3.01994 - 4.67918I$	$5.76826 + 5.37573I$
$u = -2.10660 - 2.00006I$ $a = -0.447208 - 0.093231I$ $b = -0.601993 - 1.118180I$	$1.20075 + 13.70688I$	$4.19916 - 9.59104I$
$u = -2.10660 + 2.00006I$ $a = -0.447208 + 0.093231I$ $b = -0.601993 + 1.118180I$	$1.20075 - 13.70688I$	$4.19916 + 9.59104I$
$u = -1.32163 - 0.54322I$ $a = -0.310980 - 0.756503I$ $b = -0.387382 - 1.127209I$	$-5.79250 + 1.33127I$	$-3.13829 - 0.68119I$
$u = -1.32163 + 0.54322I$ $a = -0.310980 + 0.756503I$ $b = -0.387382 + 1.127209I$	$-5.79250 - 1.33127I$	$-3.13829 + 0.68119I$
$u = -1.285980 - 0.101845I$ $a = -0.419648 + 0.795768I$ $b = -0.741153 - 0.370848I$	$0.47003 - 3.49797I$	$3.95877 + 2.64358I$
$u = -1.285980 + 0.101845I$ $a = -0.419648 - 0.795768I$ $b = -0.741153 + 0.370848I$	$0.47003 + 3.49797I$	$3.95877 - 2.64358I$
$u = -1.184050 - 0.161274I$ $a = 0.691328 + 0.314202I$ $b = 0.542683 - 1.025157I$	$-0.03125 - 3.16118I$	$2.63487 + 2.30647I$
$u = -1.184050 + 0.161274I$ $a = 0.691328 - 0.314202I$ $b = 0.542683 + 1.025157I$	$-0.03125 + 3.16118I$	$2.63487 - 2.30647I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.11260 - 1.21594I$ $a = 0.661545 - 0.115919I$ $b = 0.715981 + 0.431256I$	$4.51030 - 2.45703I$	$9.07720 + 1.39524I$
$u = -1.11260 + 1.21594I$ $a = 0.661545 + 0.115919I$ $b = 0.715981 - 0.431256I$	$4.51030 + 2.45703I$	$9.07720 - 1.39524I$
$u = -0.910693 - 0.395059I$ $a = 0.771742 - 0.308859I$ $b = 0.390925 + 1.008159I$	$-1.01538 + 2.84865I$	$1.39768 - 5.43636I$
$u = -0.910693 + 0.395059I$ $a = 0.771742 + 0.308859I$ $b = 0.390925 - 1.008159I$	$-1.01538 - 2.84865I$	$1.39768 + 5.43636I$
$u = -0.853749 - 0.276293I$ $a = 0.827133 + 0.957205I$ $b = -0.215715 + 1.099420I$	$-4.05606 + 1.05891I$	$-2.88403 - 0.52575I$
$u = -0.853749 + 0.276293I$ $a = 0.827133 - 0.957205I$ $b = -0.215715 - 1.099420I$	$-4.05606 - 1.05891I$	$-2.88403 + 0.52575I$
$u = -0.66871 - 1.56454I$ $a = 0.646193 - 0.155375I$ $b = 0.747352 + 0.586475I$	$4.38701 + 5.48645I$	$8.10083 - 6.46210I$
$u = -0.66871 + 1.56454I$ $a = 0.646193 + 0.155375I$ $b = 0.747352 - 0.586475I$	$4.38701 - 5.48645I$	$8.10083 + 6.46210I$
$u = -0.256133 - 0.265897I$ $a = -2.32465 - 1.73338I$ $b = -0.681741 + 0.083180I$	$-2.37041 + 2.31340I$	$1.61332 - 3.65794I$
$u = -0.256133 + 0.265897I$ $a = -2.32465 + 1.73338I$ $b = -0.681741 - 0.083180I$	$-2.37041 - 2.31340I$	$1.61332 + 3.65794I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.240553-0.844312I$ $a=\ 0.680250+0.232643I$ $b=\ 0.596530-0.827151I$	$0.77235-2.35753I$	$-0.15632+5.03988I$
$u=-0.240553+0.844312I$ $a=\ 0.680250-0.232643I$ $b=\ 0.596530+0.827151I$	$0.77235+2.35753I$	$-0.15632-5.03988I$
$u=\ 0.615981-0.402857I$ $a=\ 1.51435-0.75559I$ $b=-0.143682-1.140140I$	$-1.77735-6.01104I$	$0.69539+4.92263I$
$u=\ 0.615981+0.402857I$ $a=\ 1.51435+0.75559I$ $b=-0.143682+1.140140I$	$-1.77735+6.01104I$	$0.69539-4.92263I$
$u=\ 0.681038-1.147552I$ $a=\ 0.679458+0.150367I$ $b=\ 0.628968-0.548411I$	$1.39154-1.44262I$	$5.16219+3.23191I$
$u=\ 0.681038+1.147552I$ $a=\ 0.679458-0.150367I$ $b=\ 0.628968+0.548411I$	$1.39154+1.44262I$	$5.16219-3.23191I$
$u=\ 0.687842$ $a=\ 0.814629$ $b=\ 0.288084$	1.12210	9.24310
$u=\ 0.747798-0.679944I$ $a=\ 0.887589+0.242888I$ $b=\ 0.203817-0.989913I$	$0.117899+0.694763I$	$2.77512-0.93635I$
$u=\ 0.747798+0.679944I$ $a=\ 0.887589-0.242888I$ $b=\ 0.203817+0.989913I$	$0.117899-0.694763I$	$2.77512+0.93635I$
$u=\ 1.27844-0.69829I$ $a=\ 0.652957-0.295083I$ $b=\ 0.637521+1.003990I$	$3.14686-0.23394I$	$6.25545+1.76917I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.27844 + 0.69829I$ $a = 0.652957 + 0.295083I$ $b = 0.637521 - 1.003990I$	$3.14686 + 0.23394I$	$6.25545 - 1.76917I$
$u = 1.41578 - 0.62996I$ $a = -0.202646 - 0.648849I$ $b = -0.690536 + 0.475151I$	$4.74199 - 0.21154I$	$9.28481 - 0.17095I$
$u = 1.41578 + 0.62996I$ $a = -0.202646 + 0.648849I$ $b = -0.690536 - 0.475151I$	$4.74199 + 0.21154I$	$9.28481 + 0.17095I$
$u = 1.53782 - 0.20171I$ $a = 0.667457 - 0.335796I$ $b = 0.579031 + 1.081309I$	$2.59778 + 7.42216I$	$5.67783 - 6.16302I$
$u = 1.53782 + 0.20171I$ $a = 0.667457 + 0.335796I$ $b = 0.579031 - 1.081309I$	$2.59778 - 7.42216I$	$5.67783 + 6.16302I$
$u = 1.54252 - 0.98582I$ $a = -0.446132 + 0.482540I$ $b = -0.453094 + 1.132700I$	$-5.34910 - 6.48185I$	$-1.72488 + 7.04551I$
$u = 1.54252 + 0.98582I$ $a = -0.446132 - 0.482540I$ $b = -0.453094 - 1.132700I$	$-5.34910 + 6.48185I$	$-1.72488 - 7.04551I$
$u = 1.55503 - 0.95753I$ $a = 0.312269 - 0.251934I$ $b = -0.318461 - 0.921798I$	$0.86535 + 1.34877I$	$0.663414 + 0.523198I$
$u = 1.55503 + 0.95753I$ $a = 0.312269 + 0.251934I$ $b = -0.318461 + 0.921798I$	$0.86535 - 1.34877I$	$0.663414 - 0.523198I$
$u = 1.58686 - 0.02734I$ $a = -0.473709 + 0.651623I$ $b = -0.803415 - 0.397346I$	$3.34693 - 8.44363I$	$7.15486 + 5.72675I$

Solution to I_2^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.58686 + 0.02734I$ $a = -0.473709 - 0.651623I$ $b = -0.803415 + 0.397346I$	$3.34693 + 8.44363I$	$7.15486 - 5.72675I$
$u = 2.10452 - 1.78712I$ $a = -0.427447 + 0.142465I$ $b = -0.574370 + 1.108323I$	$-1.69061 - 8.49752I$	$0.86281 + 6.51033I$
$u = 2.10452 + 1.78712I$ $a = -0.427447 - 0.142465I$ $b = -0.574370 - 1.108323I$	$-1.69061 + 8.49752I$	$0.86281 - 6.51033I$

III. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1, c_8	$(u^2 - u + 1)(u^{43} + 2u^{42} + \cdots + 4u^2 - 1)$
c_2	$(u - 1)^2(u^{43} + 23u^{42} + \cdots + 3u + 1)$
c_3, c_6	$(u + 1)^2(u^{43} + 3u^{42} + \cdots - 3u - 1)$
c_4	$u^2(u^{43} + 15u^{42} + \cdots - 136u - 16)$
c_5, c_9	$u^2(u^{43} + u^{42} + \cdots + 8u + 4)$
c_7	$(u^2 - u + 1)(u^{43} + 2u^{42} + \cdots + 54u + 9)$
c_{10}	$(u^2 + u + 1)(u^{43} + 20u^{42} + \cdots + 8u - 1)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_8	$(y^2+y+1)(y^{43}+20y^{42}+\cdots+8y-1)$
c_2	$(y-1)^2(y^{43}-3y^{42}+\cdots+23y-1)$
c_3, c_6	$(y-1)^2(y^{43}-23y^{42}+\cdots+3y-1)$
c_4	$y^2(y^{43}+23y^{42}+\cdots+4128y-256)$
c_5, c_9	$y^2(y^{43}+15y^{42}+\cdots-136y-16)$
c_7	$(y^2+y+1)(y^{43}-4y^{42}+\cdots+2520y-81)$
c_{10}	$(y^2+y+1)(y^{43}+8y^{42}+\cdots+140y-1)$