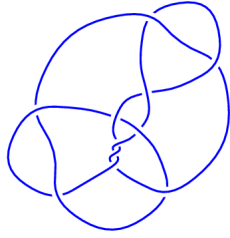
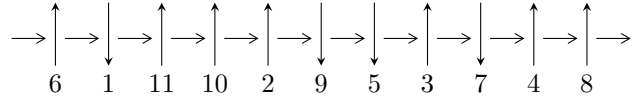


11a₁₅₂ (K11a₁₅₂)

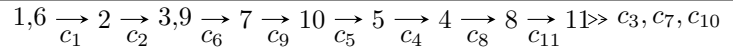


1

Arc Sequences



Solving Sequence



Representation Ideals

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

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

$$I_2^u = \langle u^{59} + 2u^{58} + \dots + 2u + 1, -6.26201 \times 10^{46}u^{58} - 2.20250 \times 10^{46}u^{57} + \dots + 1.46597 \times 10^{47}b - 4.15403 \times 10^{47} \\ - 1.24691 \times 10^{47}u^{58} - 2.95521 \times 10^{47}u^{57} + \dots + 1.95463 \times 10^{47}a - 2.41334 \times 10^{47} \rangle$$

There are 2 irreducible components with 60 representations.

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

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

(i) Arc colorings

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

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

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

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

$$a_9 = \begin{pmatrix} 1 \\ -\frac{1}{3} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 1 \\ -\frac{4}{3} \end{pmatrix}$$

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

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

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

$$a_8 = \begin{pmatrix} \frac{1}{3} \\ 0 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

(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 |
|---------------------|---------------------------------------|------------|
| $u = -1.00000$ | | |
| $a = 1.00000$ | 0 | -7.11111 |
| $b = -0.333333$ | | |

$$\text{II. } I_2^u = \langle u^{59} + 2u^{58} + \dots + 2u + 1, -6.26 \times 10^{46} u^{58} - 2.20 \times 10^{46} u^{57} + \dots + 1.47 \times 10^{47} b - 4.15 \times 10^{46}, -1.25 \times 10^{47} u^{58} - 2.96 \times 10^{47} u^{57} + \dots + 1.95 \times 10^{47} a - 2.41 \times 10^{47} \rangle$$

(i) Arc colorings

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

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

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

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

$$a_9 = \begin{pmatrix} 0.637930u^{58} + 1.51190u^{57} + \dots + 2.39473u + 1.23468 \\ 0.427158u^{58} + 0.150242u^{57} + \dots + 2.42536u + 0.283364 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0.430739u^{58} + 1.19057u^{57} + \dots + 0.228063u + 0.805821 \\ 0.606150u^{58} + 0.450809u^{57} + \dots + 3.53454u + 0.634736 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 0.716693u^{58} + 1.10334u^{57} + \dots + 4.46995u + 1.45001 \\ -0.477190u^{58} - 0.773083u^{57} + \dots - 1.18568u - 0.968726 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u \\ u^3 + u \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -1.29085u^{58} - 2.20647u^{57} + \dots - 0.324259u - 2.41081 \\ 0.375240u^{58} + 1.02106u^{57} + \dots + 0.170898u + 1.29085 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 0.539708u^{58} + 0.734598u^{57} + \dots + 0.368500u + 0.439466 \\ 0.167631u^{58} + 0.255872u^{57} + \dots + 2.15526u + 0.327184 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0.968726u^{58} + 1.46026u^{57} + \dots - 0.180023u + 0.751771 \\ -0.330049u^{58} - 0.528342u^{57} + \dots + 0.0166251u - 0.716693 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} 0.968726u^{58} + 1.46026u^{57} + \dots - 0.180023u + 0.751771 \\ -0.330049u^{58} - 0.528342u^{57} + \dots + 0.0166251u - 0.716693 \end{pmatrix}$$

(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 |
|-----------------------------|---------------------------------------|-----------------------|
| $u = -1.082860 - 0.338807I$ | | |
| $a = -0.906512 + 0.162772I$ | $0.196305 - 0.379080I$ | $0.28717 + 12.84558I$ |
| $b = 0.410355 + 0.292248I$ | | |
| $u = -1.082860 + 0.338807I$ | | |
| $a = -0.906512 - 0.162772I$ | $0.196305 + 0.379080I$ | $0.28717 - 12.84558I$ |
| $b = 0.410355 - 0.292248I$ | | |
| $u = -0.916030 - 0.448271I$ | | |
| $a = -1.44781 + 0.14196I$ | $-8.11873 - 9.85959I$ | $-0.63253 + 4.74202I$ |
| $b = 0.604847 + 1.129777I$ | | |
| $u = -0.916030 + 0.448271I$ | | |
| $a = -1.44781 - 0.14196I$ | $-8.11873 + 9.85959I$ | $-0.63253 - 4.74202I$ |
| $b = 0.604847 - 1.129777I$ | | |
| $u = -0.726401 - 0.692652I$ | | |
| $a = -0.017304 + 0.588654I$ | $1.67726 + 2.08783I$ | $6.30981 - 5.41216I$ |
| $b = 0.408232 - 0.720581I$ | | |
| $u = -0.726401 + 0.692652I$ | | |
| $a = -0.017304 - 0.588654I$ | $1.67726 - 2.08783I$ | $6.30981 + 5.41216I$ |
| $b = 0.408232 + 0.720581I$ | | |
| $u = -0.681416 - 0.490122I$ | | |
| $a = 0.829686 + 1.110163I$ | $-3.60110 - 3.99693I$ | $1.95911 + 2.96828I$ |
| $b = 0.32573 - 1.58972I$ | | |
| $u = -0.681416 + 0.490122I$ | | |
| $a = 0.829686 - 1.110163I$ | $-3.60110 + 3.99693I$ | $1.95911 - 2.96828I$ |
| $b = 0.32573 + 1.58972I$ | | |
| $u = -0.660290 - 1.139698I$ | | |
| $a = -0.180974 + 1.181926I$ | $-10.2296 + 15.6414I$ | $-2.78860 - 8.37827I$ |
| $b = 1.98520 - 1.61428I$ | | |
| $u = -0.660290 + 1.139698I$ | | |
| $a = -0.180974 - 1.181926I$ | $-10.2296 - 15.6414I$ | $-2.78860 + 8.37827I$ |
| $b = 1.98520 + 1.61428I$ | | |

| Solution to I_2^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---------------------------------------|-----------------------|
| $u = -0.651495 - 1.183980I$ $a = -0.228656 + 0.883493I$ $b = 1.29907 - 1.22571I$ | $-2.42227 + 6.38133I$ | $-0.90046 - 6.42822I$ |
| $u = -0.651495 + 1.183980I$ $a = -0.228656 - 0.883493I$ $b = 1.29907 + 1.22571I$ | $-2.42227 - 6.38133I$ | $-0.90046 + 6.42822I$ |
| $u = -0.621334 - 0.967374I$ $a = -0.444058 - 0.164780I$ $b = -0.469674 + 0.492578I$ | $0.82881 + 3.06030I$ | $4.18689 - 0.59937I$ |
| $u = -0.621334 + 0.967374I$ $a = -0.444058 + 0.164780I$ $b = -0.469674 - 0.492578I$ | $0.82881 - 3.06030I$ | $4.18689 + 0.59937I$ |
| $u = -0.589725 - 1.049109I$ $a = -0.974147 - 0.647305I$ $b = -0.65027 + 1.78415I$ | $-5.23405 + 8.92854I$ | $-1.43763 - 7.89156I$ |
| $u = -0.589725 + 1.049109I$ $a = -0.974147 + 0.647305I$ $b = -0.65027 - 1.78415I$ | $-5.23405 - 8.92854I$ | $-1.43763 + 7.89156I$ |
| $u = -0.508309$ $a = -0.519601$ $b = -0.347878$ | 0.892681 | 11.5980 |
| $u = -0.478198 - 1.043560I$ $a = -0.13176 - 1.56616I$ $b = -1.88671 + 1.47624I$ | $-10.18439 + 5.57197I$ | $-6.62529 - 6.49533I$ |
| $u = -0.478198 + 1.043560I$ $a = -0.13176 + 1.56616I$ $b = -1.88671 - 1.47624I$ | $-10.18439 - 5.57197I$ | $-6.62529 + 6.49533I$ |
| $u = -0.477142 - 0.939669I$ $a = 0.337722 - 0.975082I$ $b = -1.72819 + 2.62260I$ | $-2.01075 + 2.52108I$ | $10.02369 + 7.46616I$ |

| Solution to I_2^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|---|---------------------------------------|-----------------------|
| $u = -0.477142 + 0.939669I$ $a = 0.337722 + 0.975082I$ $b = -1.72819 - 2.62260I$ | $-2.01075 - 2.52108I$ | $10.02369 - 7.46616I$ |
| $u = -0.475233 - 0.194305I$ $a = 2.80927 + 0.02365I$ $b = -1.034361 - 0.874193I$ | $-8.07186 - 1.71448I$ | $-1.95195 + 1.33766I$ |
| $u = -0.475233 + 0.194305I$ $a = 2.80927 - 0.02365I$ $b = -1.034361 + 0.874193I$ | $-8.07186 + 1.71448I$ | $-1.95195 - 1.33766I$ |
| $u = -0.388284 - 0.766748I$ $a = 0.593509 - 0.729702I$ $b = 0.676086 - 1.196484I$ | $-1.34852 + 1.21434I$ | $-0.61490 - 9.36280I$ |
| $u = -0.388284 + 0.766748I$ $a = 0.593509 + 0.729702I$ $b = 0.676086 + 1.196484I$ | $-1.34852 - 1.21434I$ | $-0.61490 + 9.36280I$ |
| $u = -0.355783 - 1.016215I$ $a = 0.88013 - 1.46882I$ $b = -1.187677 + 0.225533I$ | $-10.99429 + 0.93911I$ | $-8.32737 - 1.66782I$ |
| $u = -0.355783 + 1.016215I$ $a = 0.88013 + 1.46882I$ $b = -1.187677 - 0.225533I$ | $-10.99429 - 0.93911I$ | $-8.32737 + 1.66782I$ |
| $u = -0.140005 - 0.951679I$ $a = 1.145599 - 0.505541I$ $b = -0.173571 - 0.842681I$ | $-7.99699 - 2.70852I$ | $-5.70787 + 2.68790I$ |
| $u = -0.140005 + 0.951679I$ $a = 1.145599 + 0.505541I$ $b = -0.173571 + 0.842681I$ | $-7.99699 + 2.70852I$ | $-5.70787 - 2.68790I$ |
| $u = -0.037114 - 1.274150I$ $a = -0.291840 + 1.134420I$ $b = -0.036185 - 0.899498I$ | $-14.4364 - 7.1649I$ | $-6.56375 + 4.09710I$ |

| Solution to I_2^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|-----------------------------|---------------------------------------|-----------------------|
| $u = -0.037114 + 1.274150I$ | | |
| $a = -0.291840 - 1.134420I$ | $-14.4364 + 7.1649I$ | $-6.56375 - 4.09710I$ |
| $b = -0.036185 + 0.899498I$ | | |
| $u = 0.040795 - 1.321705I$ | | |
| $a = 0.138951 + 0.966975I$ | $-7.08101 + 2.98588I$ | $-6.30890 - 4.69732I$ |
| $b = 0.003188 - 0.903134I$ | | |
| $u = 0.040795 + 1.321705I$ | | |
| $a = 0.138951 - 0.966975I$ | $-7.08101 - 2.98588I$ | $-6.30890 + 4.69732I$ |
| $b = 0.003188 + 0.903134I$ | | |
| $u = 0.151816 - 0.796485I$ | | |
| $a = -0.805238 - 0.598449I$ | $-1.79094 + 1.03849I$ | $-2.00439 - 5.37844I$ |
| $b = -0.041011 - 0.762641I$ | | |
| $u = 0.151816 + 0.796485I$ | | |
| $a = -0.805238 + 0.598449I$ | $-1.79094 - 1.03849I$ | $-2.00439 + 5.37844I$ |
| $b = -0.041011 + 0.762641I$ | | |
| $u = 0.290588 - 0.280288I$ | | |
| $a = -2.24336 - 1.08501I$ | $-1.71907 + 0.84714I$ | $-1.58416 - 2.44825I$ |
| $b = 0.429081 - 0.681749I$ | | |
| $u = 0.290588 + 0.280288I$ | | |
| $a = -2.24336 + 1.08501I$ | $-1.71907 - 0.84714I$ | $-1.58416 + 2.44825I$ |
| $b = 0.429081 + 0.681749I$ | | |
| $u = 0.377745 - 0.961338I$ | | |
| $a = -0.689591 - 1.203527I$ | $-4.10264 - 1.33087I$ | $-6.62416 + 1.43922I$ |
| $b = 0.581606 + 0.701387I$ | | |
| $u = 0.377745 + 0.961338I$ | | |
| $a = -0.689591 + 1.203527I$ | $-4.10264 + 1.33087I$ | $-6.62416 - 1.43922I$ |
| $b = 0.581606 - 0.701387I$ | | |
| $u = 0.487336 - 1.005408I$ | | |
| $a = 0.004403 - 1.224492I$ | $-3.33182 - 4.55345I$ | $-4.30626 + 8.52736I$ |
| $b = 1.72407 + 1.50482I$ | | |

| Solution to I_2^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|--|---------------------------------------|-----------------------|
| $u = 0.487336 + 1.005408I$ $a = 0.004403 + 1.224492I$ $b = 1.72407 - 1.50482I$ | $-3.33182 + 4.55345I$ | $-4.30626 - 8.52736I$ |
| $u = 0.514327 - 0.820334I$ $a = -0.503213 - 0.897141I$ $b = 0.32237 - 7.16447I$ | $-6.55441 - 2.12552I$ | $-3.0626 - 37.0838I$ |
| $u = 0.514327 + 0.820334I$ $a = -0.503213 + 0.897141I$ $b = 0.32237 + 7.16447I$ | $-6.55441 + 2.12552I$ | $-3.0626 + 37.0838I$ |
| $u = 0.535245 - 0.944857I$ $a = -0.149141 - 0.084466I$ $b = 1.22863 - 1.06063I$ | $-5.12435 - 1.84537I$ | $-0.81905 + 3.28443I$ |
| $u = 0.535245 + 0.944857I$ $a = -0.149141 + 0.084466I$ $b = 1.22863 + 1.06063I$ | $-5.12435 + 1.84537I$ | $-0.81905 - 3.28443I$ |
| $u = 0.547708 - 0.428908I$ $a = 0.511741 - 0.559115I$ $b = 0.911747 - 0.087367I$ | $-3.80970 - 2.30389I$ | $3.16410 + 2.52287I$ |
| $u = 0.547708 + 0.428908I$ $a = 0.511741 + 0.559115I$ $b = 0.911747 + 0.087367I$ | $-3.80970 + 2.30389I$ | $3.16410 - 2.52287I$ |
| $u = 0.604291 - 1.022451I$ $a = 0.761616 - 0.425218I$ $b = 0.527627 + 1.286857I$ | $1.09865 - 6.46666I$ | $3.55713 + 8.78536I$ |
| $u = 0.604291 + 1.022451I$ $a = 0.761616 + 0.425218I$ $b = 0.527627 - 1.286857I$ | $1.09865 + 6.46666I$ | $3.55713 - 8.78536I$ |
| $u = 0.652394 - 1.151720I$ $a = 0.171724 + 1.049555I$ $b = -1.65616 - 1.52205I$ | $-2.98475 - 11.82366I$ | $-0.27767 + 9.15160I$ |

| Solution to I_2^u | $\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$ | Cusp shape |
|--|---------------------------------------|-----------------------|
| $u = 0.652394 + 1.151720I$ $a = 0.171724 - 1.049555I$ $b = -1.65616 + 1.52205I$ | $-2.98475 + 11.82366I$ | $-0.27767 - 9.15160I$ |
| $u = 0.686392 - 0.567950I$ $a = -0.444098 + 0.856911I$ $b = -0.409774 - 1.220146I$ | $2.45484 + 1.46486I$ | $7.14865 - 3.00711I$ |
| $u = 0.686392 + 0.567950I$ $a = -0.444098 - 0.856911I$ $b = -0.409774 + 1.220146I$ | $2.45484 - 1.46486I$ | $7.14865 + 3.00711I$ |
| $u = 0.731272 - 1.183572I$ $a = 0.471808 + 0.751737I$ $b = -1.257678 - 0.503242I$ | $-9.14972 - 1.51752I$ | $-8.98073 + 1.05717I$ |
| $u = 0.731272 + 1.183572I$ $a = 0.471808 - 0.751737I$ $b = -1.257678 + 0.503242I$ | $-9.14972 + 1.51752I$ | $-8.98073 - 1.05717I$ |
| $u = 0.929365 - 0.411469I$ $a = 1.249047 + 0.094882I$ $b = -0.418963 + 0.848799I$ | $-0.73398 + 6.05254I$ | $2.05891 - 6.25817I$ |
| $u = 0.929365 + 0.411469I$ $a = 1.249047 - 0.094882I$ $b = -0.418963 - 0.848799I$ | $-0.73398 - 6.05254I$ | $2.05891 + 6.25817I$ |
| $u = 0.986191 - 0.582632I$ $a = 0.812298 + 0.680937I$ $b = -0.980334 + 0.009595I$ | $-7.26563 - 4.89851I$ | $-3.75396 + 7.31193I$ |
| $u = 0.986191 + 0.582632I$ $a = 0.812298 - 0.680937I$ $b = -0.980334 - 0.009595I$ | $-7.26563 + 4.89851I$ | $-3.75396 - 7.31193I$ |

III. u-Polynomials

| Crossings | u-Polynomials at each crossings |
|------------|--|
| c_1 | $(u + 1)(u^{59} + 2u^{58} + \dots + 2u + 1)$ |
| c_2 | $(u - 1)(u^{59} + 24u^{58} + \dots - 4u - 1)$ |
| c_3, c_4 | $(u - 1)(u^{59} + 2u^{58} + \dots - 2u - 1)$ |
| c_5 | $(u - 1)(u^{59} + 2u^{58} + \dots + 2u + 1)$ |
| c_6 | $(u - 1)(u^{59} + 2u^{58} + \dots - 32u + 9)$ |
| c_7 | $(3u + 2)(3u^{59} + 29u^{58} + \dots + 96336u - 7216)$ |
| c_8 | $(3u + 1)(3u^{59} + 44u^{58} + \dots - 96u + 64)$ |
| c_9 | $(u + 1)(u^{59} + 2u^{58} + \dots - 32u + 9)$ |
| c_{10} | $(u + 1)(u^{59} + 2u^{58} + \dots - 2u - 1)$ |
| c_{11} | $(u)(u^{59} + 5u^{58} + \dots + 108u + 18)$ |

IV. Riley Polynomials

| Crossings | Riley Polynomials at each crossings |
|--------------------|---|
| c_1, c_5 | $(y - 1)(y^{59} + 24y^{58} + \dots - 4y - 1)$ |
| c_2 | $(y - 1)(y^{59} + 16y^{58} + \dots - 76y - 1)$ |
| c_3, c_4, c_{10} | $(y - 1)(y^{59} + 60y^{58} + \dots - 4y - 1)$ |
| c_6, c_9 | $(y - 1)(y^{59} - 44y^{58} + \dots + 3472y - 81)$ |
| c_7 | $(9y - 4)(9y^{59} - 787y^{58} + \dots + 4.57874 \times 10^9 y - 5.20707 \times 10^7)$ |
| c_8 | $(9y - 1)(9y^{59} - 424y^{58} + \dots - 148480y - 4096)$ |
| c_{11} | $(y)(y^{59} + 9y^{58} + \dots - 6300y - 324)$ |