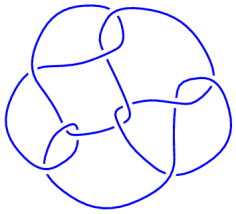
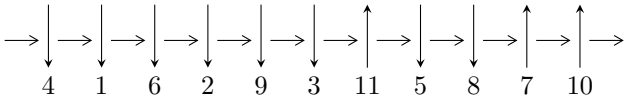
# $11a_{18}$ $(K11a_{18})$



[1]

**Arc Sequences**




**Solving Sequence**

$$5,9 \underset{c_5}{\rightarrow} 2,6 \underset{c_4}{\rightarrow} 4 \underset{c_1}{\rightarrow} 1 \underset{c_2}{\rightarrow} 3 \underset{c_6}{\rightarrow} 7 \underset{c_8}{\rightarrow} 8 \underset{c_9}{\rightarrow} 10 \underset{c_{11}}{\rightarrow} 11 \gg c_3, c_7, c_{10}$$

**Representation Ideals**

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

$I_1^u = \langle a^6 - a^5 - a^4 + 2a^3 - a + 1,\ u - 1,\ a^5 - a^4 - a^3 + 2a^2 + b - a - 1 \rangle$
$I_2^u = \langle u^3 + u^2 - 1,\ a,\ -u^2 + b - u - 1 \rangle$
$I_3^u = \langle u^{72} + 8u^{71} + \cdots + 12u + 1,$
$\quad - 1.92088 \times 10^{24} u^{71} - 1.57701 \times 10^{24} u^{70} + \cdots + 1.93314 \times 10^{24} a + 1.04791 \times 10^{25},$
$\quad 1.63603 \times 10^{25} u^{71} + 1.29840 \times 10^{26} u^{70} + \cdots + 9.66569 \times 10^{23} b + 2.67997 \times 10^{25} \rangle$

There are 3 irreducible components with 81 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.** $\boldsymbol{I_1^u = \langle a^6 - a^5 - a^4 + 2a^3 - a + 1,\ u - 1,\ a^5 - a^4 - a^3 + 2a^2 + b - a - 1\rangle}$

**(i) Arc colorings**

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

$$a_9 = \begin{pmatrix} a \\ -a^5 + a^4 + a^3 - 2a^2 + a + 1 \end{pmatrix}$$

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

$$a_6 = \begin{pmatrix} -a^2 \\ -a^2 \end{pmatrix}$$

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

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

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

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

$$a_8 = \begin{pmatrix} a \\ -a^5 + a^4 + a^3 - 2a^2 + 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -a^3 + a \\ -a^5 + a^4 + a^3 - 2a^2 + 1 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} a^5 - a^4 - 2a^3 + a^2 + a - 1 \\ -a^2 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} a^5 - a^4 - 2a^3 + a^2 + a - 1 \\ -a^2 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= a^5 + 3a^4 - a^3 - a^2 + 4a - 8$

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

| Solution to $I_1^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 1.00000$<br>$a = -1.002193 - 0.295542I$<br>$b = -1.92017 - 0.02483I$ | $-3.53554 - 0.92430I$ | $-10.88169 + 1.11590I$ |
| $u = 1.00000$<br>$a = -1.002193 + 0.295542I$<br>$b = -1.92017 + 0.02483I$ | $-3.53554 + 0.92430I$ | $-10.88169 - 1.11590I$ |
| $u = 1.00000$<br>$a = 0.428243 - 0.664531I$<br>$b = 1.113439 + 0.398729I$ | $0.245672 - 0.924305I$ | $-6.22669 - 0.83820I$ |
| $u = 1.00000$<br>$a = 0.428243 + 0.664531I$<br>$b = 1.113439 - 0.398729I$ | $0.245672 + 0.924305I$ | $-6.22669 + 0.83820I$ |
| $u = 1.00000$<br>$a = 1.073950 - 0.558752I$<br>$b = 1.80674 - 0.17750I$ | $-1.64493 + 5.69302I$ | $-8.89162 - 7.09196I$ |
| $u = 1.00000$<br>$a = 1.073950 + 0.558752I$<br>$b = 1.80674 + 0.17750I$ | $-1.64493 - 5.69302I$ | $-8.89162 + 7.09196I$ |

**II. $I_2^u = \langle u^3+u^2-1,\ a,\ -u^2+b-u-1\rangle$**

**(i) Arc colorings**

$$a_5 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_9 = \begin{pmatrix} 0 \\ u^2+u+1 \end{pmatrix}$$
$$a_2 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_4 = \begin{pmatrix} u \\ u \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -u^2+1 \\ -u^2 \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u \\ u^2+u-1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} u^2-1 \\ u^2 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} 0 \\ u^2+u+1 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 0 \\ u^2+u+1 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -u^2+1 \\ u+1 \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -u^2+1 \\ u+1 \end{pmatrix}$$

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

**(iii) Cusp Shapes** $= u^2+4$

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

| Solution to $I_2^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.877439-0.744862I$<br>$a=\quad 0$<br>$b=\quad 0.337641+0.562280I$ | $4.66906-2.82812I$ | $4.21508+1.30714I$ |
| $u=-0.877439+0.744862I$<br>$a=\quad 0$<br>$b=\quad 0.337641-0.562280I$ | $4.66906+2.82812I$ | $4.21508-1.30714I$ |
| $u=\quad 0.754878$<br>$a=\quad 0$<br>$b=\quad 2.32472$ | 0.531480 | 4.56984 |

**III. $I_3^u =$**
**$\langle u^{72}+8u^{71}+\cdots+12u+1,\ -1.92\times10^{24}u^{71}-1.58\times10^{24}u^{70}+\cdots+1.93\times10^{24}a+1.05\times10^{25},\ 1.64\times10^{25}u^{71}+1.30\times10^{26}u^{70}+\cdots+9.67\times10^{23}b+2.68\times10^{25}\rangle$**

**(i) Arc colorings**

$$a_5 = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_9 = \begin{pmatrix}0.993656u^{71}+0.815776u^{70}+\cdots-90.0472u-5.42075\\-16.9262u^{71}-134.330u^{70}+\cdots-305.927u-27.7266\end{pmatrix}$$
$$a_2 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_6 = \begin{pmatrix}9.96754u^{71}+77.3907u^{70}+\cdots+144.678u+13.4041\\-13.1525u^{71}-91.1616u^{70}+\cdots-56.3419u-4.13750\end{pmatrix}$$
$$a_4 = \begin{pmatrix}u\\u\end{pmatrix}$$
$$a_1 = \begin{pmatrix}-u^2+1\\-u^2\end{pmatrix}$$
$$a_3 = \begin{pmatrix}u^4-u^2+1\\u^4\end{pmatrix}$$
$$a_7 = \begin{pmatrix}6.33059u^{71}+57.4604u^{70}+\cdots+171.919u+16.6797\\12.8177u^{71}+99.3697u^{70}+\cdots+219.573u+19.9553\end{pmatrix}$$
$$a_8 = \begin{pmatrix}0.993656u^{71}+0.815776u^{70}+\cdots-90.0472u-5.42075\\-26.9614u^{71}-204.250u^{70}+\cdots-390.535u-34.8601\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}25.3677u^{71}+160.911u^{70}+\cdots+48.5429u+7.43421\\-16.3920u^{71}-135.134u^{70}+\cdots-343.210u-31.0010\end{pmatrix}$$
$$a_{11} = \begin{pmatrix}8.51903u^{71}+61.2402u^{70}+\cdots+60.8917u+10.3248\\-23.7775u^{71}-177.686u^{70}+\cdots-317.855u-28.0992\end{pmatrix}$$
$$a_{11} = \begin{pmatrix}8.51903u^{71}+61.2402u^{70}+\cdots+60.8917u+10.3248\\-23.7775u^{71}-177.686u^{70}+\cdots-317.855u-28.0992\end{pmatrix}$$

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

**(iii) Cusp Shapes** $= -\frac{612097405076818172305931 15}{96656938893252969972366 4}u^{71}-\frac{2215320679677519114660745 91}{48328469446626484986183 2}u^{70}+\cdots-\frac{749827309103295309695025749}{96656938893252969972366 4}u-\frac{3233181626046968031408 2073}{48328469446626484986183 2}$

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

| Solution to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.165241-0.683428I$<br>$a=-0.995396-0.096870I$<br>$b=-2.79312+0.05869I$ | $4.5389-16.0300I$ | $-2.95349+10.09848I$ |
| $u=-1.165241+0.683428I$<br>$a=-0.995396+0.096870I$<br>$b=-2.79312-0.05869I$ | $4.5389+16.0300I$ | $-2.95349-10.09848I$ |
| $u=-1.140802-0.662832I$<br>$a=\ \ 0.974472+0.048829I$<br>$b=\ \ 2.83146-0.00973I$ | $1.48181-10.73104I$ | $-6.00773+7.14911I$ |
| $u=-1.140802+0.662832I$<br>$a=\ \ 0.974472-0.048829I$<br>$b=\ \ 2.83146+0.00973I$ | $1.48181+10.73104I$ | $-6.00773-7.14911I$ |
| $u=-1.118621-0.680094I$<br>$a=-0.058388+0.926694I$<br>$b=-0.101204+0.742633I$ | $5.82177-9.49602I$ | $-1.51728+6.55107I$ |
| $u=-1.118621+0.680094I$<br>$a=-0.058388-0.926694I$<br>$b=-0.101204-0.742633I$ | $5.82177+9.49602I$ | $-1.51728-6.55107I$ |
| $u=-1.096879-0.686747I$<br>$a=-0.885404-0.052652I$<br>$b=-2.95792+0.03786I$ | $6.23840-6.61734I$ | $-1.39327+5.53156I$ |
| $u=-1.096879+0.686747I$<br>$a=-0.885404+0.052652I$<br>$b=-2.95792-0.03786I$ | $6.23840+6.61734I$ | $-1.39327-5.53156I$ |
| $u=-1.074128-0.521226I$<br>$a=\ \ 1.035124-0.223044I$<br>$b=\ \ 2.67382+0.25539I$ | $-3.02672-8.64627I$ | $-7.57936+9.09630I$ |
| $u=-1.074128+0.521226I$<br>$a=\ \ 1.035124+0.223044I$<br>$b=\ \ 2.67382-0.25539I$ | $-3.02672+8.64627I$ | $-7.57936-9.09630I$ |

| Solution to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-1.061924-0.763944I$<br>$a=-0.175884+0.773351I$<br>$b=-0.198967+0.607383I$ | $6.72982-1.38866I$ | $-0.46791-1.55400I$ |
| $u=-1.061924+0.763944I$<br>$a=-0.175884-0.773351I$<br>$b=-0.198967-0.607383I$ | $6.72982+1.38866I$ | $-0.46791+1.55400I$ |
| $u=-1.058858-0.675792I$<br>$a=\ 0.000499-0.826534I$<br>$b=\ 0.051069-0.657389I$ | $3.04313-4.90017I$ | $-4.09415+2.80236I$ |
| $u=-1.058858+0.675792I$<br>$a=\ 0.000499+0.826534I$<br>$b=\ 0.051069+0.657389I$ | $3.04313+4.90017I$ | $-4.09415-2.80236I$ |
| $u=-1.012759-0.471533I$<br>$a=-1.033467+0.377729I$<br>$b=-2.52125-0.35315I$ | $-3.84415-3.26268I$ | $-8.70986+4.01928I$ |
| $u=-1.012759+0.471533I$<br>$a=-1.033467-0.377729I$<br>$b=-2.52125+0.35315I$ | $-3.84415+3.26268I$ | $-8.70986-4.01928I$ |
| $u=-0.927726-0.549859I$<br>$a=-0.418674-0.780274I$<br>$b=-0.284406-0.612163I$ | $1.23521-4.19775I$ | $-3.49766+6.68711I$ |
| $u=-0.927726+0.549859I$<br>$a=-0.418674+0.780274I$<br>$b=-0.284406+0.612163I$ | $1.23521+4.19775I$ | $-3.49766-6.68711I$ |
| $u=-0.876096-0.806268I$<br>$a=\ 0.366768-0.276719I$<br>$b=\ 0.313702-0.177902I$ | $4.16423-3.00649I$ | $-10.90678+5.59644I$ |
| $u=-0.876096+0.806268I$<br>$a=\ 0.366768+0.276719I$<br>$b=\ 0.313702+0.177902I$ | $4.16423+3.00649I$ | $-10.90678-5.59644I$ |

| Solution to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.845544-0.559163I$<br>$a=\ \ 0.643178-0.575010I$<br>$b=\ \ 2.23468+1.15341I$ | $3.01523-2.24466I$ | $-3.71428+2.62096I$ |
| $u=-0.845544+0.559163I$<br>$a=\ \ 0.643178+0.575010I$<br>$b=\ \ 2.23468-1.15341I$ | $3.01523+2.24466I$ | $-3.71428-2.62096I$ |
| $u=-0.825916-0.351549I$<br>$a=-1.032632+0.859491I$<br>$b=-1.87494-0.31361I$ | $-2.85223-0.05705I$ | $-5.94816+3.77217I$ |
| $u=-0.825916+0.351549I$<br>$a=-1.032632-0.859491I$<br>$b=-1.87494+0.31361I$ | $-2.85223+0.05705I$ | $-5.94816-3.77217I$ |
| $u=-0.779374-0.488319I$<br>$a=\ \ 0.799156+0.715713I$<br>$b=\ \ 0.542087+0.539958I$ | $1.78878-0.06007I$ | $-1.43743+0.72520I$ |
| $u=-0.779374+0.488319I$<br>$a=\ \ 0.799156-0.715713I$<br>$b=\ \ 0.542087-0.539958I$ | $1.78878+0.06007I$ | $-1.43743-0.72520I$ |
| $u=-0.764659-0.241751I$<br>$a=\ \ 1.15534-1.08884I$<br>$b=\ \ 1.63745+0.02266I$ | $-1.00613+5.17017I$ | $-1.04226-1.11128I$ |
| $u=-0.764659+0.241751I$<br>$a=\ \ 1.15534+1.08884I$<br>$b=\ \ 1.63745-0.02266I$ | $-1.00613-5.17017I$ | $-1.04226+1.11128I$ |
| $u=-0.632470-0.934244I$<br>$a=-0.967416+0.260579I$<br>$b=-0.787219+0.037927I$ | $8.03882-4.81398I$ | $0.98382+5.72253I$ |
| $u=-0.632470+0.934244I$<br>$a=-0.967416-0.260579I$<br>$b=-0.787219-0.037927I$ | $8.03882+4.81398I$ | $0.98382-5.72253I$ |

| Solution to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.575072-0.844979I$<br>$a=\ 1.032786-0.117739I$<br>$b=\ 0.782184+0.090080I$ | $4.51528-0.75882I$ | $-2.00847+2.21103I$ |
| $u=-0.575072+0.844979I$<br>$a=\ 1.032786+0.117739I$<br>$b=\ 0.782184-0.090080I$ | $4.51528+0.75882I$ | $-2.00847-2.21103I$ |
| $u=-0.529936-0.889148I$<br>$a=\ 0.178925+1.097738I$<br>$b=\ 0.213686-0.923317I$ | $7.96250+0.80203I$ | $1.32154-0.61190I$ |
| $u=-0.529936+0.889148I$<br>$a=\ 0.178925-1.097738I$<br>$b=\ 0.213686+0.923317I$ | $7.96250-0.80203I$ | $1.32154+0.61190I$ |
| $u=-0.494612-0.902976I$<br>$a=-1.142258+0.196155I$<br>$b=-0.890679-0.085199I$ | $7.71847+3.66806I$ | $1.23654-1.87350I$ |
| $u=-0.494612+0.902976I$<br>$a=-1.142258-0.196155I$<br>$b=-0.890679+0.085199I$ | $7.71847-3.66806I$ | $1.23654+1.87350I$ |
| $u=-0.443742-0.906716I$<br>$a=-0.203389-1.200623I$<br>$b=-0.161705+0.684630I$ | $3.59461+4.95936I$ | $-3.13446-3.17768I$ |
| $u=-0.443742+0.906716I$<br>$a=-0.203389+1.200623I$<br>$b=-0.161705-0.684630I$ | $3.59461-4.95936I$ | $-3.13446+3.17768I$ |
| $u=-0.442787-0.968153I$<br>$a=\ 0.267710+1.199319I$<br>$b=\ 0.289615-0.615259I$ | $6.75363+10.01730I$ | $-0.17382-6.23023I$ |
| $u=-0.442787+0.968153I$<br>$a=\ 0.267710-1.199319I$<br>$b=\ 0.289615+0.615259I$ | $6.75363-10.01730I$ | $-0.17382+6.23023I$ |

| Solution to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u=-0.120567-0.643601I$<br>$a=-0.19318-1.63070I$<br>$b=\ \ 0.322179+0.205154I$ | $-0.63477+4.40212I$ | $-4.16070-6.41943I$ |
| $u=-0.120567+0.643601I$<br>$a=-0.19318+1.63070I$<br>$b=\ \ 0.322179-0.205154I$ | $-0.63477-4.40212I$ | $-4.16070+6.41943I$ |
| $u=-0.098616-0.127628I$<br>$a=\ \ 4.08292+0.62979I$<br>$b=\ \ 0.574788+0.458498I$ | $1.73034+0.74165I$ | $3.53259-1.03757I$ |
| $u=-0.098616+0.127628I$<br>$a=\ \ 4.08292-0.62979I$<br>$b=\ \ 0.574788-0.458498I$ | $1.73034-0.74165I$ | $3.53259+1.03757I$ |
| $u=\ \ 0.151161-0.484816I$<br>$a=\ \ 0.64042+1.67606I$<br>$b=-0.397431-0.013459I$ | $-1.57298+0.11426I$ | $-7.05869-0.49031I$ |
| $u=\ \ 0.151161+0.484816I$<br>$a=\ \ 0.64042-1.67606I$<br>$b=-0.397431+0.013459I$ | $-1.57298-0.11426I$ | $-7.05869+0.49031I$ |
| $u=\ \ 0.620181$<br>$a=\ \ 0.611212$<br>$b=-0.380543$ | $-0.987420$ | $-10.0942$ |
| $u=\ \ 0.699638-0.493461I$<br>$a=\ \ 0.324192+1.020600I$<br>$b=-0.584538+0.096124I$ | $-0.602714-0.211764I$ | $-6.49349-0.29601I$ |
| $u=\ \ 0.699638+0.493461I$<br>$a=\ \ 0.324192-1.020600I$<br>$b=-0.584538-0.096124I$ | $-0.602714+0.211764I$ | $-6.49349+0.29601I$ |
| $u=\ \ 0.718716-0.653541I$<br>$a=-0.248985-1.175059I$<br>$b=\ \ 0.562527-0.216488I$ | $2.23267-4.45748I$ | $-2.81509+3.29885I$ |

| Solution to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.718716 + 0.653541I$<br>$a = -0.248985 + 1.175059I$<br>$b = 0.562527 + 0.216488I$ | $2.23267 + 4.45748I$ | $-2.81509 - 3.29885I$ |
| $u = 0.822483 - 0.540736I$<br>$a = -1.041117 + 0.173903I$<br>$b = -2.02631 - 0.98997I$ | $2.80142 + 0.88223I$ | $-2.02170 - 2.91032I$ |
| $u = 0.822483 + 0.540736I$<br>$a = -1.041117 - 0.173903I$<br>$b = -2.02631 + 0.98997I$ | $2.80142 - 0.88223I$ | $-2.02170 + 2.91032I$ |
| $u = 0.877965 - 0.552533I$<br>$a = -0.113901 - 1.047556I$<br>$b = 0.725333 - 0.185577I$ | $2.61393 + 3.52046I$ | $-2.33746 - 3.83061I$ |
| $u = 0.877965 + 0.552533I$<br>$a = -0.113901 + 1.047556I$<br>$b = 0.725333 + 0.185577I$ | $2.61393 - 3.52046I$ | $-2.33746 + 3.83061I$ |
| $u = 0.888684$<br>$a = 0.377440$<br>$b = 4.47694$ | 0.330921 | $-46.0796$ |
| $u = 0.944057 - 0.552796I$<br>$a = 1.046228 - 0.045506I$<br>$b = 2.12039 + 0.87214I$ | $-1.37174 + 4.55999I$ | $-7.56588 - 4.82929I$ |
| $u = 0.944057 + 0.552796I$<br>$a = 1.046228 + 0.045506I$<br>$b = 2.12039 - 0.87214I$ | $-1.37174 - 4.55999I$ | $-7.56588 + 4.82929I$ |
| $u = 0.949003 - 0.622115I$<br>$a = -1.114422 + 0.041442I$<br>$b = -2.07183 - 0.82795I$ | $1.52562 + 9.43889I$ | $-3.96108 - 7.86356I$ |
| $u = 0.949003 + 0.622115I$<br>$a = -1.114422 - 0.041442I$<br>$b = -2.07183 + 0.82795I$ | $1.52562 - 9.43889I$ | $-3.96108 + 7.86356I$ |

| Solution to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
|---|---|---|
| $u = 0.994888 - 0.199419I$<br>$a = -0.075815 + 0.622960I$<br>$b = -1.039649 - 0.344746I$ | $-0.802882 + 0.774259I$ | $-7.90864 + 1.29464I$ |
| $u = 0.994888 + 0.199419I$<br>$a = -0.075815 - 0.622960I$<br>$b = -1.039649 + 0.344746I$ | $-0.802882 - 0.774259I$ | $-7.90864 - 1.29464I$ |
| $u = 1.110362 - 0.388556I$<br>$a = 0.895860 + 0.157967I$<br>$b = 2.29646 + 0.70345I$ | $-4.30882 + 3.51764I$ | $-10.31752 - 4.45263I$ |
| $u = 1.110362 + 0.388556I$<br>$a = 0.895860 - 0.157967I$<br>$b = 2.29646 - 0.70345I$ | $-4.30882 - 3.51764I$ | $-10.31752 + 4.45263I$ |
| $u = 1.175902 - 0.292913I$<br>$a = -0.814424 - 0.265263I$<br>$b = -2.30809 - 0.55748I$ | $-4.53906 - 1.05261I$ | $-10.58932 + 3.82745I$ |
| $u = 1.175902 + 0.292913I$<br>$a = -0.814424 + 0.265263I$<br>$b = -2.30809 + 0.55748I$ | $-4.53906 + 1.05261I$ | $-10.58932 - 3.82745I$ |
| $u = 1.266648 - 0.028494I$<br>$a = 0.537635 - 0.589841I$<br>$b = 1.87590 - 0.13818I$ | $1.26979 - 1.25057I$ | $-0.108352 + 1.105957I$ |
| $u = 1.266648 + 0.028494I$<br>$a = 0.537635 + 0.589841I$<br>$b = 1.87590 + 0.13818I$ | $1.26979 + 1.25057I$ | $-0.108352 - 1.105957I$ |
| $u = 1.274689 - 0.104537I$<br>$a = -0.670913 - 0.483797I$<br>$b = -2.09556 - 0.29667I$ | $-2.48615 - 2.12650I$ | $-6.43169 + 3.64338I$ |
| $u = 1.274689 + 0.104537I$<br>$a = -0.670913 + 0.483797I$<br>$b = -2.09556 + 0.29667I$ | $-2.48615 + 2.12650I$ | $-6.43169 - 3.64338I$ |
| Solution to $I_3^u$ | $\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$ | Cusp shape |
| $u = 1.346383 - 0.089859I$<br>$a = 0.710126 + 0.562358I$<br>$b = 1.99927 + 0.36411I$ | $0.24731 - 6.78521I$ | $-3.13164 + 6.33016I$ |
| $u = 1.346383 + 0.089859I$<br>$a = 0.710126 - 0.562358I$<br>$b = 1.99927 - 0.36411I$ | $0.24731 + 6.78521I$ | $-3.13164 - 6.33016I$ |

**IV. u-Polynomials**

| Crossings | u-Polynomials at each crossings |
|---|---|
| $c_1$ | $(u-1)^6(u^3+u^2-1)(u^{72}+8u^{71}+\cdots+12u+1)$ |
| $c_2$ | $(u+1)^6(u^3+u^2+2u+1)(u^{72}+32u^{71}+\cdots-8u+1)$ |
| $c_3, c_6$ | $u^6(u^3-u^2+2u-1)(u^{72}+2u^{71}+\cdots-128u-64)$ |
| $c_4$ | $(u+1)^6(u^3+u^2-1)(u^{72}+8u^{71}+\cdots+12u+1)$ |
| $c_5$ | $u^3(u^6+u^5+\cdots+u+1)(u^{72}+2u^{71}+\cdots+20u+8)$ |
| $c_7$ | $(u+1)^3(u^6-u^5+\cdots-u+1)(u^{72}+5u^{71}+\cdots-12u-1)$ |
| $c_8$ | $u^3(u^6-u^5+\cdots-u+1)(u^{72}+2u^{71}+\cdots+20u+8)$ |
| $c_9$ | $u^3(u^6+3u^5+\cdots+u+1)(u^{72}+24u^{71}+\cdots+1872u+64)$ |
| $c_{10}$ | $(u+1)^3(u^6+u^5+\cdots+u+1)(u^{72}+5u^{71}+\cdots-12u-1)$ |
| $c_{11}$ | $(u+1)^3(u^6-3u^5+5u^4-4u^3+2u^2-u+1)$ $(u^{72}+39u^{71}+\cdots+52u+1)$ |

**V. Riley Polynomials**

| Crossings | Riley Polynomials at each crossings |
|---|---|
| $c_1, c_4$ | $(y-1)^6(y^3-y^2+2y-1)(y^{72}-32y^{71}+\cdots+8y+1)$ |
| $c_2$ | $(y-1)^6(y^3+3y^2+2y-1)(y^{72}+24y^{71}+\cdots+2568y+1)$ |
| $c_3, c_6$ | $y^6(y^3+3y^2+2y-1)(y^{72}+42y^{71}+\cdots+73728y+4096)$ |
| $c_5, c_8$ | $y^3(y^6-3y^5+\cdots-y+1)(y^{72}-24y^{71}+\cdots-1872y+64)$ |
| $c_7$ | $(y-1)^3(y^6-3y^5+5y^4-4y^3+2y^2-y+1)$ $(y^{72}-39y^{71}+\cdots-52y+1)$ |
| $c_9$ | $y^3(y^6+y^5+\cdots+3y+1)(y^{72}+44y^{71}+\cdots-601344y+4096)$ |
| $c_{10}$ | $(y-1)^3(y^6-3y^5+5y^4-4y^3+2y^2-y+1)$ $(y^{72}-39y^{71}+\cdots-52y+1)$ |
| $c_{11}$ | $(y-1)^3(y^6+y^5+\cdots+3y+1)(y^{72}-7y^{71}+\cdots-2176y+1)$ |