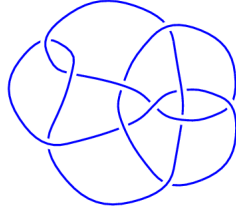
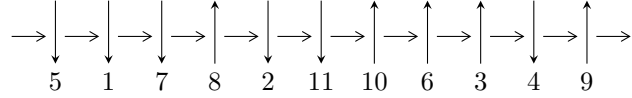


11a₁₇₀ (K11a₁₇₀)

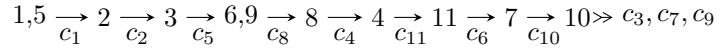


1

Arc Sequences



Solving Sequence



Representation Ideals

$$I = \bigcap_{i=1}^5 I_i^u$$

$$I_1^u = \langle u^{19} + 4u^{18} + \dots - 2u^2 + 1, -u^{18} + u^{17} + \dots + 3b + 4, 7u^{18} + 17u^{17} + \dots + 3a - 7 \rangle$$

$$I_2^u = \langle b^{76} - 3b^{75} + \dots + 7318b + 1741,$$

$$3.92188 \times 10^{371}u + 1.27505 \times 10^{368}b^{75} + \dots + 1.08619 \times 10^{372}b + 4.88008 \times 10^{371}, \\ - 1.42609 \times 10^{373}b^{75} + 5.28315 \times 10^{373}b^{74} + \dots + 1.64491 \times 10^{376}a - 5.32710 \times 10^{376} \rangle$$

$$I_3^u = \langle u^{39} - 9u^{38} + \dots - 124u + 16, -6608822u^{38} - 25979477u^{37} + \dots + 1876652a - 1265516125, \\ - 53859865u^{38} + 469238225u^{37} + \dots + 1876652b + 1261600848 \rangle$$

$$I_4^u = \langle b^2 - b + 1, a - 1, u - 1 \rangle$$

$$I_5^u = \langle b^2 - b + 1, u - 1, -b + a + 1 \rangle$$

There are 5 irreducible components with 138 representations.

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

$$\langle u^{19} + 4u^{18} + \dots - 2u^2 + 1, -u^{18} + u^{17} + \dots + 3b + 4, 7u^{18} + 17u^{17} + \dots + 3a - 7 \rangle$$

I. $I_1^u =$

(i) Arc colorings

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

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

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

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

$$a_6 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} -\frac{7}{3}u^{18} - \frac{17}{3}u^{17} + \dots - \frac{14}{3}u + \frac{7}{3} \\ \frac{1}{3}u^{18} - \frac{1}{3}u^{17} + \dots + \frac{14}{3}u - \frac{4}{3} \end{pmatrix}$$

$$a_8 = \begin{pmatrix} -\frac{2}{3}u^{18} - \frac{4}{3}u^{17} + \dots - \frac{10}{3}u + \frac{8}{3} \\ \frac{1}{3}u^{18} + \frac{5}{3}u^{17} + \dots + \frac{5}{3}u + \frac{2}{3} \end{pmatrix}$$

$$a_4 = \begin{pmatrix} -\frac{16}{3}u^{18} - \frac{44}{3}u^{17} + \dots - \frac{5}{3}u - \frac{11}{3} \\ \frac{5}{3}u^{18} + \frac{13}{3}u^{17} + \dots + \frac{1}{3}u + \frac{1}{3} \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -4.33333u^{18} - 15.66667u^{17} + \dots + 10.33333u - 4.66667 \\ \frac{7}{3}u^{18} + \frac{23}{3}u^{17} + \dots - \frac{4}{3}u + \frac{8}{3} \end{pmatrix}$$

$$a_7 = \begin{pmatrix} \frac{16}{3}u^{18} + \frac{53}{3}u^{17} + \dots - \frac{34}{3}u + \frac{17}{3} \\ -\frac{11}{3}u^{18} - \frac{34}{3}u^{17} + \dots + \frac{5}{3}u - \frac{7}{3} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -\frac{7}{3}u^{18} - \frac{20}{3}u^{17} + \dots - \frac{2}{3}u + \frac{4}{3} \\ \frac{5}{3}u^{18} + \frac{13}{3}u^{17} + \dots + \frac{10}{3}u + \frac{1}{3} \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -\frac{7}{3}u^{18} - \frac{20}{3}u^{17} + \dots - \frac{2}{3}u + \frac{4}{3} \\ \frac{5}{3}u^{18} + \frac{13}{3}u^{17} + \dots + \frac{10}{3}u + \frac{1}{3} \end{pmatrix}$$

(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
$u = -1.70193$ $a = 0.124087$ $b = 0.148240$	-6.35573	-86.5699
$u = -1.081831 - 0.692882I$ $a = -1.54148 - 0.76568I$ $b = 1.22094 - 0.94306I$	$3.28624 - 9.25767I$	$0.20658 + 5.93399I$
$u = -1.081831 + 0.692882I$ $a = -1.54148 + 0.76568I$ $b = 1.22094 + 0.94306I$	$3.28624 + 9.25767I$	$0.20658 - 5.93399I$
$u = -1.010811 - 0.472691I$ $a = 0.64628 + 1.72285I$ $b = -0.969321 - 0.054024I$	$1.44789 - 8.17017I$	$1.07066 + 8.69229I$
$u = -1.010811 + 0.472691I$ $a = 0.64628 - 1.72285I$ $b = -0.969321 + 0.054024I$	$1.44789 + 8.17017I$	$1.07066 - 8.69229I$
$u = -0.835173 - 0.681676I$ $a = -1.53299 - 0.83277I$ $b = 1.303925 - 0.198899I$	$4.55790 - 2.62916I$	$7.70901 + 3.24676I$
$u = -0.835173 + 0.681676I$ $a = -1.53299 + 0.83277I$ $b = 1.303925 + 0.198899I$	$4.55790 + 2.62916I$	$7.70901 - 3.24676I$
$u = -0.762199 - 0.432518I$ $a = 2.82378 + 0.50842I$ $b = -1.155380 + 0.453204I$	$2.35431 + 4.44658I$	$3.29197 - 0.64229I$
$u = -0.762199 + 0.432518I$ $a = 2.82378 - 0.50842I$ $b = -1.155380 - 0.453204I$	$2.35431 - 4.44658I$	$3.29197 + 0.64229I$
$u = -0.584392 - 0.863114I$ $a = -1.067007 - 0.892533I$ $b = 1.184060 + 0.726241I$	$4.82041 + 3.45939I$	$2.24813 - 1.36505I$

Solution to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.584392 + 0.863114I$ $a = -1.067007 + 0.892533I$ $b = 1.184060 - 0.726241I$	$4.82041 - 3.45939I$	$2.24813 + 1.36505I$
$u = 0.266449 - 0.290297I$ $a = 1.60696 + 0.93954I$ $b = 0.824926 - 0.477228I$	$2.48354 - 1.43560I$	$12.35059 + 4.73480I$
$u = 0.266449 + 0.290297I$ $a = 1.60696 - 0.93954I$ $b = 0.824926 + 0.477228I$	$2.48354 + 1.43560I$	$12.35059 - 4.73480I$
$u = 0.841641 - 0.632116I$ $a = -0.545098 + 0.028168I$ $b = -0.579320 + 0.956972I$	$3.52042 + 7.51917I$	$2.67994 - 6.56347I$
$u = 0.841641 + 0.632116I$ $a = -0.545098 - 0.028168I$ $b = -0.579320 - 0.956972I$	$3.52042 - 7.51917I$	$2.67994 + 6.56347I$
$u = 0.854923 - 0.732941I$ $a = 0.275406 - 0.180507I$ $b = -0.069722 - 0.736282I$	$3.44755 - 2.31743I$	$3.03564 + 2.58655I$
$u = 0.854923 + 0.732941I$ $a = 0.275406 + 0.180507I$ $b = -0.069722 + 0.736282I$	$3.44755 + 2.31743I$	$3.03564 - 2.58655I$
$u = 1.162359 - 0.019941I$ $a = 0.272105 - 0.272023I$ $b = 0.665776 - 0.701646I$	$-1.35625 - 2.07457I$	$-3.80759 + 4.22380I$
$u = 1.162359 + 0.019941I$ $a = 0.272105 + 0.272023I$ $b = 0.665776 + 0.701646I$	$-1.35625 + 2.07457I$	$-3.80759 - 4.22380I$

$$\text{II. } I_2^u = \langle b^{76} - 3b^{75} + \dots + 7318b + 1741, 3.92 \times 10^{371}u + 1.28 \times 10^{368}b^{75} + \dots + 1.09 \times 10^{372}b + 4.88 \times 10^{371}, -1.43 \times 10^{373}b^{75} + 5.28 \times 10^{373}b^{74} + \dots + 1.64 \times 10^{376}a - 5.33 \times 10^{376} \rangle$$

(i) Arc colorings

$$\begin{aligned} a_1 &= \begin{pmatrix} 1 \\ 0 \end{pmatrix} \\ a_5 &= \begin{pmatrix} 0 \\ -0.000325112b^{75} + 0.00122477b^{74} + \dots - 2.76956b - 1.24432 \end{pmatrix} \\ a_2 &= \begin{pmatrix} 1 \\ 0.000433925b^{75} - 0.00167014b^{74} + \dots + 1.77738b + 0.144907 \end{pmatrix} \\ a_3 &= \begin{pmatrix} -0.000433925b^{75} + 0.00167014b^{74} + \dots - 1.77738b + 0.855093 \\ 0.000433925b^{75} - 0.00167014b^{74} + \dots + 1.77738b + 0.144907 \end{pmatrix} \\ a_6 &= \begin{pmatrix} 0.000325112b^{75} - 0.00122477b^{74} + \dots + 2.76956b + 1.24432 \\ -0.000239556b^{75} + 0.000655246b^{74} + \dots - 2.83732b - 2.83972 \end{pmatrix} \\ a_9 &= \begin{pmatrix} 0.000866970b^{75} - 0.00321181b^{74} + \dots + 5.44918b + 3.23853 \\ b \end{pmatrix} \\ a_8 &= \begin{pmatrix} -0.000633084b^{75} + 0.00209517b^{74} + \dots - 5.03001b - 2.44665 \\ 0.00210351b^{75} - 0.00711477b^{74} + \dots + 20.1252b + 9.09129 \end{pmatrix} \\ a_4 &= \begin{pmatrix} -0.000260187b^{75} + 0.000990502b^{74} + \dots - 0.766278b + 1.26151 \\ -0.000567317b^{75} + 0.00203592b^{74} + \dots - 4.88321b - 2.07576 \end{pmatrix} \\ a_{11} &= \begin{pmatrix} -0.000610897b^{75} + 0.00215823b^{74} + \dots - 3.10596b - 0.509395 \\ b^2 \end{pmatrix} \\ a_7 &= \begin{pmatrix} -0.0000467270b^{75} + 0.000226162b^{74} + \dots + 2.56467b + 1.29789 \\ -0.000447279b^{75} + 0.00140413b^{74} + \dots - 4.91589b - 3.48018 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -0.000326928b^{75} + 0.00101206b^{74} + \dots - 2.35159b - 1.15360 \\ 0.00119027b^{75} - 0.00404345b^{74} + \dots + 11.0328b + 5.64738 \end{pmatrix} \\ a_{10} &= \begin{pmatrix} -0.000326928b^{75} + 0.00101206b^{74} + \dots - 2.35159b - 1.15360 \\ 0.00119027b^{75} - 0.00404345b^{74} + \dots + 11.0328b + 5.64738 \end{pmatrix} \end{aligned}$$

(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
$u = -1.036116 + 0.567146I$ $a = 1.76124 - 1.35730I$ $b = -1.88998 - 0.95003I$	$0.05398 + 9.62803I$	$-3.53397 - 12.41778I$
$u = -1.036116 - 0.567146I$ $a = 1.76124 + 1.35730I$ $b = -1.88998 + 0.95003I$	$0.05398 - 9.62803I$	$-3.53397 + 12.41778I$
$u = 0.902262 + 0.616698I$ $a = -0.21850 + 1.85798I$ $b = -1.77548 - 1.87701I$	$3.96785 - 8.80564I$	$5.90760 + 12.35499I$
$u = 0.902262 - 0.616698I$ $a = -0.21850 - 1.85798I$ $b = -1.77548 + 1.87701I$	$3.96785 + 8.80564I$	$5.90760 - 12.35499I$
$u = -0.628447 + 0.282749I$ $a = 1.96404 - 1.79448I$ $b = -1.71551 - 0.12227I$	$1.73711 - 5.29191I$	$-1.82857 + 8.05106I$
$u = -0.628447 - 0.282749I$ $a = 1.96404 + 1.79448I$ $b = -1.71551 + 0.12227I$	$1.73711 + 5.29191I$	$-1.82857 - 8.05106I$
$u = -0.310562 - 0.497043I$ $a = 2.18165 + 1.30002I$ $b = -1.46486 - 0.37241I$	$1.75286 + 5.17897I$	$0.41778 - 7.25838I$
$u = -0.310562 + 0.497043I$ $a = 2.18165 - 1.30002I$ $b = -1.46486 + 0.37241I$	$1.75286 - 5.17897I$	$0.41778 + 7.25838I$
$u = -1.116218 + 0.690124I$ $a = 1.39794 - 0.85583I$ $b = -1.31620 - 0.67924I$	$4.06740 + 10.25010I$	$5.86786 - 12.03410I$
$u = -1.116218 - 0.690124I$ $a = 1.39794 + 0.85583I$ $b = -1.31620 + 0.67924I$	$4.06740 - 10.25010I$	$5.86786 + 12.03410I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.511993 - 0.911621I$ $a = 1.29409 + 0.67016I$ $b = -1.240436 - 0.476019I$	$5.90964 + 4.35931I$	$9.40004 - 6.47018I$
$u = -0.511993 + 0.911621I$ $a = 1.29409 - 0.67016I$ $b = -1.240436 + 0.476019I$	$5.90964 - 4.35931I$	$9.40004 + 6.47018I$
$u = 0.785473 - 0.623414I$ $a = 2.41966 - 0.14717I$ $b = -1.16440 - 2.08290I$	$4.33121 - 3.93186I$	$7.62421 + 4.84403I$
$u = 0.785473 + 0.623414I$ $a = 2.41966 + 0.14717I$ $b = -1.16440 + 2.08290I$	$4.33121 + 3.93186I$	$7.62421 - 4.84403I$
$u = 1.114792 + 0.217503I$ $a = -0.549520 + 0.535109I$ $b = -0.985105 - 0.921275I$	$-2.19784 + 2.79119I$	$-7.49818 - 10.51788I$
$u = 1.114792 - 0.217503I$ $a = -0.549520 - 0.535109I$ $b = -0.985105 + 0.921275I$	$-2.19784 - 2.79119I$	$-7.49818 + 10.51788I$
$u = -0.511993 - 0.911621I$ $a = 0.916533 - 0.072235I$ $b = -0.885035 - 0.161743I$	$5.90964 + 0.29954I$	$9.40004 + 0.45802I$
$u = -0.511993 + 0.911621I$ $a = 0.916533 + 0.072235I$ $b = -0.885035 + 0.161743I$	$5.90964 - 0.29954I$	$9.40004 - 0.45802I$
$u = -0.835893 + 0.695746I$ $a = 1.42763 + 0.23009I$ $b = -0.828389 - 0.055025I$	$4.59520 + 4.69611I$	$7.58619 - 6.67289I$
$u = -0.835893 - 0.695746I$ $a = 1.42763 - 0.23009I$ $b = -0.828389 + 0.055025I$	$4.59520 - 4.69611I$	$7.58619 + 6.67289I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.785473 + 0.623414I$ $a = 1.42707 - 0.72473I$ $b = -0.773228 - 0.391918I$	$4.33121 + 3.93186I$	$7.62421 - 4.84403I$
$u = 0.785473 - 0.623414I$ $a = 1.42707 + 0.72473I$ $b = -0.773228 + 0.391918I$	$4.33121 - 3.93186I$	$7.62421 + 4.84403I$
$u = -1.116218 + 0.690124I$ $a = 0.815686 - 0.820456I$ $b = -0.743972 - 0.426108I$	$4.06740 + 6.19033I$	$5.86786 - 5.10589I$
$u = -1.116218 - 0.690124I$ $a = 0.815686 + 0.820456I$ $b = -0.743972 + 0.426108I$	$4.06740 - 6.19033I$	$5.86786 + 5.10589I$
$u = 1.27340$ $a = -0.092694 + 0.109020I$ $b = -0.715909 - 0.459593I$	$-0.73172 + 2.02988I$	$13.11408 - 3.46410I$
$u = 1.27340$ $a = -0.092694 - 0.109020I$ $b = -0.715909 + 0.459593I$	$-0.73172 - 2.02988I$	$13.11408 + 3.46410I$
$u = -0.835893 + 0.695746I$ $a = 1.07793 - 1.22160I$ $b = -0.562098 - 0.080039I$	$4.59520 + 0.63634I$	$7.58619 + 0.25531I$
$u = -0.835893 - 0.695746I$ $a = 1.07793 + 1.22160I$ $b = -0.562098 + 0.080039I$	$4.59520 - 0.63634I$	$7.58619 - 0.25531I$
$u = 0.902262 - 0.616698I$ $a = 0.96742 - 2.04283I$ $b = -0.510770 - 0.421055I$	$3.96785 + 8.80564I$	$5.90760 - 12.35499I$
$u = 0.902262 + 0.616698I$ $a = 0.96742 + 2.04283I$ $b = -0.510770 + 0.421055I$	$3.96785 - 8.80564I$	$5.90760 + 12.35499I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -1.036116 - 0.567146I$ $a = 0.848206 + 0.212533I$ $b = -0.317655 - 0.165427I$	$0.05398 - 5.56826I$	$-3.53397 + 5.48958I$
$u = -1.036116 + 0.567146I$ $a = 0.848206 - 0.212533I$ $b = -0.317655 + 0.165427I$	$0.05398 + 5.56826I$	$-3.53397 - 5.48958I$
$u = 1.114792 - 0.217503I$ $a = 0.788775 + 0.011060I$ $b = -0.034287 - 0.842428I$	$-2.19784 + 1.26857I$	$-7.49818 + 3.58967I$
$u = 1.114792 + 0.217503I$ $a = 0.788775 - 0.011060I$ $b = -0.034287 + 0.842428I$	$-2.19784 - 1.26857I$	$-7.49818 - 3.58967I$
$u = -0.628447 + 0.282749I$ $a = -2.92433 + 0.49985I$ $b = -0.016610 - 0.486348I$	$1.73711 - 5.29191I$	$-1.82857 + 8.05106I$
$u = -0.628447 - 0.282749I$ $a = -2.92433 - 0.49985I$ $b = -0.016610 + 0.486348I$	$1.73711 + 5.29191I$	$-1.82857 - 8.05106I$
$u = -0.310562 + 0.497043I$ $a = 1.29157 + 0.66269I$ $b = 0.183851 - 0.352721I$	$1.75286 - 1.11920I$	$0.417778 + 0.330175I$
$u = -0.310562 - 0.497043I$ $a = 1.29157 - 0.66269I$ $b = 0.183851 + 0.352721I$	$1.75286 + 1.11920I$	$0.417778 - 0.330175I$
$u = -0.310562 + 0.497043I$ $a = -1.89464 - 0.29483I$ $b = 0.225689 - 0.858784I$	$1.75286 - 5.17897I$	$0.41778 + 7.25838I$
$u = -0.310562 - 0.497043I$ $a = -1.89464 + 0.29483I$ $b = 0.225689 + 0.858784I$	$1.75286 + 5.17897I$	$0.41778 - 7.25838I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.628447 + 0.282749I$ $a = 2.08367 - 0.14281I$ $b = 0.290734 - 0.675194I$	$1.73711 - 1.23215I$	$-1.82857 + 1.12286I$
$u = -0.628447 - 0.282749I$ $a = 2.08367 + 0.14281I$ $b = 0.290734 + 0.675194I$	$1.73711 + 1.23215I$	$-1.82857 - 1.12286I$
$u = 1.114792 + 0.217503I$ $a = 0.769322 - 0.574519I$ $b = 0.316571 - 0.472967I$	$-2.19784 - 1.26857I$	$-7.49818 - 3.58967I$
$u = 1.114792 - 0.217503I$ $a = 0.769322 + 0.574519I$ $b = 0.316571 + 0.472967I$	$-2.19784 + 1.26857I$	$-7.49818 + 3.58967I$
$u = 1.114792 - 0.217503I$ $a = 0.277599 - 1.107031I$ $b = 0.524000 - 0.981011I$	$-2.19784 - 2.79119I$	$-7.49818 + 10.51788I$
$u = 1.114792 + 0.217503I$ $a = 0.277599 + 1.107031I$ $b = 0.524000 + 0.981011I$	$-2.19784 + 2.79119I$	$-7.49818 - 10.51788I$
$u = -1.036116 - 0.567146I$ $a = -2.07244 - 0.93139I$ $b = 0.591464 - 0.730749I$	$0.05398 - 9.62803I$	$-3.53397 + 12.41778I$
$u = -1.036116 + 0.567146I$ $a = -2.07244 + 0.93139I$ $b = 0.591464 + 0.730749I$	$0.05398 + 9.62803I$	$-3.53397 - 12.41778I$
$u = -1.036116 - 0.567146I$ $a = -1.061450 - 0.694991I$ $b = 0.777013 - 1.068762I$	$0.05398 - 5.56826I$	$-3.53397 + 5.48958I$
$u = -1.036116 + 0.567146I$ $a = -1.061450 + 0.694991I$ $b = 0.777013 + 1.068762I$	$0.05398 + 5.56826I$	$-3.53397 - 5.48958I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.27340$ $a = 0.444164 - 0.499744I$ $b = 0.838275 - 0.671537I$	$-0.73172 - 2.02988I$	$13.11408 + 3.46410I$
$u = 1.27340$ $a = 0.444164 + 0.499744I$ $b = 0.838275 + 0.671537I$	$-0.73172 + 2.02988I$	$13.11408 - 3.46410I$
$u = -0.310562 + 0.497043I$ $a = -0.053892 + 0.383291I$ $b = 0.856947 - 0.477245I$	$1.75286 - 1.11920I$	$0.417778 + 0.330175I$
$u = -0.310562 - 0.497043I$ $a = -0.053892 - 0.383291I$ $b = 0.856947 + 0.477245I$	$1.75286 + 1.11920I$	$0.417778 - 0.330175I$
$u = 0.785473 + 0.623414I$ $a = -1.61444 - 1.58477I$ $b = 0.910135 - 0.293460I$	$4.33121 - 0.12791I$	$7.62421 + 2.08417I$
$u = 0.785473 - 0.623414I$ $a = -1.61444 + 1.58477I$ $b = 0.910135 + 0.293460I$	$4.33121 + 0.12791I$	$7.62421 - 2.08417I$
$u = -0.628447 + 0.282749I$ $a = -0.482349 - 0.041508I$ $b = 1.102407 - 0.520560I$	$1.73711 - 1.23215I$	$-1.82857 + 1.12286I$
$u = -0.628447 - 0.282749I$ $a = -0.482349 + 0.041508I$ $b = 1.102407 + 0.520560I$	$1.73711 + 1.23215I$	$-1.82857 - 1.12286I$
$u = 0.902262 + 0.616698I$ $a = -2.16979 - 0.87182I$ $b = 1.19203 - 1.42868I$	$3.96785 - 4.74587I$	$5.90760 + 5.42679I$
$u = 0.902262 - 0.616698I$ $a = -2.16979 + 0.87182I$ $b = 1.19203 + 1.42868I$	$3.96785 + 4.74587I$	$5.90760 - 5.42679I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.902262 - 0.616698I$ $a = -1.58287 + 0.42999I$ $b = 1.211990 - 0.176709I$	$3.96785 + 4.74587I$	$5.90760 - 5.42679I$
$u = 0.902262 + 0.616698I$ $a = -1.58287 - 0.42999I$ $b = 1.211990 + 0.176709I$	$3.96785 - 4.74587I$	$5.90760 + 5.42679I$
$u = -1.116218 - 0.690124I$ $a = -0.655707 - 0.904435I$ $b = 1.233013 - 0.227606I$	$4.06740 - 6.19033I$	$5.86786 + 5.10589I$
$u = -1.116218 + 0.690124I$ $a = -0.655707 + 0.904435I$ $b = 1.233013 + 0.227606I$	$4.06740 + 6.19033I$	$5.86786 - 5.10589I$
$u = -1.116218 - 0.690124I$ $a = -1.55066 - 0.95239I$ $b = 1.24358 - 1.20201I$	$4.06740 - 10.25010I$	$5.86786 + 12.03410I$
$u = -1.116218 + 0.690124I$ $a = -1.55066 + 0.95239I$ $b = 1.24358 + 1.20201I$	$4.06740 + 10.25010I$	$5.86786 - 12.03410I$
$u = -0.835893 - 0.695746I$ $a = -1.90650 - 0.27477I$ $b = 1.26379 - 1.47557I$	$4.59520 - 4.69611I$	$7.58619 + 6.67289I$
$u = -0.835893 + 0.695746I$ $a = -1.90650 + 0.27477I$ $b = 1.26379 + 1.47557I$	$4.59520 + 4.69611I$	$7.58619 - 6.67289I$
$u = -0.511993 - 0.911621I$ $a = -1.084492 - 0.136260I$ $b = 1.279291 - 0.136292I$	$5.90964 + 0.29954I$	$9.40004 + 0.45802I$
$u = -0.511993 + 0.911621I$ $a = -1.084492 + 0.136260I$ $b = 1.279291 + 0.136292I$	$5.90964 - 0.29954I$	$9.40004 - 0.45802I$

Solution to I_2^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.511993 + 0.911621I$ $a = -1.029548 + 0.711365I$ $b = 1.30141 - 0.96647I$	$5.90964 - 4.35931I$	$9.40004 + 6.47018I$
$u = -0.511993 - 0.911621I$ $a = -1.029548 - 0.711365I$ $b = 1.30141 + 0.96647I$	$5.90964 + 4.35931I$	$9.40004 - 6.47018I$
$u = 0.785473 - 0.623414I$ $a = -0.80910 + 1.45781I$ $b = 1.52311 - 1.12601I$	$4.33121 + 0.12791I$	$7.62421 - 2.08417I$
$u = 0.785473 + 0.623414I$ $a = -0.80910 - 1.45781I$ $b = 1.52311 + 1.12601I$	$4.33121 - 0.12791I$	$7.62421 + 2.08417I$
$u = -0.835893 + 0.695746I$ $a = -0.40127 + 1.38388I$ $b = 1.57462 - 1.00730I$	$4.59520 + 0.63634I$	$7.58619 + 0.25531I$
$u = -0.835893 - 0.695746I$ $a = -0.40127 - 1.38388I$ $b = 1.57462 + 1.00730I$	$4.59520 - 0.63634I$	$7.58619 - 0.25531I$

III.

$$I_3^u = \langle u^{39} - 9u^{38} + \dots - 124u + 16, -6.61 \times 10^6 u^{38} - 2.60 \times 10^7 u^{37} + \dots + 1.88 \times 10^6 a - 1.27 \times 10^9, -5.39 \times 10^7 u^{38} + 4.69 \times 10^8 u^{37} + \dots + 1.88 \times 10^6 b + 1.26 \times 10^9 \rangle$$

(i) Arc colorings

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

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

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

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

$$a_6 = \begin{pmatrix} -u \\ -u^3 + u \end{pmatrix}$$

$$a_9 = \begin{pmatrix} 3.52160u^{38} + 13.8435u^{37} + \dots - 3933.74u + 674.348 \\ 28.7000u^{38} - 250.040u^{37} + \dots + 4479.33u - 672.261 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 11.7813u^{38} - 75.9997u^{37} + \dots - 1047.20u + 215.148 \\ -17.0751u^{38} + 125.808u^{37} + \dots - 462.109u + 35.0352 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 78.7741u^{38} - 637.879u^{37} + \dots + 7824.70u - 1095.92 \\ -34.0523u^{38} + 275.660u^{37} + \dots - 3405.44u + 478.305 \end{pmatrix}$$

$$a_{11} = \begin{pmatrix} -30.4774u^{38} + 294.742u^{37} + \dots - 7781.67u + 1225.33 \\ 44.0342u^{38} - 368.827u^{37} + \dots + 5577.73u - 814.764 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 2.07696u^{38} - 45.8247u^{37} + \dots + 3183.14u - 533.862 \\ 1.44961u^{38} + 1.91037u^{37} + \dots - 1177.83u + 202.484 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 4.35373u^{38} - 15.1442u^{37} + \dots - 1536.69u + 275.289 \\ -2.16404u^{38} + 12.5121u^{37} + \dots + 406.254u - 84.7016 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 4.35373u^{38} - 15.1442u^{37} + \dots - 1536.69u + 275.289 \\ -2.16404u^{38} + 12.5121u^{37} + \dots + 406.254u - 84.7016 \end{pmatrix}$$

(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
$u = -1.72205$ $a = 0.0545623$ $b = 0.255762$	-6.30934	86.0058
$u = -1.296565 - 0.064676I$ $a = -0.248967 + 0.283163I$ $b = -0.806098 + 0.784117I$	$-0.36330 - 10.93516I$	$-2.05956 + 8.84286I$
$u = -1.296565 + 0.064676I$ $a = -0.248967 - 0.283163I$ $b = -0.806098 - 0.784117I$	$-0.36330 + 10.93516I$	$-2.05956 - 8.84286I$
$u = -1.116181 - 0.183582I$ $a = -0.189018 - 0.412516I$ $b = -0.195310 - 1.072642I$	$-5.58025 - 3.26982I$	$-9.43637 + 5.14015I$
$u = -1.116181 + 0.183582I$ $a = -0.189018 + 0.412516I$ $b = -0.195310 + 1.072642I$	$-5.58025 + 3.26982I$	$-9.43637 - 5.14015I$
$u = -0.975947 - 0.142895I$ $a = 0.146763 - 0.578865I$ $b = 0.524196 - 1.042568I$	$-1.14633 - 4.05626I$	$-2.09422 + 9.77682I$
$u = -0.975947 + 0.142895I$ $a = 0.146763 + 0.578865I$ $b = 0.524196 + 1.042568I$	$-1.14633 + 4.05626I$	$-2.09422 - 9.77682I$
$u = -0.896283 - 0.526036I$ $a = -0.393504 - 0.430501I$ $b = 0.072488 - 1.190609I$	$-0.07010 - 4.24589I$	$-2.71126 + 7.01324I$
$u = -0.896283 + 0.526036I$ $a = -0.393504 + 0.430501I$ $b = 0.072488 + 1.190609I$	$-0.07010 + 4.24589I$	$-2.71126 - 7.01324I$
$u = -0.847922 - 0.515232I$ $a = 0.677597 + 0.276751I$ $b = 0.497441 + 1.301344I$	$0.0975477 + 0.0620158I$	$-2.09239 - 0.09201I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.847922 + 0.515232I$ $a = 0.677597 - 0.276751I$ $b = 0.497441 - 1.301344I$	$0.0975477 - 0.0620158I$	$-2.09239 + 0.09201I$
$u = -0.149923 - 0.665950I$ $a = 0.249283 - 0.699646I$ $b = 0.538058 + 0.405453I$	$1.74925 + 1.27793I$	$-1.87953 - 3.64165I$
$u = -0.149923 + 0.665950I$ $a = 0.249283 + 0.699646I$ $b = 0.538058 - 0.405453I$	$1.74925 - 1.27793I$	$-1.87953 + 3.64165I$
$u = 0.308040 - 0.549050I$ $a = 0.980929 - 0.778767I$ $b = -0.340636 + 0.607530I$	$-1.48621 + 0.90379I$	$-4.25055 - 1.87469I$
$u = 0.308040 + 0.549050I$ $a = 0.980929 + 0.778767I$ $b = -0.340636 - 0.607530I$	$-1.48621 - 0.90379I$	$-4.25055 + 1.87469I$
$u = 0.510450 - 1.009796I$ $a = 0.767115 + 0.114179I$ $b = -0.971503 - 0.161150I$	$6.38619 + 7.86261I$	$6.70357 - 7.20003I$
$u = 0.510450 + 1.009796I$ $a = 0.767115 - 0.114179I$ $b = -0.971503 + 0.161150I$	$6.38619 - 7.86261I$	$6.70357 + 7.20003I$
$u = 0.529629 - 0.935718I$ $a = 1.12462 - 0.87054I$ $b = -1.31312 + 0.91673I$	$6.6772 - 13.2005I$	$3.23296 + 6.61606I$
$u = 0.529629 + 0.935718I$ $a = 1.12462 + 0.87054I$ $b = -1.31312 - 0.91673I$	$6.6772 + 13.2005I$	$3.23296 - 6.61606I$
$u = 0.619141 - 1.033365I$ $a = -0.417356 + 0.561463I$ $b = 0.682336 - 0.629184I$	$2.84675 - 3.80672I$	$-0.93603 + 10.43442I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.619141 + 1.033365I$ $a = -0.417356 - 0.561463I$ $b = 0.682336 + 0.629184I$	$2.84675 + 3.80672I$	$-0.93603 - 10.43442I$
$u = 0.667016 - 0.856603I$ $a = -0.93549 + 1.21506I$ $b = 1.24188 - 0.89377I$	$5.48378 - 3.90827I$	$11.7315 + 8.1973I$
$u = 0.667016 + 0.856603I$ $a = -0.93549 - 1.21506I$ $b = 1.24188 + 0.89377I$	$5.48378 + 3.90827I$	$11.7315 - 8.1973I$
$u = 0.809060 - 0.242308I$ $a = 1.084262 - 0.444883I$ $b = -0.297792 - 0.067549I$	$-1.40805 + 0.45537I$	$-6.68789 - 0.37229I$
$u = 0.809060 + 0.242308I$ $a = 1.084262 + 0.444883I$ $b = -0.297792 + 0.067549I$	$-1.40805 - 0.45537I$	$-6.68789 + 0.37229I$
$u = 0.852776 - 0.474162I$ $a = -2.43252 + 0.21385I$ $b = 0.923846 + 0.738862I$	$-0.09530 + 3.97123I$	$-1.67802 - 6.97168I$
$u = 0.852776 + 0.474162I$ $a = -2.43252 - 0.21385I$ $b = 0.923846 - 0.738862I$	$-0.09530 - 3.97123I$	$-1.67802 + 6.97168I$
$u = 0.881854 - 0.424142I$ $a = -0.39328 + 1.59611I$ $b = 0.628738 - 0.326039I$	$-0.162274 - 0.211332I$	$-1.308088 - 0.536675I$
$u = 0.881854 + 0.424142I$ $a = -0.39328 - 1.59611I$ $b = 0.628738 + 0.326039I$	$-0.162274 + 0.211332I$	$-1.308088 + 0.536675I$
$u = 1.033079 - 0.558941I$ $a = 1.56152 - 0.54955I$ $b = -0.761967 - 0.777631I$	$-3.26169 + 3.52438I$	$-6.48938 - 3.45367I$

Solution to I_3^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.033079 + 0.558941I$ $a = 1.56152 + 0.54955I$ $b = -0.761967 + 0.777631I$	$-3.26169 - 3.52438I$	$-6.48938 + 3.45367I$
$u = 1.037456 - 0.718697I$ $a = -1.80712 + 0.56016I$ $b = 1.29595 + 1.12850I$	$4.32938 + 9.77720I$	$8.34561 - 10.94840I$
$u = 1.037456 + 0.718697I$ $a = -1.80712 - 0.56016I$ $b = 1.29595 - 1.12850I$	$4.32938 - 9.77720I$	$8.34561 + 10.94840I$
$u = 1.115343 - 0.760077I$ $a = -1.136683 + 0.246020I$ $b = 0.740582 + 0.952790I$	$1.25508 + 10.27041I$	$-2.53034 - 12.19257I$
$u = 1.115343 + 0.760077I$ $a = -1.136683 - 0.246020I$ $b = 0.740582 - 0.952790I$	$1.25508 - 10.27041I$	$-2.53034 + 12.19257I$
$u = 1.119575 - 0.702931I$ $a = 1.64722 - 0.85009I$ $b = -1.33386 - 1.12855I$	$4.8624 + 19.2051I$	$0.87027 - 10.50814I$
$u = 1.119575 + 0.702931I$ $a = 1.64722 + 0.85009I$ $b = -1.33386 + 1.12855I$	$4.8624 - 19.2051I$	$0.87027 + 10.50814I$
$u = 1.160429 - 0.782105I$ $a = 0.437355 - 0.548869I$ $b = -0.753113 - 0.218254I$	$4.42472 - 1.39638I$	$7.76683 - 0.79514I$
$u = 1.160429 + 0.782105I$ $a = 0.437355 + 0.548869I$ $b = -0.753113 + 0.218254I$	$4.42472 + 1.39638I$	$7.76683 + 0.79514I$

$$\text{IV. } I_4^u = \langle b^2 - b + 1, a - 1, u - 1 \rangle$$

(i) Arc colorings

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

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

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

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

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

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

$$a_8 = \begin{pmatrix} -b + 1 \\ b \end{pmatrix}$$

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

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

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

$$a_{10} = \begin{pmatrix} 1 \\ b - 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} 1 \\ b - 1 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes = unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_4^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$		
$a = 1.00000$	$-1.64493 - 2.02988I$	$-3.00000 + 3.46410I$
$b = 0.500000 - 0.866025I$		
$u = 1.00000$		
$a = 1.00000$	$-1.64493 + 2.02988I$	$-3.00000 - 3.46410I$
$b = 0.500000 + 0.866025I$		

$$\mathbf{V. } I_5^u = \langle b^2 - b + 1, u - 1, -b + a + 1 \rangle$$

(i) Arc colorings

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

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

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

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

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

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

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

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

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

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

$$a_{10} = \begin{pmatrix} b-1 \\ 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} b-1 \\ 1 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes =unknown

(iv) Complex Volumes and Cusp Shapes

Solution to I_5^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 1.00000$		
$a = -0.500000 - 0.866025I$	$-1.64493 - 2.02988I$	$-3.00000 + 3.46410I$
$b = 0.500000 - 0.866025I$		
$u = 1.00000$		
$a = -0.500000 + 0.866025I$	$-1.64493 + 2.02988I$	$-3.00000 - 3.46410I$
$b = 0.500000 + 0.866025I$		

VI. u-Polynomials

Crossings	u-Polynomials at each crossings
c_1	$(u-1)^4$ $(1-4u+6u^2+u^3-14u^4+10u^5+18u^6-26u^7-9u^8+36u^9-8u^{10}-29u^{11}+19u^{12}+14u^{13}-14u^{14}+10u^{15}-6u^{16}+3u^{17}-u^{18}+u^{19}+4u^{18}+\dots-2u^2+1)(u^{39}+9u^{38}+\dots-124u-16)$
c_2	$(u+1)^4$ $(1+4u+16u^2+53u^3+166u^4+388u^5+734u^6+1132u^7+1483u^8+1688u^9+1702u^{10}+1411u^{11}+1132u^{12}+734u^{13}+388u^{14}+166u^{15}+53u^{16}+16u^{17}+4u^{18}+u^{19}+10u^{18}+\dots+4u+1)(u^{39}+17u^{38}+\dots+1200u+256)$
c_3, c_{10}	$(u-1)^2(u^2+u+1)(u^{19}+3u^{17}+\dots-u+1)(u^{39}-4u^{37}+\dots+u-1)$ $(u^{76}+4u^{75}+\dots-13u+1)$
c_4	$(u-1)^2(u^2+u+1)(u^{19}-u^{18}+\dots-3u-1)$ $(u^{39}-u^{38}+\dots+47u+17)(u^{76}+2u^{75}+\dots-461147u+92641)$
c_5	$(u+1)^4(u^{19}-4u^{18}+\dots+2u^2-1)$ $(1-4u+6u^2+u^3-14u^4+10u^5+18u^6-26u^7-9u^8+36u^9-8u^{10}-29u^{11}+19u^{12}+14u^{13}-14u^{14}+10u^{15}-6u^{16}+3u^{17}-u^{18}+u^{19}+4u^{18}+\dots-124u-16)$
c_6	$(u^2-u+1)^2(u^2+u+1)^{38}(u^{19}+6u^{18}+\dots+10u+1)$ $(u^{39}-37u^{38}+\dots+5505024u-262144)$
c_7	u^4 $(-2-u+9u^2+21u^3-4u^4-66u^5-74u^6+44u^7+182u^8+145u^9-73u^{10}-247u^{11}-198u^{12}+145u^{13}-73u^{14}+44u^{15}+21u^{16}+9u^{17}-u^{18}+u^{19}+12u^{18}+\dots+51u+9)(u^{39}-29u^{38}+\dots+14u-4)$
c_8, c_{11}	$(u^2-u+1)^2(u^{19}-5u^{18}+\dots+9u-1)(u^{39}+u^{38}+\dots-u+1)$ $(u^{76}+3u^{75}+\dots-7318u+1741)$
c_9	$(u-1)^2(u^2+u+1)(u^{19}-u^{18}+\dots-3u-1)$ $(u^{39}-u^{38}+\dots+47u+17)(u^{76}+2u^{75}+\dots-461147u+92641)$

VII. Riley Polynomials

Crossings	Riley Polynomials at each crossings
c_1, c_5	$(y-1)^4(y^{19} - 10y^{18} + \dots + 4y - 1)$ $(-1 + 4y - 16y^2 + 53y^3 - 166y^4 + 388y^5 - 734y^6 + 1132y^7 - 1483y^8 + 1688y^9 - 1702y^{10} + \dots)$ $(y^{39} - 17y^{38} + \dots + 1200y - 256)$
c_2	$(y-1)^4(y^{19} + 2y^{18} + \dots - 88y - 1)$ $(-1 - 16y - 164y^2 - 867y^3 - 3826y^4 - 1.05 \times 10^4 y^5 - 1.84 \times 10^4 y^6 - 2.18 \times 10^4 y^7 - 1.81 \times 10^4 y^8 + \dots)$ $(y^{39} + 11y^{38} + \dots - 231680y - 65536)$
c_3, c_{10}	$(y-1)^2(y^2 + y + 1)(y^{19} + 6y^{18} + \dots - 9y - 1)$ $(y^{39} - 8y^{38} + \dots + 9y - 1)(y^{76} + 26y^{75} + \dots + 75y + 1)$
c_4	$(y-1)^2(y^2 + y + 1)(y^{19} - 9y^{18} + \dots + y - 1)$ $(y^{39} - 19y^{38} + \dots + 3399y - 289)$ $(y^{76} - 34y^{75} + \dots - 289799457437y + 8582354881)$
c_6	$(y^2 + y + 1)^{40}(y^{19} - 6y^{18} + \dots + 18y - 1)$ $(y^{39} - 5y^{38} + \dots + 515396075520y - 68719476736)$
c_7	$y^4(y^{19} - 8y^{18} + \dots - 1467y - 81)$ $(-4 + 37y - 139y^2 + 349y^3 - 816y^4 + 1754y^5 - 2722y^6 + 2948y^7 - 2788y^8 + 2827y^9 - 2041y^{10} + \dots)$ $(y^{39} - 11y^{38} + \dots - 276y - 16)$
c_8, c_{11}	$(y^2 + y + 1)^2(y^{19} - 9y^{18} + \dots + 47y - 1)(y^{39} + y^{38} + \dots + 37y - 1)$ $(y^{76} - 31y^{75} + \dots - 27023766y + 3031081)$
c_9	$(y-1)^2(y^2 + y + 1)(y^{19} - 9y^{18} + \dots + y - 1)$ $(y^{39} - 19y^{38} + \dots + 3399y - 289)$ $(y^{76} - 34y^{75} + \dots - 289799457437y + 8582354881)$