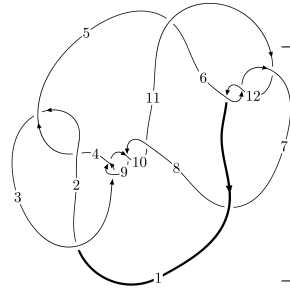
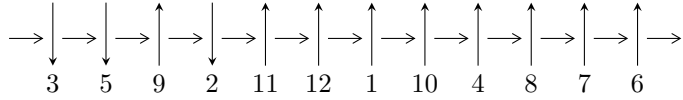


12a<sub>0161</sub> (K12a<sub>0161</sub>)



A knot diagram<sup>1</sup>

**Linearized knot diagram**



**Solving Sequence**

$$7, 11 \xrightarrow{c_{11}} 12 \xrightarrow{c_6} 6 \xrightarrow{c_{12}} 1 \xrightarrow{c_7} 8 \xrightarrow{c_5} 2, 5 \xrightarrow{c_2} 3 \xrightarrow{c_4} 4 \xrightarrow{c_{10}} 10 \xrightarrow{c_9} 9 \rightsquigarrow c_1, c_3, c_8$$

**Ideals for irreducible components<sup>2</sup> of  $X_{\text{par}}$**

$$I_1^u = \langle -u^{45} - 19u^{43} + \dots + b - u, u^{77} + u^{76} + \dots + a - 1, u^{78} + 2u^{77} + \dots - 4u^2 - 1 \rangle$$

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

\* 2 irreducible components of  $\dim_{\mathbb{C}} = 0$ , with total 81 representations.

<sup>1</sup>The image of knot diagram is generated by the software “**Draw programme**” developed by Andrew Bartholomew(<http://www.layer8.co.uk/maths/draw/index.htm#Running-draw>), where we modified some parts for our purpose(<https://github.com/CATsTAILs/LinksPainter>).

<sup>2</sup>All coefficients of polynomials are rational numbers. But the coefficients are sometimes approximated in decimal forms when there is not enough margin.

$$I_1^u = \langle -u^{45} - 19u^{43} + \dots + b - u, u^{77} + u^{76} + \dots + a - 1, u^{78} + 2u^{77} + \dots - 4u^2 - 1 \rangle \quad \text{I.}$$

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

$$a_{12} = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

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

$$a_1 = \begin{pmatrix} u^2 + 1 \\ -u^4 - 2u^2 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} u^5 + 2u^3 + u \\ -u^7 - 3u^5 - 2u^3 + u \end{pmatrix}$$

$$a_2 = \begin{pmatrix} -u^{77} - u^{76} + \dots + 4u + 1 \\ u^{45} + 19u^{43} + \dots - 8u^2 + u \end{pmatrix}$$

$$a_5 = \begin{pmatrix} -u^3 - 2u \\ u^3 + u \end{pmatrix}$$

$$a_3 = \begin{pmatrix} -u^{51} - 22u^{49} + \dots - 16u^2 + 6u \\ -u^{77} - 2u^{76} + \dots - 2u^2 + 1 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 2u^{77} + 2u^{76} + \dots - 4u - 1 \\ -u^{77} - 2u^{76} + \dots - u + 1 \end{pmatrix}$$

$$a_{10} = \begin{pmatrix} -u^{12} - 5u^{10} - 9u^8 - 6u^6 + u^2 + 1 \\ u^{14} + 6u^{12} + 13u^{10} + 10u^8 - 2u^6 - 4u^4 + u^2 \end{pmatrix}$$

$$a_9 = \begin{pmatrix} u^{19} + 8u^{17} + 26u^{15} + 42u^{13} + 31u^{11} + 2u^9 - 10u^7 - 4u^5 + u^3 + 2u \\ -u^{21} - 9u^{19} + \dots - u^3 + u \end{pmatrix}$$

(ii) Obstruction class = -1

(iii) Cusp Shapes =  $-u^{77} - 2u^{76} + \dots + 19u + 1$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
$c_1$	$u^{78} + 44u^{77} + \dots + 17u + 1$
$c_2, c_4$	$u^{78} - 4u^{77} + \dots + 9u - 1$
$c_3, c_9$	$u^{78} - u^{77} + \dots + 4u + 8$
$c_5, c_7$	$u^{78} - 2u^{77} + \dots + 4u - 1$
$c_6, c_{11}, c_{12}$	$u^{78} + 2u^{77} + \dots - 4u^2 - 1$
$c_8, c_{10}$	$u^{78} - 21u^{77} + \dots - 1232u + 64$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
$c_1$	$y^{78} - 16y^{77} + \dots - 329y + 1$
$c_2, c_4$	$y^{78} - 44y^{77} + \dots - 17y + 1$
$c_3, c_9$	$y^{78} - 21y^{77} + \dots - 1232y + 64$
$c_5, c_7$	$y^{78} - 38y^{77} + \dots + 8y + 1$
$c_6, c_{11}, c_{12}$	$y^{78} + 66y^{77} + \dots + 8y + 1$
$c_8, c_{10}$	$y^{78} + 67y^{77} + \dots - 68864y + 4096$

(vi) Complex Volumes and Cusp Shapes

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.221840 + 0.947945I$ $a = -0.90854 - 2.19426I$ $b = -0.63575 + 1.79124I$	$-6.03562 - 1.43380I$	0
$u = 0.221840 - 0.947945I$ $a = -0.90854 + 2.19426I$ $b = -0.63575 - 1.79124I$	$-6.03562 + 1.43380I$	0
$u = -0.322913 + 0.983251I$ $a = -0.59097 + 2.36662I$ $b = -0.89380 - 1.94580I$	$-5.23022 + 7.49440I$	0
$u = -0.322913 - 0.983251I$ $a = -0.59097 - 2.36662I$ $b = -0.89380 + 1.94580I$	$-5.23022 - 7.49440I$	0
$u = -0.266822 + 1.014570I$ $a = -0.265621 - 0.087182I$ $b = 0.763129 - 0.052329I$	$-2.10877 + 2.64422I$	0
$u = -0.266822 - 1.014570I$ $a = -0.265621 + 0.087182I$ $b = 0.763129 + 0.052329I$	$-2.10877 - 2.64422I$	0
$u = -0.201285 + 0.867169I$ $a = -0.61079 - 1.89983I$ $b = 0.17550 + 1.40684I$	$-6.10936 - 1.32608I$	$0.73693 + 1.24858I$
$u = -0.201285 - 0.867169I$ $a = -0.61079 + 1.89983I$ $b = 0.17550 - 1.40684I$	$-6.10936 + 1.32608I$	$0.73693 - 1.24858I$
$u = 0.316364 + 0.786903I$ $a = -0.12641 + 1.88878I$ $b = 0.12525 - 1.63413I$	$-5.61969 + 7.17353I$	$1.91318 - 7.13043I$
$u = 0.316364 - 0.786903I$ $a = -0.12641 - 1.88878I$ $b = 0.12525 + 1.63413I$	$-5.61969 - 7.17353I$	$1.91318 + 7.13043I$

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.785147 + 0.185065I$ $a = -3.20268 + 3.17739I$ $b = 1.37992 - 2.53027I$	$-2.75716 - 11.61650I$	$5.77587 + 8.60798I$
$u = -0.785147 - 0.185065I$ $a = -3.20268 - 3.17739I$ $b = 1.37992 + 2.53027I$	$-2.75716 + 11.61650I$	$5.77587 - 8.60798I$
$u = -0.770791 + 0.171159I$ $a = 0.857137 + 0.494336I$ $b = -0.743484 + 0.108436I$	$0.46016 - 6.59193I$	$9.04398 + 5.71613I$
$u = -0.770791 - 0.171159I$ $a = 0.857137 - 0.494336I$ $b = -0.743484 - 0.108436I$	$0.46016 + 6.59193I$	$9.04398 - 5.71613I$
$u = 0.216613 + 0.756610I$ $a = -0.036625 + 0.331435I$ $b = 0.702068 - 0.142190I$	$-2.39928 + 2.61834I$	$4.76572 - 3.85328I$
$u = 0.216613 - 0.756610I$ $a = -0.036625 - 0.331435I$ $b = 0.702068 + 0.142190I$	$-2.39928 - 2.61834I$	$4.76572 + 3.85328I$
$u = -0.782132 + 0.079591I$ $a = -1.50273 + 2.21168I$ $b = 0.47522 - 1.74253I$	$4.89842 - 5.92763I$	$11.50709 + 7.07473I$
$u = -0.782132 - 0.079591I$ $a = -1.50273 - 2.21168I$ $b = 0.47522 + 1.74253I$	$4.89842 + 5.92763I$	$11.50709 - 7.07473I$
$u = -0.320177 + 1.177210I$ $a = -0.373766 + 1.202460I$ $b = -0.73975 - 1.50874I$	$1.55633 + 1.91915I$	0
$u = -0.320177 - 1.177210I$ $a = -0.373766 - 1.202460I$ $b = -0.73975 + 1.50874I$	$1.55633 - 1.91915I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.756990 + 0.181313I$ $a = -2.99011 - 3.55109I$ $b = 1.19344 + 2.71479I$	$-3.62530 + 5.27142I$	$4.61455 - 4.56249I$
$u = 0.756990 - 0.181313I$ $a = -2.99011 + 3.55109I$ $b = 1.19344 - 2.71479I$	$-3.62530 - 5.27142I$	$4.61455 + 4.56249I$
$u = -0.773908 + 0.039316I$ $a = 0.028490 - 0.517470I$ $b = -0.307660 + 0.629701I$	$6.03009 - 1.10865I$	$14.3285 + 0.8012I$
$u = -0.773908 - 0.039316I$ $a = 0.028490 + 0.517470I$ $b = -0.307660 - 0.629701I$	$6.03009 + 1.10865I$	$14.3285 - 0.8012I$
$u = -0.051004 + 1.229700I$ $a = -0.65147 - 1.75217I$ $b = -0.546978 - 0.264959I$	$-5.84021 - 1.10052I$	0
$u = -0.051004 - 1.229700I$ $a = -0.65147 + 1.75217I$ $b = -0.546978 + 0.264959I$	$-5.84021 + 1.10052I$	0
$u = -0.743598 + 0.185676I$ $a = 3.33465 - 1.56772I$ $b = -1.28958 + 1.13847I$	$-3.82604 - 2.40404I$	$4.47486 + 3.48448I$
$u = -0.743598 - 0.185676I$ $a = 3.33465 + 1.56772I$ $b = -1.28958 - 1.13847I$	$-3.82604 + 2.40404I$	$4.47486 - 3.48448I$
$u = 0.724926 + 0.227700I$ $a = 2.97783 + 1.77944I$ $b = -1.03439 - 1.28165I$	$-3.74163 - 3.33148I$	$4.54329 + 2.27222I$
$u = 0.724926 - 0.227700I$ $a = 2.97783 - 1.77944I$ $b = -1.03439 + 1.28165I$	$-3.74163 + 3.33148I$	$4.54329 - 2.27222I$

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.163517 + 1.233490I$ $a = -0.418961 + 0.316278I$ $b = 0.741466 + 0.295231I$	$-2.91541 + 2.01642I$	0
$u = 0.163517 - 1.233490I$ $a = -0.418961 - 0.316278I$ $b = 0.741466 - 0.295231I$	$-2.91541 - 2.01642I$	0
$u = 0.717043 + 0.182657I$ $a = 1.087960 - 0.258300I$ $b = -0.815686 - 0.256787I$	$-0.315586 + 0.899815I$	$8.05190 - 1.09209I$
$u = 0.717043 - 0.182657I$ $a = 1.087960 + 0.258300I$ $b = -0.815686 + 0.256787I$	$-0.315586 - 0.899815I$	$8.05190 + 1.09209I$
$u = -0.323388 + 1.222800I$ $a = 0.540462 - 0.141703I$ $b = 0.601785 + 0.420796I$	$2.39590 - 2.86000I$	0
$u = -0.323388 - 1.222800I$ $a = 0.540462 + 0.141703I$ $b = 0.601785 - 0.420796I$	$2.39590 + 2.86000I$	0
$u = 0.272850 + 1.244810I$ $a = -1.084010 - 0.348222I$ $b = 0.12739 + 1.81207I$	$-2.00980 + 1.83090I$	0
$u = 0.272850 - 1.244810I$ $a = -1.084010 + 0.348222I$ $b = 0.12739 - 1.81207I$	$-2.00980 - 1.83090I$	0
$u = 0.719177 + 0.040036I$ $a = 0.37747 - 2.59587I$ $b = -0.66798 + 1.81340I$	$1.67961 + 1.74944I$	$8.87795 - 3.96310I$
$u = 0.719177 - 0.040036I$ $a = 0.37747 + 2.59587I$ $b = -0.66798 - 1.81340I$	$1.67961 - 1.74944I$	$8.87795 + 3.96310I$



Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.274784 + 1.281070I$ $a = -1.74319 - 1.43094I$ $b = 1.33894 - 0.46268I$	$-3.63721 - 3.47711I$	0
$u = -0.274784 - 1.281070I$ $a = -1.74319 + 1.43094I$ $b = 1.33894 + 0.46268I$	$-3.63721 + 3.47711I$	0
$u = -0.688313$ $a = 3.35104$ $b = -1.29655$	0.354274	12.4140
$u = 0.298521 + 1.292870I$ $a = 1.55001 + 1.06840I$ $b = 1.15050 - 1.83635I$	$-2.48033 + 5.43449I$	0
$u = 0.298521 - 1.292870I$ $a = 1.55001 - 1.06840I$ $b = 1.15050 + 1.83635I$	$-2.48033 - 5.43449I$	0
$u = -0.330502 + 1.287190I$ $a = -0.148188 - 0.049151I$ $b = 0.044709 - 0.772496I$	$1.89914 - 5.09234I$	0
$u = -0.330502 - 1.287190I$ $a = -0.148188 + 0.049151I$ $b = 0.044709 + 0.772496I$	$1.89914 + 5.09234I$	0
$u = -0.337500 + 1.313270I$ $a = 2.00680 - 0.11521I$ $b = -0.20506 + 1.85852I$	$0.53996 - 9.96745I$	0
$u = -0.337500 - 1.313270I$ $a = 2.00680 + 0.11521I$ $b = -0.20506 - 1.85852I$	$0.53996 + 9.96745I$	0
$u = 0.118296 + 1.357210I$ $a = -0.617226 + 1.056650I$ $b = 0.33291 + 1.37529I$	$-5.11060 + 4.79864I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.118296 - 1.357210I$ $a = -0.617226 - 1.056650I$ $b = 0.33291 - 1.37529I$	$-5.11060 - 4.79864I$	0
$u = 0.212992 + 1.351290I$ $a = -1.31861 + 0.66037I$ $b = 0.840813 + 1.053440I$	$-4.03525 + 2.28010I$	0
$u = 0.212992 - 1.351290I$ $a = -1.31861 - 0.66037I$ $b = 0.840813 - 1.053440I$	$-4.03525 - 2.28010I$	0
$u = 0.301735 + 1.364260I$ $a = -0.299894 + 0.766680I$ $b = 0.805459 + 0.404103I$	$-5.19764 + 4.61194I$	0
$u = 0.301735 - 1.364260I$ $a = -0.299894 - 0.766680I$ $b = 0.805459 - 0.404103I$	$-5.19764 - 4.61194I$	0
$u = -0.311251 + 1.368930I$ $a = -2.40297 - 0.78639I$ $b = 1.81013 - 1.33373I$	$-8.73778 - 6.23313I$	0
$u = -0.311251 - 1.368930I$ $a = -2.40297 + 0.78639I$ $b = 1.81013 + 1.33373I$	$-8.73778 + 6.23313I$	0
$u = -0.324957 + 1.366060I$ $a = -0.121142 - 0.795607I$ $b = 0.685934 - 0.203092I$	$-4.39480 - 10.55880I$	0
$u = -0.324957 - 1.366060I$ $a = -0.121142 + 0.795607I$ $b = 0.685934 + 0.203092I$	$-4.39480 + 10.55880I$	0
$u = 0.317497 + 1.368890I$ $a = 3.12911 - 0.00654I$ $b = -1.24074 - 3.25839I$	$-8.52354 + 9.16648I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.317497 - 1.368890I$ $a = 3.12911 + 0.00654I$ $b = -1.24074 + 3.25839I$	$-8.52354 - 9.16648I$	0
$u = -0.330057 + 1.374490I$ $a = 3.07659 + 0.21604I$ $b = -1.51815 + 2.97295I$	$-7.6876 - 15.6495I$	0
$u = -0.330057 - 1.374490I$ $a = 3.07659 - 0.21604I$ $b = -1.51815 - 2.97295I$	$-7.6876 + 15.6495I$	0
$u = 0.295867 + 1.382440I$ $a = -2.29433 + 0.57982I$ $b = 1.61811 + 1.49611I$	$-8.83720 + 0.37277I$	0
$u = 0.295867 - 1.382440I$ $a = -2.29433 - 0.57982I$ $b = 1.61811 - 1.49611I$	$-8.83720 - 0.37277I$	0
$u = 0.01557 + 1.41703I$ $a = -0.590163 - 0.023145I$ $b = -0.502778 + 0.138020I$	$-8.98429 + 3.00952I$	0
$u = 0.01557 - 1.41703I$ $a = -0.590163 + 0.023145I$ $b = -0.502778 - 0.138020I$	$-8.98429 - 3.00952I$	0
$u = -0.00417 + 1.42134I$ $a = 0.267222 - 0.793896I$ $b = -0.64326 - 2.84980I$	$-12.84860 - 1.47997I$	0
$u = -0.00417 - 1.42134I$ $a = 0.267222 + 0.793896I$ $b = -0.64326 + 2.84980I$	$-12.84860 + 1.47997I$	0
$u = 0.02254 + 1.43315I$ $a = 0.103861 + 0.659204I$ $b = -0.28487 + 2.87993I$	$-12.4992 + 7.7676I$	0

Solutions to $I_1^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.02254 - 1.43315I$ $a = 0.103861 - 0.659204I$ $b = -0.28487 - 2.87993I$	$-12.4992 - 7.7676I$	0
$u = 0.359180 + 0.436801I$ $a = 0.662229 + 0.372982I$ $b = -0.248173 - 1.100090I$	$0.37969 + 3.21597I$	$7.04752 - 8.62566I$
$u = 0.359180 - 0.436801I$ $a = 0.662229 - 0.372982I$ $b = -0.248173 + 1.100090I$	$0.37969 - 3.21597I$	$7.04752 + 8.62566I$
$u = 0.472822 + 0.269583I$ $a = 1.58775 + 0.80986I$ $b = -0.165683 - 0.644607I$	$0.913188 - 0.312563I$	$10.41614 - 0.13435I$
$u = 0.472822 - 0.269583I$ $a = 1.58775 - 0.80986I$ $b = -0.165683 + 0.644607I$	$0.913188 + 0.312563I$	$10.41614 + 0.13435I$
$u = 0.419349$ $a = 1.23689$ $b = -0.399405$	0.742145	13.5430
$u = -0.135471 + 0.223794I$ $a = 0.41686 + 2.11056I$ $b = 0.419076 + 0.683835I$	$-1.63000 - 0.53870I$	$-3.53001 + 1.26153I$
$u = -0.135471 - 0.223794I$ $a = 0.41686 - 2.11056I$ $b = 0.419076 - 0.683835I$	$-1.63000 + 0.53870I$	$-3.53001 - 1.26153I$

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

(i) Arc colorings

$$a_7 = \begin{pmatrix} 0 \\ u \end{pmatrix}$$

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

$$a_{12} = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} -u \\ u^2 - u + 1 \end{pmatrix}$$

$$a_1 = \begin{pmatrix} u^2 + 1 \\ -u^2 + u - 1 \end{pmatrix}$$

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

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

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

$$a_3 = \begin{pmatrix} u^2 + 1 \\ 0 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} u^2 + 1 \\ 0 \end{pmatrix}$$

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

$$a_9 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

(ii) Obstruction class = 1

(iii) Cusp Shapes =  $3u^2 - 4u + 4$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
$c_1, c_2$	$(u - 1)^3$
$c_3, c_8, c_9$ $c_{10}$	$u^3$
$c_4$	$(u + 1)^3$
$c_5, c_7$	$u^3 - u^2 + 1$
$c_6$	$u^3 + u^2 + 2u + 1$
$c_{11}, c_{12}$	$u^3 - u^2 + 2u - 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
$c_1, c_2, c_4$	$(y - 1)^3$
$c_3, c_8, c_9$ $c_{10}$	$y^3$
$c_5, c_7$	$y^3 - y^2 + 2y - 1$
$c_6, c_{11}, c_{12}$	$y^3 + 3y^2 + 2y - 1$

(vi) Complex Volumes and Cusp Shapes

Solutions to $I_2^u$	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.215080 + 1.307140I$ $a = -1.32472 + 1.12456I$ $b = 0.877439 + 0.744862I$	$-4.66906 + 2.82812I$	$-1.84740 - 3.54173I$
$u = 0.215080 - 1.307140I$ $a = -1.32472 - 1.12456I$ $b = 0.877439 - 0.744862I$	$-4.66906 - 2.82812I$	$-1.84740 + 3.54173I$
$u = 0.569840$ $a = 2.64944$ $b = -0.754878$	$-0.531480$	$2.69480$



### III. u-Polynomials

Crossings	u-Polynomials at each crossing
$c_1$	$((u - 1)^3)(u^{78} + 44u^{77} + \dots + 17u + 1)$
$c_2$	$((u - 1)^3)(u^{78} - 4u^{77} + \dots + 9u - 1)$
$c_3, c_9$	$u^3(u^{78} - u^{77} + \dots + 4u + 8)$
$c_4$	$((u + 1)^3)(u^{78} - 4u^{77} + \dots + 9u - 1)$
$c_5, c_7$	$(u^3 - u^2 + 1)(u^{78} - 2u^{77} + \dots + 4u - 1)$
$c_6$	$(u^3 + u^2 + 2u + 1)(u^{78} + 2u^{77} + \dots - 4u^2 - 1)$
$c_8, c_{10}$	$u^3(u^{78} - 21u^{77} + \dots - 1232u + 64)$
$c_{11}, c_{12}$	$(u^3 - u^2 + 2u - 1)(u^{78} + 2u^{77} + \dots - 4u^2 - 1)$

#### IV. Riley Polynomials

Crossings	Riley Polynomials at each crossing
$c_1$	$((y - 1)^3)(y^{78} - 16y^{77} + \dots - 329y + 1)$
$c_2, c_4$	$((y - 1)^3)(y^{78} - 44y^{77} + \dots - 17y + 1)$
$c_3, c_9$	$y^3(y^{78} - 21y^{77} + \dots - 1232y + 64)$
$c_5, c_7$	$(y^3 - y^2 + 2y - 1)(y^{78} - 38y^{77} + \dots + 8y + 1)$
$c_6, c_{11}, c_{12}$	$(y^3 + 3y^2 + 2y - 1)(y^{78} + 66y^{77} + \dots + 8y + 1)$
$c_8, c_{10}$	$y^3(y^{78} + 67y^{77} + \dots - 68864y + 4096)$