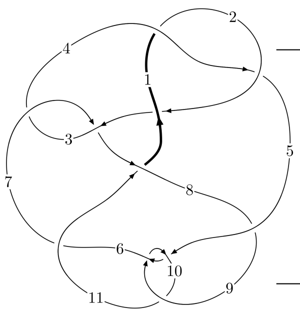
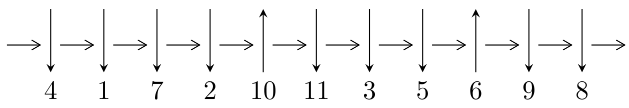
$11a_{31}$ ($K11a_{31}$)



A knot diagram[1]

Linearized knot diagam



Solving Sequence

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

Ideals for irreducible components[2] of $X_{\mathbf{par}}$

$$I_1^u = \langle -u^{65} + u^{64} + \cdots + b - u,\ -u^{65} + u^{64} + \cdots + a - 1,\ u^{67} - 2u^{66} + \cdots - 4u^2 + 1\rangle$$
$$I_2^u = \langle b + 1,\ -u^3 + u^2 + a - u + 2,\ u^5 - u^4 + 2u^3 - u^2 + u - 1\rangle$$

* 2 irreducible components of $\dim_{\mathbb{C}} = 0$, with total 72 representations.

[1] 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`).

[2] All coefficients of polynomials are rational numbers. But the coefficients are sometimes approximated in decimal forms when there is not enough margin.

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$$\boldsymbol{I^u_1 = \langle -u^{65}+u^{64}+\cdots+b-u,\ -u^{65}+u^{64}+\cdots+a-1,\ u^{67}-2u^{66}+\cdots-4u^2+1\rangle}$$

(i) Arc colorings

$$a_5 = \begin{pmatrix}1\\0\end{pmatrix}$$
$$a_{10} = \begin{pmatrix}0\\u\end{pmatrix}$$
$$a_2 = \begin{pmatrix}u^{65}-u^{64}+\cdots-2u+1\\u^{65}-u^{64}+\cdots-2u^2+u\end{pmatrix}$$
$$a_6 = \begin{pmatrix}1\\-u^2\end{pmatrix}$$
$$a_4 = \begin{pmatrix}2u^{65}-2u^{64}+\cdots-2u+2\\u^{65}-u^{64}+\cdots+5u^3-3u^2\end{pmatrix}$$
$$a_1 = \begin{pmatrix}-u^{11}-2u^9-2u^7-u^3\\-u^{11}-3u^9-4u^7-u^5+u^3+u\end{pmatrix}$$
$$a_9 = \begin{pmatrix}-u\\u^3+u\end{pmatrix}$$
$$a_{11} = \begin{pmatrix}-u^3\\u^5+u^3+u\end{pmatrix}$$
$$a_7 = \begin{pmatrix}-u^6-u^4+1\\u^8+2u^6+2u^4\end{pmatrix}$$
$$a_3 = \begin{pmatrix}-u^{63}+u^{62}+\cdots-u+1\\u^{65}-u^{64}+\cdots-u^2+u\end{pmatrix}$$
$$a_8 = \begin{pmatrix}u^3\\u^3+u\end{pmatrix}$$
$$a_8 = \begin{pmatrix}u^3\\u^3+u\end{pmatrix}$$

(ii) Obstruction class $= -1$

(iii) Cusp Shapes $= -4u^{66}+13u^{65}+\cdots+u-3$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1, c_4	$u^{67} - 6u^{66} + \cdots - 6u + 1$
c_2	$u^{67} + 32u^{66} + \cdots - 6u + 1$
c_3, c_7	$u^{67} + u^{66} + \cdots + 96u + 32$
c_5, c_9	$u^{67} - 2u^{66} + \cdots - 4u^2 + 1$
c_6, c_8	$u^{67} + 2u^{66} + \cdots + 78u + 9$
c_{10}	$u^{67} + 36u^{66} + \cdots + 8u - 1$
c_{11}	$u^{67} - 8u^{66} + \cdots + 2798u + 53$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_4	$y^{67} - 32y^{66} + \cdots - 6y - 1$
c_2	$y^{67} + 12y^{66} + \cdots - 266y - 1$
c_3, c_7	$y^{67} + 33y^{66} + \cdots - 14848y - 1024$
c_5, c_9	$y^{67} + 36y^{66} + \cdots + 8y - 1$
c_6, c_8	$y^{67} - 52y^{66} + \cdots - 360y - 81$
c_{10}	$y^{67} - 8y^{66} + \cdots + 124y - 1$
c_{11}	$y^{67} + 8y^{66} + \cdots + 6484936y - 2809$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u = -0.564990 + 0.825170I$ $a = -1.000610 + 0.092379I$ $b = 0.481444 - 0.849559I$	$4.87488 - 4.14687I$	$-1.59935 + 4.64549I$
$u = -0.564990 - 0.825170I$ $a = -1.000610 - 0.092379I$ $b = 0.481444 + 0.849559I$	$4.87488 + 4.14687I$	$-1.59935 - 4.64549I$
$u = 0.511350 + 0.819428I$ $a = -0.40478 - 2.45910I$ $b = -0.887590 + 0.499549I$	$0.03256 + 4.08481I$	$-5.93835 - 7.04941I$
$u = 0.511350 - 0.819428I$ $a = -0.40478 + 2.45910I$ $b = -0.887590 - 0.499549I$	$0.03256 - 4.08481I$	$-5.93835 + 7.04941I$
$u = -0.569629 + 0.864915I$ $a = 1.27940 - 2.06653I$ $b = 1.098240 + 0.652944I$	$3.02110 - 9.72497I$	$-4.76527 + 9.27372I$
$u = -0.569629 - 0.864915I$ $a = 1.27940 + 2.06653I$ $b = 1.098240 - 0.652944I$	$3.02110 + 9.72497I$	$-4.76527 - 9.27372I$
$u = 0.246240 + 1.034280I$ $a = 0.823566 + 0.817173I$ $b = 0.575942 + 0.558676I$	$-0.281369 + 0.970663I$	0
$u = 0.246240 - 1.034280I$ $a = 0.823566 - 0.817173I$ $b = 0.575942 - 0.558676I$	$-0.281369 - 0.970663I$	0
$u = 0.119094 + 1.072640I$ $a = 2.44789 - 0.02818I$ $b = 1.039730 - 0.556055I$	$-1.77198 + 5.50921I$	0
$u = 0.119094 - 1.072640I$ $a = 2.44789 + 0.02818I$ $b = 1.039730 + 0.556055I$	$-1.77198 - 5.50921I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u=-0.052245+0.915458I$ $a=-2.62750+1.03290I$ $b=-1.058310-0.288428I$	$-3.49198-1.02780I$	$-15.4724+0.3169I$
$u=-0.052245-0.915458I$ $a=-2.62750-1.03290I$ $b=-1.058310+0.288428I$	$-3.49198+1.02780I$	$-15.4724-0.3169I$
$u=-0.465256+0.785906I$ $a=-0.92627+1.18008I$ $b=-1.225020+0.046584I$	$-1.16301-1.95072I$	$-3.00568+5.39206I$
$u=-0.465256-0.785906I$ $a=-0.92627-1.18008I$ $b=-1.225020-0.046584I$	$-1.16301+1.95072I$	$-3.00568-5.39206I$
$u=-0.574831+0.702829I$ $a=\ 0.276564-1.126500I$ $b=\ 0.534420+0.823507I$	$5.22376-0.38517I$	$-0.51661+2.40952I$
$u=-0.574831-0.702829I$ $a=\ 0.276564+1.126500I$ $b=\ 0.534420-0.823507I$	$5.22376+0.38517I$	$-0.51661-2.40952I$
$u=-0.592161+0.649495I$ $a=-0.159409+0.601501I$ $b=\ 1.063280-0.655308I$	$3.63203+5.13427I$	$-3.00083-2.99523I$
$u=-0.592161-0.649495I$ $a=-0.159409-0.601501I$ $b=\ 1.063280+0.655308I$	$3.63203-5.13427I$	$-3.00083+2.99523I$
$u=\ 0.493599+0.712589I$ $a=\ 0.989105+0.915694I$ $b=-0.797853-0.467895I$	$0.345703+0.068999I$	$-4.55173-0.43344I$
$u=\ 0.493599-0.712589I$ $a=\ 0.989105-0.915694I$ $b=-0.797853+0.467895I$	$0.345703-0.068999I$	$-4.55173+0.43344I$

	Solutions to I_1^u	$\sqrt{-1}(\text{vol} + \sqrt{-1}CS)$	Cusp shape
$u =$	$0.249006 + 0.819006I$		
$a =$	$0.686833 + 0.149955I$	$-0.492874 + 1.272410I$	$-5.34668 - 4.93990I$
$b =$	$0.113095 + 0.211783I$		
$u =$	$0.249006 - 0.819006I$		
$a =$	$0.686833 - 0.149955I$	$-0.492874 - 1.272410I$	$-5.34668 + 4.93990I$
$b =$	$0.113095 - 0.211783I$		
$u =$	$0.816854 + 0.158141I$		
$a =$	$1.31512 - 1.20053I$	$-0.49031 - 10.48350I$	$-6.68771 + 6.96472I$
$b =$	$1.150520 + 0.623562I$		
$u =$	$0.816854 - 0.158141I$		
$a =$	$1.31512 + 1.20053I$	$-0.49031 + 10.48350I$	$-6.68771 - 6.96472I$
$b =$	$1.150520 - 0.623562I$		
$u =$	$-0.819060 + 0.039508I$		
$a =$	$1.247840 + 0.239436I$	$-3.90258 - 1.39316I$	$-7.44622 + 4.95368I$
$b =$	$0.943939 + 0.369724I$		
$u =$	$-0.819060 - 0.039508I$		
$a =$	$1.247840 - 0.239436I$	$-3.90258 + 1.39316I$	$-7.44622 - 4.95368I$
$b =$	$0.943939 - 0.369724I$		
$u =$	$0.491373 + 1.074670I$		
$a =$	$0.250948 + 0.870006I$	$0.415223 + 0.749566I$	0
$b =$	$0.912328 + 0.663370I$		
$u =$	$0.491373 - 1.074670I$		
$a =$	$0.250948 - 0.870006I$	$0.415223 - 0.749566I$	0
$b =$	$0.912328 - 0.663370I$		
$u =$	$0.787826 + 0.169798I$		
$a =$	$-0.403477 + 0.028686I$	$1.83934 - 4.96300I$	$-3.50692 + 3.21590I$
$b =$	$0.374311 - 0.872073I$		
$u =$	$0.787826 - 0.169798I$		
$a =$	$-0.403477 - 0.028686I$	$1.83934 + 4.96300I$	$-3.50692 - 3.21590I$
$b =$	$0.374311 + 0.872073I$		

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.771054 + 0.136932I$ $a = -0.93208 - 1.67887I$ $b = -1.010020 + 0.515425I$	$-2.81565 + 4.36823I$	$-8.36975 - 4.25487I$
$u = -0.771054 - 0.136932I$ $a = -0.93208 + 1.67887I$ $b = -1.010020 - 0.515425I$	$-2.81565 - 4.36823I$	$-8.36975 + 4.25487I$
$u = 0.506993 + 1.122470I$ $a = 1.55101 + 0.80025I$ $b = 0.704157 - 0.772274I$	$1.05507 + 6.16799I$	0
$u = 0.506993 - 1.122470I$ $a = 1.55101 - 0.80025I$ $b = 0.704157 + 0.772274I$	$1.05507 - 6.16799I$	0
$u = 0.751013 + 0.111032I$ $a = -1.48016 + 0.29513I$ $b = -1.254480 + 0.179113I$	$-3.63648 - 1.86851I$	$-7.74469 + 3.58479I$
$u = 0.751013 - 0.111032I$ $a = -1.48016 - 0.29513I$ $b = -1.254480 - 0.179113I$	$-3.63648 + 1.86851I$	$-7.74469 - 3.58479I$
$u = -0.423713 + 1.167870I$ $a = -0.210888 + 0.121533I$ $b = -0.351913 - 0.524199I$	$-4.77435 - 3.67797I$	0
$u = -0.423713 - 1.167870I$ $a = -0.210888 - 0.121533I$ $b = -0.351913 + 0.524199I$	$-4.77435 + 3.67797I$	0
$u = 0.360436 + 1.193060I$ $a = 0.685565 - 0.715503I$ $b = 0.331641 - 0.843858I$	$-2.23668 - 1.18578I$	0
$u = 0.360436 - 1.193060I$ $a = 0.685565 + 0.715503I$ $b = 0.331641 + 0.843858I$	$-2.23668 + 1.18578I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.385671 + 1.191060I$ $a = -1.81898 - 0.21940I$ $b = -1.047790 + 0.496161I$	$-6.70689 + 0.47788I$	0
$u = -0.385671 - 1.191060I$ $a = -1.81898 + 0.21940I$ $b = -1.047790 - 0.496161I$	$-6.70689 - 0.47788I$	0
$u = 0.402865 + 1.186580I$ $a = -2.97982 - 0.67442I$ $b = -1.251850 + 0.222499I$	$-7.37230 + 2.08523I$	0
$u = 0.402865 - 1.186580I$ $a = -2.97982 + 0.67442I$ $b = -1.251850 - 0.222499I$	$-7.37230 - 2.08523I$	0
$u = -0.481238 + 1.165490I$ $a = 0.648241 + 0.407995I$ $b = -0.501049 + 0.552756I$	$-4.35980 - 4.63647I$	0
$u = -0.481238 - 1.165490I$ $a = 0.648241 - 0.407995I$ $b = -0.501049 - 0.552756I$	$-4.35980 + 4.63647I$	0
$u = 0.363456 + 1.217370I$ $a = 2.20761 + 0.35528I$ $b = 1.152000 + 0.602107I$	$-4.67059 - 6.53918I$	0
$u = 0.363456 - 1.217370I$ $a = 2.20761 - 0.35528I$ $b = 1.152000 - 0.602107I$	$-4.67059 + 6.53918I$	0
$u = 0.678065 + 0.264736I$ $a = 0.241702 - 0.802492I$ $b = 0.639652 + 0.752359I$	$3.53541 - 1.62116I$	$-1.50598 + 2.39002I$
$u = 0.678065 - 0.264736I$ $a = 0.241702 + 0.802492I$ $b = 0.639652 - 0.752359I$	$3.53541 + 1.62116I$	$-1.50598 - 2.39002I$

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol} + \sqrt{-1}CS)$	Cusp shape
$u = 0.636846 + 0.349077I$ $a = 0.126882 + 0.689081I$ $b = 0.982683 - 0.638281I$	$2.50124 + 3.65316I$	$-3.04825 - 3.77451I$
$u = 0.636846 - 0.349077I$ $a = 0.126882 - 0.689081I$ $b = 0.982683 + 0.638281I$	$2.50124 - 3.65316I$	$-3.04825 + 3.77451I$
$u = 0.493300 + 1.180590I$ $a = -2.28193 - 1.49318I$ $b = -1.286340 - 0.182808I$	$-6.72971 + 6.47733I$	0
$u = 0.493300 - 1.180590I$ $a = -2.28193 + 1.49318I$ $b = -1.286340 + 0.182808I$	$-6.72971 - 6.47733I$	0
$u = -0.504577 + 1.182750I$ $a = -2.16655 + 1.99170I$ $b = -1.022760 - 0.541798I$	$-5.86773 - 9.08868I$	0
$u = -0.504577 - 1.182750I$ $a = -2.16655 - 1.99170I$ $b = -1.022760 + 0.541798I$	$-5.86773 + 9.08868I$	0
$u = 0.518615 + 1.181260I$ $a = -0.854148 + 0.948142I$ $b = 0.360963 + 0.899604I$	$-1.13304 + 9.79846I$	0
$u = 0.518615 - 1.181260I$ $a = -0.854148 - 0.948142I$ $b = 0.360963 - 0.899604I$	$-1.13304 - 9.79846I$	0
$u = -0.434695 + 1.222970I$ $a = 2.46804 - 0.22231I$ $b = 0.982398 + 0.369460I$	$-7.66696 - 5.81189I$	0
$u = -0.434695 - 1.222970I$ $a = 2.46804 + 0.22231I$ $b = 0.982398 - 0.369460I$	$-7.66696 + 5.81189I$	0

Solutions to I_1^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = 0.521787+1.193990I$ $a = 2.69334+1.63831I$ $b = 1.164330-0.627272I$	$-3.5558+15.4016I$	0
$u = 0.521787-1.193990I$ $a = 2.69334-1.63831I$ $b = 1.164330+0.627272I$	$-3.5558-15.4016I$	0
$u = -0.473515+1.216160I$ $a = 1.73934-1.24342I$ $b = 0.939042-0.333718I$	$-7.39058-3.26134I$	0
$u = -0.473515-1.216160I$ $a = 1.73934+1.24342I$ $b = 0.939042+0.333718I$	$-7.39058+3.26134I$	0
$u = -0.680235+0.090499I$ $a = 0.733959+0.447029I$ $b = -0.481544-0.437537I$	$-1.341860+0.241306I$	$-6.37372+0.86588I$
$u = -0.680235-0.090499I$ $a = 0.733959-0.447029I$ $b = -0.481544+0.437537I$	$-1.341860-0.241306I$	$-6.37372-0.86588I$
$u = -0.311701$ $a = 1.66731$ $b = -0.735196$	-1.10322	-8.76950

II. $\boldsymbol{I_2^u = \langle b+1,\ -u^3+u^2+a-u+2,\ u^5-u^4+2u^3-u^2+u-1\rangle}$

(i) Arc colorings

$$a_5 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$
$$a_{10} = \begin{pmatrix} 0 \\ u \end{pmatrix}$$
$$a_2 = \begin{pmatrix} u^3-u^2+u-2 \\ -1 \end{pmatrix}$$
$$a_6 = \begin{pmatrix} 1 \\ -u^2 \end{pmatrix}$$
$$a_4 = \begin{pmatrix} u^3-u^2+u-1 \\ -1 \end{pmatrix}$$
$$a_1 = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$$
$$a_9 = \begin{pmatrix} -u \\ u^3+u \end{pmatrix}$$
$$a_{11} = \begin{pmatrix} -u^3 \\ u^4-u^3+u^2+1 \end{pmatrix}$$
$$a_7 = \begin{pmatrix} u^3 \\ u^3+u \end{pmatrix}$$
$$a_3 = \begin{pmatrix} u^3-u^2+u-1 \\ -1 \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u^3 \\ u^3+u \end{pmatrix}$$
$$a_8 = \begin{pmatrix} u^3 \\ u^3+u \end{pmatrix}$$

(ii) Obstruction class $= 1$

(iii) Cusp Shapes $= 2u^4+u^3+2u-12$

(iv) u-Polynomials at the component

Crossings	u-Polynomials at each crossing
c_1	$(u-1)^5$
c_2, c_4	$(u+1)^5$
c_3, c_7	u^5
c_5	$u^5 - u^4 + 2u^3 - u^2 + u - 1$
c_6	$u^5 + u^4 - 2u^3 - u^2 + u - 1$
c_8, c_{11}	$u^5 - u^4 - 2u^3 + u^2 + u + 1$
c_9	$u^5 + u^4 + 2u^3 + u^2 + u + 1$
c_{10}	$u^5 + 3u^4 + 4u^3 + u^2 - u - 1$

(v) Riley Polynomials at the component

Crossings	Riley Polynomials at each crossing
c_1, c_2, c_4	$(y-1)^5$
c_3, c_7	y^5
c_5, c_9	$y^5+3y^4+4y^3+y^2-y-1$
c_6, c_8, c_{11}	$y^5-5y^4+8y^3-3y^2-y-1$
c_{10}	$y^5-y^4+8y^3-3y^2+3y-1$

(vi) Complex Volumes and Cusp Shapes

Solutions to I_2^u	$\sqrt{-1}(\mathrm{vol}+\sqrt{-1}CS)$	Cusp shape
$u = -0.339110 + 0.822375I$ $a = -1.12878 + 1.10766I$ $b = -1.00000$	$-1.97403 - 1.53058I$	$-12.02124 + 2.62456I$
$u = -0.339110 - 0.822375I$ $a = -1.12878 - 1.10766I$ $b = -1.00000$	$-1.97403 + 1.53058I$	$-12.02124 - 2.62456I$
$u = 0.766826$ $a = -1.37029$ $b = -1.00000$	-4.04602	-9.32390
$u = 0.455697 + 1.200150I$ $a = -2.18608 - 0.87465I$ $b = -1.00000$	$-7.51750 + 4.40083I$	$-12.31681 - 3.97407I$
$u = 0.455697 - 1.200150I$ $a = -2.18608 + 0.87465I$ $b = -1.00000$	$-7.51750 - 4.40083I$	$-12.31681 + 3.97407I$

III. u-Polynomials

Crossings	u-Polynomials at each crossing
c_1	$((u-1)^5)(u^{67} - 6u^{66} + \cdots - 6u + 1)$
c_2	$((u+1)^5)(u^{67} + 32u^{66} + \cdots - 6u + 1)$
c_3, c_7	$u^5(u^{67} + u^{66} + \cdots + 96u + 32)$
c_4	$((u+1)^5)(u^{67} - 6u^{66} + \cdots - 6u + 1)$
c_5	$(u^5 - u^4 + 2u^3 - u^2 + u - 1)(u^{67} - 2u^{66} + \cdots - 4u^2 + 1)$
c_6	$(u^5 + u^4 - 2u^3 - u^2 + u - 1)(u^{67} + 2u^{66} + \cdots + 78u + 9)$
c_8	$(u^5 - u^4 - 2u^3 + u^2 + u + 1)(u^{67} + 2u^{66} + \cdots + 78u + 9)$
c_9	$(u^5 + u^4 + 2u^3 + u^2 + u + 1)(u^{67} - 2u^{66} + \cdots - 4u^2 + 1)$
c_{10}	$(u^5 + 3u^4 + 4u^3 + u^2 - u - 1)(u^{67} + 36u^{66} + \cdots + 8u - 1)$
c_{11}	$(u^5 - u^4 - 2u^3 + u^2 + u + 1)(u^{67} - 8u^{66} + \cdots + 2798u + 53)$

IV. Riley Polynomials

Crossings	Riley Polynomials at each crossing
c_1, c_4	$((y-1)^5)(y^{67} - 32y^{66} + \cdots - 6y - 1)$
c_2	$((y-1)^5)(y^{67} + 12y^{66} + \cdots - 266y - 1)$
c_3, c_7	$y^5(y^{67} + 33y^{66} + \cdots - 14848y - 1024)$
c_5, c_9	$(y^5 + 3y^4 + 4y^3 + y^2 - y - 1)(y^{67} + 36y^{66} + \cdots + 8y - 1)$
c_6, c_8	$(y^5 - 5y^4 + 8y^3 - 3y^2 - y - 1)(y^{67} - 52y^{66} + \cdots - 360y - 81)$
c_{10}	$(y^5 - y^4 + 8y^3 - 3y^2 + 3y - 1)(y^{67} - 8y^{66} + \cdots + 124y - 1)$
c_{11}	$(y^5 - 5y^4 + 8y^3 - 3y^2 - y - 1)(y^{67} + 8y^{66} + \cdots + 6484936y - 2809)$