OpenGeoProver Output for conjecture "Chou 009"

Wu's method used

February 12, 2012

1 Validation of Construction Protocol

Construction steps:

- Free point A0
- Free point A1
- Free point A2
- Free point A3
- Free point A4
- Line A0A1 through two points A0 and A1
- Line A2A3 through two points A2 and A3
- Intersection point A of point sets A0A1 and A2A3
- Line A2A4 through two points A2 and A4
- Intersection point B of point sets A0A1 and A2A4
- Line A0A2 through two points A0 and A2
- Line A1A3 through two points A1 and A3
- Intersection point C of point sets A0A2 and A1A3
- Line A1A4 through two points A1 and A4
- Intersection point D of point sets A0A2 and A1A4
- Line A0A3 through two points A0 and A3
- Line A1A2 through two points A1 and A2
- Intersection point E of point sets A0A3 and A1A2
- Line A0A4 through two points A0 and A4
- Intersection point F of point sets A0A4 and A1A2
- General Conic Section c which contains points A, B, C, D and E

Theorem statement:

- Point F lies on set of points c

Validation result: Construction protocol is valid.

2 Transformation of Construction Protocol to algebraic form

Transformation of Construction steps

2.1 Transformation of point A0:

- Point A0 has been assigned following coordinates: (0, 0)

2.2 Transformation of point A1:

- Point A1 has been assigned following coordinates: $(0, u_1)$

2.3 Transformation of point A2:

- Point A2 has been assigned following coordinates: (u_2, u_3)

2.4 Transformation of point A3:

- Point A3 has been assigned following coordinates: (u_4, u_5)

2.5 Transformation of point A4:

- Point A4 has been assigned following coordinates: (u_6, u_7)

2.6 Transformation of point A:

- Point A has been assigned following coordinates: (x_1, x_2)
- Polynomial that point A has to satisfy is:

$$p = x_1$$

- Processing of polynomial

$$p = x_1$$

Info: Will try to rename X coordinate of point A

Info: Y coordinate of point A will be replaced by X coordinate

Info: X coordinate of point A renamed by zero

- Point A has been renamed. Point A has been assigned following coordinates: $(0, x_1)$

- Polynomial that point A has to satisfy is:

$$p = (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3)$$

- Processing of polynomial

$$p = (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3)$$

Info: Polynomial

$$p = (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3)$$

added to system of polynomials that represents the constructions

- New polynomial added to system of hypotheses

2.7 Transformation of point B:

- Point B has been assigned following coordinates: (x_2, x_3)
- Polynomial that point B has to satisfy is:

$$p = x_2$$

- Processing of polynomial

$$p = x_2$$

Info: Will try to rename X coordinate of point B

Info: Y coordinate of point B will be replaced by X coordinate

Info: X coordinate of point B renamed by zero

- Point B has been renamed. Point B has been assigned following coordinates: $(0, x_2)$
- Polynomial that point B has to satisfy is:

$$p = (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3)$$

- Processing of polynomial

$$p = (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3)$$

Info: Polynomial

$$p = (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3)$$

added to system of polynomials that represents the constructions

- New polynomial added to system of hypotheses

2.8 Transformation of point C:

- Point C has been assigned following coordinates: (x_3, x_4)
- Polynomial that point C has to satisfy is:

$$p = u_2x_4 - u_3x_3$$

- Processing of polynomial

$$p = u_2x_4 - u_3x_3$$

Info: Polynomial

$$p = u_2x_4 - u_3x_3$$

added to system of polynomials that represents the constructions

- New polynomial added to system of hypotheses
- Polynomial that point C has to satisfy is:

$$p = u_4x_4 + (-u_5 + u_1)x_3 - u_4u_1$$

- Processing of polynomial

$$p = u_4x_4 + (-u_5 + u_1)x_3 - u_4u_1$$

Info: Polynomial

$$p = u_4x_4 + (-u_5 + u_1)x_3 - u_4u_1$$

added to system of polynomials that represents the constructions

- New polynomial added to system of hypotheses

2.9 Transformation of point D:

- Point D has been assigned following coordinates: (x_5, x_6)
- Polynomial that point D has to satisfy is:

$$p = u_2x_6 - u_3x_5$$

- Processing of polynomial

$$p = u_2x_6 - u_3x_5$$

Info: Polynomial

$$p = u_2x_6 - u_3x_5$$

added to system of polynomials that represents the constructions

- New polynomial added to system of hypotheses

- Polynomial that point D has to satisfy is:

$$p = u_6 x_6 + (-u_7 + u_1)x_5 - u_6 u_1$$

- Processing of polynomial

$$p = u_6 x_6 + (-u_7 + u_1)x_5 - u_6 u_1$$

Info: Polynomial

$$p = u_6 x_6 + (-u_7 + u_1)x_5 - u_6 u_1$$

added to system of polynomials that represents the constructions

- New polynomial added to system of hypotheses

2.10 Transformation of point E:

- Point E has been assigned following coordinates: (x_7, x_8)
- Polynomial that point E has to satisfy is:

$$p = u_4 x_8 - u_5 x_7$$

- Processing of polynomial

$$p = u_4 x_8 - u_5 x_7$$

Info: Polynomial

$$p = u_4 x_8 - u_5 x_7$$

added to system of polynomials that represents the constructions

- New polynomial added to system of hypotheses
- Polynomial that point E has to satisfy is:

$$p = u_2 x_8 + (-u_3 + u_1)x_7 - u_2 u_1$$

- Processing of polynomial

$$p = u_2 x_8 + (-u_3 + u_1)x_7 - u_2 u_1$$

Info: Polynomial

$$p = u_2 x_8 + (-u_3 + u_1)x_7 - u_2 u_1$$

added to system of polynomials that represents the constructions

- New polynomial added to system of hypotheses

2.11 Transformation of point F:

- Point F has been assigned following coordinates: $(x_9,\, x_{10})$
- Polynomial that point F has to satisfy is:

$$p = u_6x_{10} - u_7x_9$$

- Processing of polynomial

$$p = u_6x_{10} - u_7x_9$$

Info: Polynomial

$$p = u_6x_{10} - u_7x_9$$

added to system of polynomials that represents the constructions

- New polynomial added to system of hypotheses
- Polynomial that point F has to satisfy is:

$$p = u_2x_{10} + (-u_3 + u_1)x_9 - u_2u_1$$

- Processing of polynomial

$$p = u_2x_{10} + (-u_3 + u_1)x_9 - u_2u_1$$

Info: Polynomial

$$p = u_2x_{10} + (-u_3 + u_1)x_9 - u_2u_1$$

added to system of polynomials that represents the constructions

- New polynomial added to system of hypotheses

2.12 Transformation of general conic section c:

List of parametric points

- Point Bc has been assigned following coordinates: $(x_{11},\, 0)$
- Point Cc has been assigned following coordinates: $(x_{12},\, 0)$
- Point Dc has been assigned following coordinates: $(x_{13},\, 0)$
- Point Ec has been assigned following coordinates: $(x_{14},\, 0)$
- Point Fc has been assigned following coordinates: $(x_{15},\, 0)$
- Condition for point X$(x_1,\, x_2)$ to belong to this conic section is following equation:

$$p = x_{15} + x_{14}x_2 + x_{13}x_1 + x_{12}x_2^2 + x_{11}x_2x_1 + x_1^2$$

- Polynomial condition for point A to belong to conic section c is:

$$p = x_{15} + x_{14}x_1 + x_{12}x_1^2$$

- Polynomial condition for point B to belong to conic section c is:

$$p = x_{15} + x_{14}x_2 + x_{12}x_2^2$$

- Polynomial condition for point C to belong to conic section c is:

$$p = x_{15} + x_{14}x_4 + x_{13}x_3 + x_{12}x_4^2 + x_{11}x_4x_3 + x_3^2$$

- Polynomial condition for point D to belong to conic section c is:

$$p = x_{15} + x_{14}x_6 + x_{13}x_5 + x_{12}x_6^2 + x_{11}x_6x_5 + x_5^2$$

- Polynomial condition for point E to belong to conic section c is:

$$p = x_{15} + x_{14}x_8 + x_{13}x_7 + x_{12}x_8^2 + x_{11}x_8x_7 + x_7^2$$

Transformation of Theorem statement

- Polynomial for theorem statement:

$$p = x_{15} + x_{14}x_{10} + x_{13}x_9 + x_{12}x_{10}^2 + x_{11}x_{10}x_9 + x_9^2$$

Time spent for transformation of Construction Protocol to algebraic form

- 0.137 seconds

3 Invoking the theorem prover

The used proving method is Wu's method.

The input system is:

$$\begin{aligned}
p_1 &= (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3)\\
p_2 &= (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3)\\
p_3 &= u_2x_4 - u_3x_3\\
p_4 &= u_4x_4 + (-u_5 + u_1)x_3 - u_4u_1\\
p_5 &= u_2x_6 - u_3x_5\\
p_6 &= u_6x_6 + (-u_7 + u_1)x_5 - u_6u_1\\
p_7 &= u_4x_8 - u_5x_7\\
p_8 &= u_2x_8 + (-u_3 + u_1)x_7 - u_2u_1\\
p_9 &= u_6x_{10} - u_7x_9\\
p_{10} &= u_2x_{10} + (-u_3 + u_1)x_9 - u_2u_1\\
p_{11} &= x_{15} + x_{14}x_1 + x_{12}x_1^2\\
p_{12} &= x_{15} + x_{14}x_2 + x_{12}x_2^2\\
p_{13} &= x_{15} + x_{14}x_4 + x_{13}x_3 + x_{12}x_4^2 + x_{11}x_4x_3 + x_3^2\\
p_{14} &= x_{15} + x_{14}x_6 + x_{13}x_5 + x_{12}x_6^2 + x_{11}x_6x_5 + x_5^2\\
p_{15} &= x_{15} + x_{14}x_8 + x_{13}x_7 + x_{12}x_8^2 + x_{11}x_8x_7 + x_7^2
\end{aligned}$$

3.1 Triangulation, step 1

Choosing variable: Trying the variable with index 15.

Variable x_{15} selected: The number of polynomials with this variable, with indexes from 1 to 15, is 5.

Minimal degrees: 5 polynomial(s) with degree 1.

Polynomial with linear degree: Removing variable x_{15} from all other polynomials by reducing them with polynomial p_{11} from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_1 &= (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3) \\
p_2 &= (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3) \\
p_3 &= u_2x_4 - u_3x_3 \\
p_4 &= u_4x_4 + (-u_5 + u_1)x_3 - u_4u_1 \\
p_5 &= u_2x_6 - u_3x_5 \\
p_6 &= u_6x_6 + (-u_7 + u_1)x_5 - u_6u_1 \\
p_7 &= u_4x_8 - u_5x_7 \\
p_8 &= u_2x_8 + (-u_3 + u_1)x_7 - u_2u_1 \\
p_9 &= u_6x_{10} - u_7x_9 \\
p_{10} &= u_2x_{10} + (-u_3 + u_1)x_9 - u_2u_1 \\
p_{11} &= x_{14}x_2 - x_{14}x_1 + x_{12}x_2^2 - x_{12}x_1^2 \\
p_{12} &= x_{14}x_4 - x_{14}x_1 + x_{13}x_3 + x_{12}x_4^2 - x_{12}x_1^2 + x_{11}x_4x_3 + x_3^2 \\
p_{13} &= x_{14}x_6 - x_{14}x_1 + x_{13}x_5 + x_{12}x_6^2 - x_{12}x_1^2 + x_{11}x_6x_5 + x_5^2 \\
p_{14} &= x_{14}x_8 - x_{14}x_1 + x_{13}x_7 + x_{12}x_8^2 - x_{12}x_1^2 + x_{11}x_8x_7 + x_7^2 \\
p_{15} &= x_{15} + x_{14}x_1 + x_{12}x_1^2
\end{aligned}
$$

3.2 Triangulation, step 2

Choosing variable: Trying the variable with index 14.

Variable x_{14} selected: The number of polynomials with this variable, with indexes from 1 to 14, is 4.

Minimal degrees: 4 polynomial(s) with degree 1.

Polynomial with linear degree: Removing variable x_{14} from all other polynomials by reducing them with polynomial p_{11} from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_1 &= (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3) \\
p_2 &= (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3) \\
p_3 &= u_2x_4 - u_3x_3
\end{aligned}
$$

$$
\begin{aligned}
p_4 &= u_4x_4 + (-u_5 + u_1)x_3 - u_4u_1 \\
p_5 &= u_2x_6 - u_3x_5 \\
p_6 &= u_6x_6 + (-u_7 + u_1)x_5 - u_6u_1 \\
p_7 &= u_4x_8 - u_5x_7 \\
p_8 &= u_2x_8 + (-u_3 + u_1)x_7 - u_2u_1 \\
p_9 &= u_6x_{10} - u_7x_9 \\
p_{10} &= u_2x_{10} + (-u_3 + u_1)x_9 - u_2u_1 \\
p_{11} &= x_{13}x_3x_2 - x_{13}x_3x_1 + x_{12}x_4^2x_2 - x_{12}x_4^2x_1 \\
&\quad -x_{12}x_4x_2^2 + x_{12}x_4x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\
&\quad x_{11}x_4x_3x_2 - x_{11}x_4x_3x_1 + x_3^2x_2 - x_3^2x_1 \\
p_{12} &= x_{13}x_5x_2 - x_{13}x_5x_1 + x_{12}x_6^2x_2 - x_{12}x_6^2x_1 \\
&\quad -x_{12}x_6x_2^2 + x_{12}x_6x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\
&\quad x_{11}x_6x_5x_2 - x_{11}x_6x_5x_1 + x_5^2x_2 - x_5^2x_1 \\
p_{13} &= x_{13}x_7x_2 - x_{13}x_7x_1 + x_{12}x_8^2x_2 - x_{12}x_8^2x_1 \\
&\quad -x_{12}x_8x_2^2 + x_{12}x_8x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\
&\quad x_{11}x_8x_7x_2 - x_{11}x_8x_7x_1 + x_7^2x_2 - x_7^2x_1 \\
p_{14} &= x_{14}x_2 - x_{14}x_1 + x_{12}x_2^2 - x_{12}x_1^2 \\
p_{15} &= x_{15} + x_{14}x_1 + x_{12}x_1^2
\end{aligned}
$$

3.3 Triangulation, step 3

Choosing variable: Trying the variable with index 13.

Variable x_{13} selected: The number of polynomials with this variable, with indexes from 1 to 13, is 3.

Minimal degrees: 3 polynomial(s) with degree 1.

Polynomial with linear degree: Removing variable x_{13} from all other polynomials by reducing them with polynomial p_{11} from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_1 &= (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3) \\
p_2 &= (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3) \\
p_3 &= u_2x_4 - u_3x_3 \\
p_4 &= u_4x_4 + (-u_5 + u_1)x_3 - u_4u_1 \\
p_5 &= u_2x_6 - u_3x_5 \\
p_6 &= u_6x_6 + (-u_7 + u_1)x_5 - u_6u_1 \\
p_7 &= u_4x_8 - u_5x_7 \\
p_8 &= u_2x_8 + (-u_3 + u_1)x_7 - u_2u_1 \\
p_9 &= u_6x_{10} - u_7x_9 \\
p_{10} &= u_2x_{10} + (-u_3 + u_1)x_9 - u_2u_1 \\
p_{11} &= x_{12}x_6^2x_3x_2^2 - 2x_{12}x_6^2x_3x_2x_1 + x_{12}x_6^2x_3x_1^2
\end{aligned}
$$

$$
\begin{array}{rcl}
 & & -x_{12}x_6x_3x_2^3 + x_{12}x_6x_3x_2^2x_1 + x_{12}x_6x_3x_2x_1^2 \\
 & & -x_{12}x_6x_3x_1^3 - x_{12}x_5x_4^2x_2^2 + 2x_{12}x_5x_4^2x_2x_1 \\
 & & -x_{12}x_5x_4^2x_1^2 + x_{12}x_5x_4x_2^3 - x_{12}x_5x_4x_2^2x_1 \\
 & & -x_{12}x_5x_4x_2x_1^2 + x_{12}x_5x_4x_1^3 - x_{12}x_5x_2^3x_1 + \\
 & & 2x_{12}x_5x_2^2x_1^2 - x_{12}x_5x_2x_1^3 + x_{12}x_3x_2^3x_1 \\
 & & -2x_{12}x_3x_2^2x_1^2 + x_{12}x_3x_2x_1^3 + x_{11}x_6x_5x_3x_2^2 \\
 & & -2x_{11}x_6x_5x_3x_2x_1 + x_{11}x_6x_5x_3x_1^2 \\
 & & -x_{11}x_5x_4x_3x_2^2 + 2x_{11}x_5x_4x_3x_2x_1 \\
 & & -x_{11}x_5x_4x_3x_1^2 + x_5^2x_3x_2^2 - 2x_5^2x_3x_2x_1 + \\
 & & x_5^2x_3x_1^2 - x_5x_3^2x_2^2 + 2x_5x_3^2x_2x_1 \\
 & & -x_5x_3^2x_1^2 \\
p_{12} & = & x_{12}x_8^2x_3x_2^2 - 2x_{12}x_8^2x_3x_2x_1 + x_{12}x_8^2x_3x_1^2 \\
 & & -x_{12}x_8x_3x_2^3 + x_{12}x_8x_3x_2^2x_1 + x_{12}x_8x_3x_2x_1^2 \\
 & & -x_{12}x_8x_3x_1^3 - x_{12}x_7x_4^2x_2^2 + 2x_{12}x_7x_4^2x_2x_1 \\
 & & -x_{12}x_7x_4^2x_1^2 + x_{12}x_7x_4x_2^3 - x_{12}x_7x_4x_2^2x_1 \\
 & & -x_{12}x_7x_4x_2x_1^2 + x_{12}x_7x_4x_1^3 - x_{12}x_7x_2^3x_1 + \\
 & & 2x_{12}x_7x_2^2x_1^2 - x_{12}x_7x_2x_1^3 + x_{12}x_3x_2^3x_1 \\
 & & -2x_{12}x_3x_2^2x_1^2 + x_{12}x_3x_2x_1^3 + x_{11}x_8x_7x_3x_2^2 \\
 & & -2x_{11}x_8x_7x_3x_2x_1 + x_{11}x_8x_7x_3x_1^2 \\
 & & -x_{11}x_7x_4x_3x_2^2 + 2x_{11}x_7x_4x_3x_2x_1 \\
 & & -x_{11}x_7x_4x_3x_1^2 + x_7^2x_3x_2^2 - 2x_7^2x_3x_2x_1 + \\
 & & x_7^2x_3x_1^2 - x_7x_3^2x_2^2 + 2x_7x_3^2x_2x_1 \\
 & & -x_7x_3^2x_1^2 \\
p_{13} & = & x_{13}x_3x_2 - x_{13}x_3x_1 + x_{12}x_4^2x_2 - x_{12}x_4^2x_1 \\
 & & -x_{12}x_4x_2^2 + x_{12}x_4x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\
 & & x_{11}x_4x_3x_2 - x_{11}x_4x_3x_1 + x_3^2x_2 - x_3^2x_1 \\
p_{14} & = & x_{14}x_2 - x_{14}x_1 + x_{12}x_2^2 - x_{12}x_1^2 \\
p_{15} & = & x_{15} + x_{14}x_1 + x_{12}x_1^2
\end{array}
$$

3.4 Triangulation, step 4

Choosing variable: Trying the variable with index 12.

Variable x_{12} selected: The number of polynomials with this variable, with indexes from 1 to 12, is 2.

Minimal degrees: 2 polynomial(s) with degree 1.

Polynomial with linear degree: Removing variable x_{12} from all other polynomials by reducing them with polynomial p_{11} from previous step.

Finished a triangulation step, the current system is:

$$
p_1 = (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3)
$$

$$
\begin{aligned}
p_2 &= (u_6 - u_2)x_2 + (u_7 u_2 - u_6 u_3) \\
p_3 &= u_2 x_4 - u_3 x_3 \\
p_4 &= u_4 x_4 + (-u_5 + u_1)x_3 - u_4 u_1 \\
p_5 &= u_2 x_6 - u_3 x_5 \\
p_6 &= u_6 x_6 + (-u_7 + u_1)x_5 - u_6 u_1 \\
p_7 &= u_4 x_8 - u_5 x_7 \\
p_8 &= u_2 x_8 + (-u_3 + u_1)x_7 - u_2 u_1 \\
p_9 &= u_6 x_{10} - u_7 x_9 \\
p_{10} &= u_2 x_{10} + (-u_3 + u_1)x_9 - u_2 u_1 \\
p_{11} &= \ldots \\
p_{12} &= x_{12}x_6^2x_3x_2^2 - 2x_{12}x_6^2x_3x_2x_1 + x_{12}x_6^2x_3x_1^2 \\
&\quad -x_{12}x_6x_3x_2^3 + x_{12}x_6x_3x_2^2x_1 + x_{12}x_6x_3x_2x_1^2 \\
&\quad -x_{12}x_6x_3x_1^3 - x_{12}x_5x_4^2x_2^2 + 2x_{12}x_5x_4^2x_2x_1 \\
&\quad -x_{12}x_5x_4^2x_1^2 + x_{12}x_5x_4x_2^3 - x_{12}x_5x_4x_2^2x_1 \\
&\quad -x_{12}x_5x_4x_2x_1^2 + x_{12}x_5x_4x_1^3 - x_{12}x_5x_2^3x_1 + \\
&\quad 2x_{12}x_5x_2^2x_1^2 - x_{12}x_5x_2x_1^3 + x_{12}x_3x_2^3x_1 \\
&\quad -2x_{12}x_3x_2^2x_1^2 + x_{12}x_3x_2x_1^3 + x_{11}x_6x_5x_3x_2^2 \\
&\quad -2x_{11}x_6x_5x_3x_2x_1 + x_{11}x_6x_5x_3x_1^2 \\
&\quad -x_{11}x_5x_4x_3x_2^2 + 2x_{11}x_5x_4x_3x_2x_1 \\
&\quad -x_{11}x_5x_4x_3x_1^2 + x_5^2x_3x_2^2 - 2x_5^2x_3x_2x_1 + \\
&\quad x_5^2x_3x_1^2 - x_5x_3^2x_2^2 + 2x_5x_3^2x_2x_1 \\
&\quad -x_5x_3^2x_1^2 \\
p_{13} &= x_{13}x_3x_2 - x_{13}x_3x_1 + x_{12}x_4^2x_2 - x_{12}x_4^2x_1 \\
&\quad -x_{12}x_4x_2^2 + x_{12}x_4x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\
&\quad x_{11}x_4x_3x_2 - x_{11}x_4x_3x_1 + x_3^2x_2 - x_3^2x_1 \\
p_{14} &= x_{14}x_2 - x_{14}x_1 + x_{12}x_2^2 - x_{12}x_1^2 \\
p_{15} &= x_{15} + x_{14}x_1 + x_{12}x_1^2
\end{aligned}
$$

3.5 Triangulation, step 5

Choosing variable: Trying the variable with index 11.

Variable x_{11} selected: The number of polynomials with this variable, with indexes from 1 to 11, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_{11}. No reduction needed.

The triangular system has not been changed.

3.6 Triangulation, step 6

Choosing variable: Trying the variable with index 10.

Variable x_{10} selected: The number of polynomials with this variable, with indexes from 1 to 10, is 2.

Minimal degrees: 2 polynomial(s) with degree 1.

Polynomial with linear degree: Removing variable x_{10} from all other polynomials by reducing them with polynomial p_9 from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_1 &= (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3) \\
p_2 &= (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3) \\
p_3 &= u_2x_4 - u_3x_3 \\
p_4 &= u_4x_4 + (-u_5 + u_1)x_3 - u_4u_1 \\
p_5 &= u_2x_6 - u_3x_5 \\
p_6 &= u_6x_6 + (-u_7 + u_1)x_5 - u_6u_1 \\
p_7 &= u_4x_8 - u_5x_7 \\
p_8 &= u_2x_8 + (-u_3 + u_1)x_7 - u_2u_1 \\
p_9 &= (u_7u_2 - u_6u_3 + u_6u_1)x_9 - u_6u_2u_1 \\
p_{10} &= u_6x_{10} - u_7x_9 \\
p_{11} &= \ldots \\
p_{12} &= x_{12}x_6^2x_3x_2^2 - 2x_{12}x_6^2x_3x_2x_1 + x_{12}x_6^2x_3x_1^2 \\
&\quad -x_{12}x_6x_3x_2^3 + x_{12}x_6x_3x_2^2x_1 + x_{12}x_6x_3x_2x_1^2 \\
&\quad -x_{12}x_6x_3x_1^3 - x_{12}x_5x_4^2x_2^2 + 2x_{12}x_5x_4^2x_2x_1 \\
&\quad -x_{12}x_5x_4^2x_1^2 + x_{12}x_5x_4x_2^3 - x_{12}x_5x_4x_2^2x_1 \\
&\quad -x_{12}x_5x_4x_2x_1^2 + x_{12}x_5x_4x_1^3 - x_{12}x_5x_2^3x_1 + \\
&\quad 2x_{12}x_5x_2^2x_1^2 - x_{12}x_5x_2x_1^3 + x_{12}x_3x_2^3x_1 \\
&\quad -2x_{12}x_3x_2^2x_1^2 + x_{12}x_3x_2x_1^3 + x_{11}x_6x_5x_3x_2^2 \\
&\quad -2x_{11}x_6x_5x_3x_2x_1 + x_{11}x_6x_5x_3x_1^2 \\
&\quad -x_{11}x_5x_4x_3x_2^2 + 2x_{11}x_5x_4x_3x_2x_1 \\
&\quad -x_{11}x_5x_4x_3x_1^2 + x_5^2x_3x_2^2 - 2x_5^2x_3x_2x_1 + \\
&\quad x_5^2x_3x_1^2 - x_5x_3^2x_2^2 + 2x_5x_3^2x_2x_1 \\
&\quad -x_5x_3^2x_1^2 \\
p_{13} &= x_{13}x_3x_2 - x_{13}x_3x_1 + x_{12}x_4^2x_2 - x_{12}x_4^2x_1 \\
&\quad -x_{12}x_4x_2^2 + x_{12}x_4x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\
&\quad x_{11}x_4x_3x_2 - x_{11}x_4x_3x_1 + x_3^2x_2 - x_3^2x_1 \\
p_{14} &= x_{14}x_2 - x_{14}x_1 + x_{12}x_2^2 - x_{12}x_1^2 \\
p_{15} &= x_{15} + x_{14}x_1 + x_{12}x_1^2
\end{aligned}
$$

3.7 Triangulation, step 7

Choosing variable: Trying the variable with index 9.

Variable x_9 selected: The number of polynomials with this variable, with indexes from 1 to 9, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_9. No reduction needed.

The triangular system has not been changed.

3.8 Triangulation, step 8

Choosing variable: Trying the variable with index 8.

Variable x_8 selected: The number of polynomials with this variable, with indexes from 1 to 8, is 2.

Minimal degrees: 2 polynomial(s) with degree 1.

Polynomial with linear degree: Removing variable x_8 from all other polynomials by reducing them with polynomial p_7 from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_1 &= (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3) \\
p_2 &= (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3) \\
p_3 &= u_2x_4 - u_3x_3 \\
p_4 &= u_4x_4 + (-u_5 + u_1)x_3 - u_4u_1 \\
p_5 &= u_2x_6 - u_3x_5 \\
p_6 &= u_6x_6 + (-u_7 + u_1)x_5 - u_6u_1 \\
p_7 &= (u_5u_2 - u_4u_3 + u_4u_1)x_7 - u_4u_2u_1 \\
p_8 &= u_4x_8 - u_5x_7 \\
p_9 &= (u_7u_2 - u_6u_3 + u_6u_1)x_9 - u_6u_2u_1 \\
p_{10} &= u_6x_{10} - u_7x_9 \\
p_{11} &= \ldots \\
p_{12} &= x_{12}x_6^2x_3x_2^2 - 2x_{12}x_6^2x_3x_2x_1 + x_{12}x_6^2x_3x_1^2 \\
&\quad -x_{12}x_6x_3x_2^3 + x_{12}x_6x_3x_2^2x_1 + x_{12}x_6x_3x_2x_1^2 \\
&\quad -x_{12}x_6x_3x_1^3 - x_{12}x_5x_4^2x_2^2 + 2x_{12}x_5x_4^2x_2x_1 \\
&\quad -x_{12}x_5x_4^2x_1^2 + x_{12}x_5x_4x_2^3 - x_{12}x_5x_4x_2^2x_1 \\
&\quad -x_{12}x_5x_4x_2x_1^2 + x_{12}x_5x_4x_1^3 - x_{12}x_5x_2^3x_1 + \\
&\quad 2x_{12}x_5x_2^2x_1^2 - x_{12}x_5x_2x_1^3 + x_{12}x_3x_2^3x_1 \\
&\quad -2x_{12}x_3x_2^2x_1^2 + x_{12}x_3x_2x_1^3 + x_{11}x_6x_5x_3x_2^2 \\
&\quad -2x_{11}x_6x_5x_3x_2x_1 + x_{11}x_6x_5x_3x_1^2 \\
&\quad -x_{11}x_5x_4x_3x_2^2 + 2x_{11}x_5x_4x_3x_2x_1 \\
&\quad -x_{11}x_5x_4x_3x_1^2 + x_5^2x_3x_2^2 - 2x_5^2x_3x_2x_1 + \\
&\quad x_5^2x_3x_1^2 - x_5x_3^2x_2^2 + 2x_5x_3^2x_2x_1 \\
&\quad -x_5x_3^2x_1^2
\end{aligned}
$$

$$
\begin{aligned}
p_{13} &= x_{13}x_3x_2 - x_{13}x_3x_1 + x_{12}x_4^2x_2 - x_{12}x_4^2x_1 \\
&\quad -x_{12}x_4x_2^2 + x_{12}x_4x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\
&\quad x_{11}x_4x_3x_2 - x_{11}x_4x_3x_1 + x_3^2x_2 - x_3^2x_1 \\
p_{14} &= x_{14}x_2 - x_{14}x_1 + x_{12}x_2^2 - x_{12}x_1^2 \\
p_{15} &= x_{15} + x_{14}x_1 + x_{12}x_1^2
\end{aligned}
$$

3.9 Triangulation, step 9

Choosing variable: Trying the variable with index 7.

Variable x_7 selected: The number of polynomials with this variable, with indexes from 1 to 7, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_7. No reduction needed.

The triangular system has not been changed.

3.10 Triangulation, step 10

Choosing variable: Trying the variable with index 6.

Variable x_6 selected: The number of polynomials with this variable, with indexes from 1 to 6, is 2.

Minimal degrees: 2 polynomial(s) with degree 1.

Polynomial with linear degree: Removing variable x_6 from all other polynomials by reducing them with polynomial p_5 from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_1 &= (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3) \\
p_2 &= (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3) \\
p_3 &= u_2x_4 - u_3x_3 \\
p_4 &= u_4x_4 + (-u_5 + u_1)x_3 - u_4u_1 \\
p_5 &= (-u_7u_2 + u_6u_3 + u_2u_1)x_5 - u_6u_2u_1 \\
p_6 &= u_2x_6 - u_3x_5 \\
p_7 &= (u_5u_2 - u_4u_3 + u_4u_1)x_7 - u_4u_2u_1 \\
p_8 &= u_4x_8 - u_5x_7 \\
p_9 &= (u_7u_2 - u_6u_3 + u_6u_1)x_9 - u_6u_2u_1 \\
p_{10} &= u_6x_{10} - u_7x_9 \\
p_{11} &= \ldots \\
p_{12} &= x_{12}x_6^2x_3x_2^2 - 2x_{12}x_6^2x_3x_2x_1 + x_{12}x_6^2x_3x_1^2 \\
&\quad -x_{12}x_6x_3x_2^3 + x_{12}x_6x_3x_2^2x_1 + x_{12}x_6x_3x_2x_1^2 \\
&\quad -x_{12}x_6x_3x_1^3 - x_{12}x_5x_4^2x_2^2 + 2x_{12}x_5x_4^2x_2x_1 \\
&\quad -x_{12}x_5x_4^2x_1^2 + x_{12}x_5x_4x_2^3 - x_{12}x_5x_4x_2^2x_1
\end{aligned}
$$

$$
\begin{aligned}
& -x_{12}x_5x_4x_2x_1^2 + x_{12}x_5x_4x_1^3 - x_{12}x_5x_2^3x_1 + \\
& 2x_{12}x_5x_2^2x_1^2 - x_{12}x_5x_2x_1^3 + x_{12}x_3x_2^3x_1 \\
& -2x_{12}x_3x_2^2x_1^2 + x_{12}x_3x_2x_1^3 + x_{11}x_6x_5x_3x_2^2 \\
& -2x_{11}x_6x_5x_3x_2x_1 + x_{11}x_6x_5x_3x_1^2 \\
& -x_{11}x_5x_4x_3x_2^2 + 2x_{11}x_5x_4x_3x_2x_1 \\
& -x_{11}x_5x_4x_3x_1^2 + x_5^2x_3x_2^2 - 2x_5^2x_3x_2x_1 + \\
& x_5^2x_3x_1^2 - x_5x_3^2x_2^2 + 2x_5x_3^2x_2x_1 \\
& -x_5x_3^2x_1^2 \\
p_{13} &= x_{13}x_3x_2 - x_{13}x_3x_1 + x_{12}x_4^2x_2 - x_{12}x_4^2x_1 \\
& -x_{12}x_4x_2^2 + x_{12}x_4x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\
& x_{11}x_4x_3x_2 - x_{11}x_4x_3x_1 + x_3^2x_2 - x_3^2x_1 \\
p_{14} &= x_{14}x_2 - x_{14}x_1 + x_{12}x_2^2 - x_{12}x_1^2 \\
p_{15} &= x_{15} + x_{14}x_1 + x_{12}x_1^2
\end{aligned}
$$

3.11 Triangulation, step 11

Choosing variable: Trying the variable with index 5.

Variable x_5 selected: The number of polynomials with this variable, with indexes from 1 to 5, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_5. No reduction needed.

The triangular system has not been changed.

3.12 Triangulation, step 12

Choosing variable: Trying the variable with index 4.

Variable x_4 selected: The number of polynomials with this variable, with indexes from 1 to 4, is 2.

Minimal degrees: 2 polynomial(s) with degree 1.

Polynomial with linear degree: Removing variable x_4 from all other polynomials by reducing them with polynomial p_3 from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_1 &= (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3) \\
p_2 &= (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3) \\
p_3 &= (-u_5u_2 + u_4u_3 + u_2u_1)x_3 - u_4u_2u_1 \\
p_4 &= u_2x_4 - u_3x_3 \\
p_5 &= (-u_7u_2 + u_6u_3 + u_2u_1)x_5 - u_6u_2u_1 \\
p_6 &= u_2x_6 - u_3x_5 \\
p_7 &= (u_5u_2 - u_4u_3 + u_4u_1)x_7 - u_4u_2u_1
\end{aligned}
$$

$$
\begin{aligned}
p_8 &= u_4x_8 - u_5x_7 \\
p_9 &= (u_7u_2 - u_6u_3 + u_6u_1)x_9 - u_6u_2u_1 \\
p_{10} &= u_6x_{10} - u_7x_9 \\
p_{11} &= \ldots \\
p_{12} &= x_{12}x_6^2x_3x_2^2 - 2x_{12}x_6^2x_3x_2x_1 + x_{12}x_6^2x_3x_1^2 \\
&\quad -x_{12}x_6x_3x_2^3 + x_{12}x_6x_3x_2^2x_1 + x_{12}x_6x_3x_2x_1^2 \\
&\quad -x_{12}x_6x_3x_1^3 - x_{12}x_5x_4^2x_2^2 + 2x_{12}x_5x_4^2x_2x_1 \\
&\quad -x_{12}x_5x_4^2x_1^2 + x_{12}x_5x_4x_2^3 - x_{12}x_5x_4x_2^2x_1 \\
&\quad -x_{12}x_5x_4x_2x_1^2 + x_{12}x_5x_4x_1^3 - x_{12}x_5x_2^3x_1 + \\
&\quad 2x_{12}x_5x_2^2x_1^2 - x_{12}x_5x_2x_1^3 + x_{12}x_3x_2^3x_1 \\
&\quad -2x_{12}x_3x_2^2x_1^2 + x_{12}x_3x_2x_1^3 + x_{11}x_6x_5x_3x_2^2 \\
&\quad -2x_{11}x_6x_5x_3x_2x_1 + x_{11}x_6x_5x_3x_1^2 \\
&\quad -x_{11}x_5x_4x_3x_2^2 + 2x_{11}x_5x_4x_3x_2x_1 \\
&\quad -x_{11}x_5x_4x_3x_1^2 + x_5^2x_3x_2^2 - 2x_5^2x_3x_2x_1 + \\
&\quad x_5^2x_3x_1^2 - x_5x_3^2x_2^2 + 2x_5x_3^2x_2x_1 \\
&\quad -x_5x_3^2x_1^2 \\
p_{13} &= x_{13}x_3x_2 - x_{13}x_3x_1 + x_{12}x_4^2x_2 - x_{12}x_4^2x_1 \\
&\quad -x_{12}x_4x_2^2 + x_{12}x_4x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\
&\quad x_{11}x_4x_3x_2 - x_{11}x_4x_3x_1 + x_3^2x_2 - x_3^2x_1 \\
p_{14} &= x_{14}x_2 - x_{14}x_1 + x_{12}x_2^2 - x_{12}x_1^2 \\
p_{15} &= x_{15} + x_{14}x_1 + x_{12}x_1^2
\end{aligned}
$$

3.13 Triangulation, step 13

Choosing variable: Trying the variable with index 3.

Variable x_3 selected: The number of polynomials with this variable, with indexes from 1 to 3, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_3. No reduction needed.

The triangular system has not been changed.

3.14 Triangulation, step 14

Choosing variable: Trying the variable with index 2.

Variable x_2 selected: The number of polynomials with this variable, with indexes from 1 to 2, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_2. No reduction needed.

The triangular system has not been changed.

3.15 Triangulation, step 15

Choosing variable: Trying the variable with index 1.

Variable x_1 selected: The number of polynomials with this variable, with indexes from 1 to 1, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_1. No reduction needed.

The triangular system has not been changed.

The triangular system is:

$$
\begin{array}{rcl}
p_1 & = & (u_4 - u_2)x_1 + (u_5u_2 - u_4u_3) \\
p_2 & = & (u_6 - u_2)x_2 + (u_7u_2 - u_6u_3) \\
p_3 & = & (-u_5u_2 + u_4u_3 + u_2u_1)x_3 - u_4u_2u_1 \\
p_4 & = & u_2x_4 - u_3x_3 \\
p_5 & = & (-u_7u_2 + u_6u_3 + u_2u_1)x_5 - u_6u_2u_1 \\
p_6 & = & u_2x_6 - u_3x_5 \\
p_7 & = & (u_5u_2 - u_4u_3 + u_4u_1)x_7 - u_4u_2u_1 \\
p_8 & = & u_4x_8 - u_5x_7 \\
p_9 & = & (u_7u_2 - u_6u_3 + u_6u_1)x_9 - u_6u_2u_1 \\
p_{10} & = & u_6x_{10} - u_7x_9 \\
p_{11} & = & \ldots \\
p_{12} & = & x_{12}x_6^2x_3x_2^2 - 2x_{12}x_6^2x_3x_2x_1 + x_{12}x_6^2x_3x_1^2 \\
 & & -x_{12}x_6x_3x_2^3 + x_{12}x_6x_3x_2^2x_1 + x_{12}x_6x_3x_2x_1^2 \\
 & & -x_{12}x_6x_3x_1^3 - x_{12}x_5x_4^2x_2^2 + 2x_{12}x_5x_4^2x_2x_1 \\
 & & -x_{12}x_5x_4^2x_1^2 + x_{12}x_5x_4x_2^3 - x_{12}x_5x_4x_2^2x_1 \\
 & & -x_{12}x_5x_4x_2x_1^2 + x_{12}x_5x_4x_1^3 - x_{12}x_5x_2^3x_1 + \\
 & & 2x_{12}x_5x_2^2x_1^2 - x_{12}x_5x_2x_1^3 + x_{12}x_3x_2^3x_1 \\
 & & -2x_{12}x_3x_2^2x_1^2 + x_{12}x_3x_2x_1^3 + x_{11}x_6x_5x_3x_2^2 \\
 & & -2x_{11}x_6x_5x_3x_2x_1 + x_{11}x_6x_5x_3x_1^2 \\
 & & -x_{11}x_5x_4x_3x_2^2 + 2x_{11}x_5x_4x_3x_2x_1 \\
 & & -x_{11}x_5x_4x_3x_1^2 + x_5^2x_3x_2^2 - 2x_5^2x_3x_2x_1 + \\
 & & x_5^2x_3x_1^2 - x_5x_3^2x_2^2 + 2x_5x_3^2x_2x_1 \\
 & & -x_5x_3^2x_1^2 \\
p_{13} & = & x_{13}x_3x_2 - x_{13}x_3x_1 + x_{12}x_4^2x_2 - x_{12}x_4^2x_1 \\
 & & -x_{12}x_4x_2^2 + x_{12}x_4x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\
 & & x_{11}x_4x_3x_2 - x_{11}x_4x_3x_1 + x_3^2x_2 - x_3^2x_1 \\
p_{14} & = & x_{14}x_2 - x_{14}x_1 + x_{12}x_2^2 - x_{12}x_1^2 \\
p_{15} & = & x_{15} + x_{14}x_1 + x_{12}x_1^2
\end{array}
$$

4 Final Remainder

4.1 Final remainder for conjecture Chou 009

Calculating final remainder of the conclusion:

$$g = x_{15} + x_{14}x_{10} + x_{13}x_9 + x_{12}x_{10}^2 + x_{11}x_{10}x_9 + x_9^2$$

with respect to the triangular system.

1. Pseudo remainder with p_{15} over variable x_{15}:

$$\begin{aligned} g = {} & x_{14}x_{10} - x_{14}x_1 + x_{13}x_9 + x_{12}x_{10}^2 - x_{12}x_1^2 + x_{11}x_{10}x_9 + \\ & x_9^2 \end{aligned}$$

2. Pseudo remainder with p_{14} over variable x_{14}:

$$\begin{aligned} g = {} & x_{13}x_9x_2 - x_{13}x_9x_1 + x_{12}x_{10}^2x_2 - x_{12}x_{10}^2x_1 \\ & -x_{12}x_{10}x_2^2 + x_{12}x_{10}x_1^2 + x_{12}x_2^2x_1 - x_{12}x_2x_1^2 + \\ & x_{11}x_{10}x_9x_2 - x_{11}x_{10}x_9x_1 + x_9^2x_2 - x_9^2x_1 \end{aligned}$$

3. Pseudo remainder with p_{13} over variable x_{13}:

$$\begin{aligned} g = {} & x_{12}x_{10}^2x_3x_2^2 - 2x_{12}x_{10}^2x_3x_2x_1 + \\ & x_{12}x_{10}^2x_3x_1^2 - x_{12}x_{10}x_3x_2^3 + x_{12}x_{10}x_3x_2^2x_1 + \\ & x_{12}x_{10}x_3x_2x_1^2 - x_{12}x_{10}x_3x_1^3 - x_{12}x_9x_4^2x_2^2 + \\ & 2x_{12}x_9x_4^2x_2x_1 - x_{12}x_9x_4^2x_1^2 + x_{12}x_9x_4x_2^3 \\ & -x_{12}x_9x_4x_2^2x_1 - x_{12}x_9x_4x_2x_1^2 + x_{12}x_9x_4x_1^3 \\ & -x_{12}x_9x_2^3x_1 + 2x_{12}x_9x_2^2x_1^2 - x_{12}x_9x_2x_1^3 + \\ & x_{12}x_3x_2^3x_1 - 2x_{12}x_3x_2^2x_1^2 + x_{12}x_3x_2x_1^3 + \\ & x_{11}x_{10}x_9x_3x_2^2 - 2x_{11}x_{10}x_9x_3x_2x_1 + \\ & x_{11}x_{10}x_9x_3x_1^2 - x_{11}x_9x_4x_3x_2^2 + \\ & 2x_{11}x_9x_4x_3x_2x_1 - x_{11}x_9x_4x_3x_1^2 + x_9^2x_3x_2^2 \\ & -2x_9^2x_3x_2x_1 + x_9^2x_3x_1^2 - x_9x_3^2x_2^2 + \\ & 2x_9x_3^2x_2x_1 - x_9x_3^2x_1^2 \end{aligned}$$

4. Pseudo remainder with p_{12} over variable x_{12}:
   Polynomial too big for output (text size is 8514 *characters, number of terms is* 192*)*

5. Pseudo remainder with p_{11} over variable x_{11}:
   Polynomial too big for output (number of terms is 3352*)*

6. Pseudo remainder with p_{10} over variable x_{10}:

   Polynomial too big for output (number of terms is 3352*)*

7. Pseudo remainder with p_9 over variable x_9:

   Polynomial too big for output (number of terms is 3352*)*

8. Pseudo remainder with p_8 over variable x_8:

   Polynomial too big for output (number of terms is 2527*)*

9. Pseudo remainder with p_7 over variable x_7:

   Polynomial too big for output (number of terms is 1462*)*

10. Pseudo remainder with p_6 over variable x_6:

    Polynomial too big for output (number of terms is 907*)*

11. Pseudo remainder with p_5 over variable x_5:

    Polynomial too big for output (number of terms is 360*)*

12. Pseudo remainder with p_4 over variable x_4:

    Polynomial too big for output (text size is 321655 *characters, number of terms is* 159*)*

13. Pseudo remainder with p_3 over variable x_3:

    Polynomial too big for output (text size is greater than 2000 *characters, number of terms is* 47*)*

14. Pseudo remainder with p_2 over variable x_2:

    Polynomial too big for output (text size is greater than 2000 *characters, number of terms is* 11*)*

15. Pseudo remainder with p_1 over variable x_1:

$$g = 0$$

5 Prover results

Status: Theorem has been proved.

Space Complexity: The biggest polynomial obtained during prover execution contains 3352 terms.

Time Complexity: Time spent by the prover is 24.608 seconds.

6 NDG Conditions

NDG Conditions in readable form

- Points A2, A3, B and A0 are not collinear
- Points A2 and A4 are not identical
- Points A2, A1 and A3 are not collinear
- Points A2, A and A0 are not collinear
- Points A2, A1, A4 and B are not collinear
- Points A2, A1 and A3 are not collinear
- Points A3, A and B are not collinear
- Points A2, A1, A4 and B are not collinear
- Points A4, A, B and A0 are not collinear
- *Polynomial too big for output (text size is* 4023 *characters, number of terms is* 96*)*
- $$\begin{aligned} p \;=\; & x_6^2x_3x_2^2 - 2x_6^2x_3x_2x_1 + x_6^2x_3x_1^2 \\ & -x_6x_3x_2^3 + x_6x_3x_2^2x_1 + x_6x_3x_2x_1^2 - x_6x_3x_1^3 \\ & -x_5x_4^2x_2^2 + 2x_5x_4^2x_2x_1 - x_5x_4^2x_1^2 + \\ & x_5x_4x_2^3 - x_5x_4x_2^2x_1 - x_5x_4x_2x_1^2 + x_5x_4x_1^3 \\ & -x_5x_2^3x_1 + 2x_5x_2^2x_1^2 - x_5x_2x_1^3 + x_3x_2^3x_1 \\ & -2x_3x_2^2x_1^2 + x_3x_2x_1^3 \end{aligned}$$
- Line through points A1 and C is not parallel with line through points A and B
- Line through points A1 and A0 is not perpendicular to line through points A and B

Time spent for processing NDG Conditions

- 1.528 seconds