OpenGeoProver Output for conjecture "geothm_zadatak"

Wu's method used

October 1, 2016

1 Invoking the theorem prover

The used proving method is Wu's method.
The input system is:

$$
\begin{aligned}
p_1 &= 2x_1 - \\
p_2 &= 2x_2 - \\
p_3 &= 2x_3 - 2 \\
p_4 &= 2x_4 - \\
p_5 &= 2x_5 - \\
p_6 &= 2x_6 - 2 \\
p_7 &= x_7 - x_1 \\
p_8 &= x_8 + x_2 \\
p_9 &= x_9 + x_5 - x_3 \\
p_{10} &= x_{10} + x_6 - x_4 \\
p_{11} &= x_{11} - \\
p_{12} &= x_{12} + x_{11}x_8 \\
p_{13} &= x_{13} - x_{11}x_7 \\
p_{14} &= x_{14} + x_{12}x_1 \\
p_{15} &= x_{15} + x_{11}x_{10} \\
p_{16} &= x_{16} - x_{11}x_9 \\
p_{17} &= x_{17} + x_{16}x_4 + x_{15}x_3 \\
p_{18} &= x_{18} + 1 \\
p_{19} &= x_{19} + 1 \\
p_{20} &= x_{20} \\
p_{21} &= -x_{24}x_{18} + x_{21} \\
p_{22} &= -x_{24}x_{19} + x_{22} \\
p_{23} &= -x_{24}x_{20} + x_{23} - \\
p_{24} &= x_{22}x_{13} + x_{21}x_{12} + x_{14} \\
p_{25} &= -x_{28}x_{18} + x_{25}
\end{aligned}
$$

$$
\begin{aligned}
p_{26} &= -x_{28}x_{19} + x_{26} \\
p_{27} &= -x_{28}x_{20} + x_{27} - \\
p_{28} &= x_{26}x_{16} + x_{25}x_{15} + x_{17}
\end{aligned}
$$

1.1 Triangulation, step 1

Choosing variable: Trying the variable with index 28.

Variable x_{28} selected: The number of polynomials with this variable, with indexes from 1 to 28, is 3.

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

Polynomial with linear degree: Removing variable x_{28} from all other polynomials by reducing them with polynomial p_{25} from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_{1} &= 2x_{1} - \\
p_{2} &= 2x_{2} - \\
p_{3} &= 2x_{3} - 2 \\
p_{4} &= 2x_{4} - \\
p_{5} &= 2x_{5} - \\
p_{6} &= 2x_{6} - 2 \\
p_{7} &= x_{7} - x_{1} \\
p_{8} &= x_{8} + x_{2} \\
p_{9} &= x_{9} + x_{5} - x_{3} \\
p_{10} &= x_{10} + x_{6} - x_{4} \\
p_{11} &= x_{11} - \\
p_{12} &= x_{12} + x_{11}x_{8} \\
p_{13} &= x_{13} - x_{11}x_{7} \\
p_{14} &= x_{14} + x_{12}x_{1} \\
p_{15} &= x_{15} + x_{11}x_{10} \\
p_{16} &= x_{16} - x_{11}x_{9} \\
p_{17} &= x_{17} + x_{16}x_{4} + x_{15}x_{3} \\
p_{18} &= x_{18} + 1 \\
p_{19} &= x_{19} + 1 \\
p_{20} &= x_{20} \\
p_{21} &= -x_{24}x_{18} + x_{21} \\
p_{22} &= -x_{24}x_{19} + x_{22} \\
p_{23} &= -x_{24}x_{20} + x_{23} - \\
p_{24} &= x_{22}x_{13} + x_{21}x_{12} + x_{14} \\
p_{25} &= x_{26}x_{16} + x_{25}x_{15} + x_{17} \\
p_{26} &= -x_{26}x_{18} + x_{25}x_{19}
\end{aligned}
$$

$$
\begin{aligned}
p_{27} &= -x_{27}x_{18} + x_{25}x_{20} + x_{18} \\
p_{28} &= -x_{28}x_{18} + x_{25}
\end{aligned}
$$

1.2 Triangulation, step 2

Choosing variable: Trying the variable with index 27.

Variable x_{27} selected: The number of polynomials with this variable, with indexes from 1 to 27, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_{27}. No reduction needed.

The triangular system has not been changed.

1.3 Triangulation, step 3

Choosing variable: Trying the variable with index 26.

Variable x_{26} selected: The number of polynomials with this variable, with indexes from 1 to 26, is 2.

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

Polynomial with linear degree: Removing variable x_{26} from all other polynomials by reducing them with polynomial p_{25} from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_{1} &= 2x_{1} - \\
p_{2} &= 2x_{2} - \\
p_{3} &= 2x_{3} - 2 \\
p_{4} &= 2x_{4} - \\
p_{5} &= 2x_{5} - \\
p_{6} &= 2x_{6} - 2 \\
p_{7} &= x_{7} - x_{1} \\
p_{8} &= x_{8} + x_{2} \\
p_{9} &= x_{9} + x_{5} - x_{3} \\
p_{10} &= x_{10} + x_{6} - x_{4} \\
p_{11} &= x_{11} - \\
p_{12} &= x_{12} + x_{11}x_{8} \\
p_{13} &= x_{13} - x_{11}x_{7} \\
p_{14} &= x_{14} + x_{12}x_{1} \\
p_{15} &= x_{15} + x_{11}x_{10} \\
p_{16} &= x_{16} - x_{11}x_{9} \\
p_{17} &= x_{17} + x_{16}x_{4} + x_{15}x_{3} \\
p_{18} &= x_{18} + 1
\end{aligned}
$$

$$
\begin{aligned}
p_{19} &= x_{19}+1\\
p_{20} &= x_{20}\\
p_{21} &= -x_{24}x_{18}+x_{21}\\
p_{22} &= -x_{24}x_{19}+x_{22}\\
p_{23} &= -x_{24}x_{20}+x_{23}-\\
p_{24} &= x_{22}x_{13}+x_{21}x_{12}+x_{14}\\
p_{25} &= x_{25}x_{19}x_{16}+x_{25}x_{18}x_{15}+x_{18}x_{17}\\
p_{26} &= x_{26}x_{16}+x_{25}x_{15}+x_{17}\\
p_{27} &= -x_{27}x_{18}+x_{25}x_{20}+x_{18}\\
p_{28} &= -x_{28}x_{18}+x_{25}
\end{aligned}
$$

1.4 Triangulation, step 4

Choosing variable: Trying the variable with index 25.

Variable x_{25} selected: The number of polynomials with this variable, with indexes from 1 to 25, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_{25}. No reduction needed.

The triangular system has not been changed.

1.5 Triangulation, step 5

Choosing variable: Trying the variable with index 24.

Variable x_{24} selected: The number of polynomials with this variable, with indexes from 1 to 24, is 3.

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

Polynomial with linear degree: Removing variable x_{24} from all other polynomials by reducing them with polynomial p_{21} from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_{1} &= 2x_{1}-\\
p_{2} &= 2x_{2}-\\
p_{3} &= 2x_{3}-2\\
p_{4} &= 2x_{4}-\\
p_{5} &= 2x_{5}-\\
p_{6} &= 2x_{6}-2\\
p_{7} &= x_{7}-x_{1}\\
p_{8} &= x_{8}+x_{2}\\
p_{9} &= x_{9}+x_{5}-x_{3}\\
p_{10} &= x_{10}+x_{6}-x_{4}
\end{aligned}
$$

$$
\begin{aligned}
p_{11} &= x_{11} - \\
p_{12} &= x_{12} + x_{11}x_8 \\
p_{13} &= x_{13} - x_{11}x_7 \\
p_{14} &= x_{14} + x_{12}x_1 \\
p_{15} &= x_{15} + x_{11}x_{10} \\
p_{16} &= x_{16} - x_{11}x_9 \\
p_{17} &= x_{17} + x_{16}x_4 + x_{15}x_3 \\
p_{18} &= x_{18} + 1 \\
p_{19} &= x_{19} + 1 \\
p_{20} &= x_{20} \\
p_{21} &= x_{22}x_{13} + x_{21}x_{12} + x_{14} \\
p_{22} &= -x_{22}x_{18} + x_{21}x_{19} \\
p_{23} &= -x_{23}x_{18} + x_{21}x_{20} + x_{18} \\
p_{24} &= -x_{24}x_{18} + x_{21} \\
p_{25} &= x_{25}x_{19}x_{16} + x_{25}x_{18}x_{15} + x_{18}x_{17} \\
p_{26} &= x_{26}x_{16} + x_{25}x_{15} + x_{17} \\
p_{27} &= -x_{27}x_{18} + x_{25}x_{20} + x_{18} \\
p_{28} &= -x_{28}x_{18} + x_{25}
\end{aligned}
$$

1.6 Triangulation, step 6

Choosing variable: Trying the variable with index 23.

Variable x_{23} selected: The number of polynomials with this variable, with indexes from 1 to 23, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_{23}. No reduction needed.

The triangular system has not been changed.

1.7 Triangulation, step 7

Choosing variable: Trying the variable with index 22.

Variable x_{22} selected: The number of polynomials with this variable, with indexes from 1 to 22, is 2.

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

Polynomial with linear degree: Removing variable x_{22} from all other polynomials by reducing them with polynomial p_{21} from previous step.

Finished a triangulation step, the current system is:

$$
\begin{aligned}
p_1 &= 2x_1 - \\
p_2 &= 2x_2 -
\end{aligned}
$$

$$
\begin{array}{rcl}
p_3 & = & 2x_3 - 2 \\
p_4 & = & 2x_4 - \\
p_5 & = & 2x_5 - \\
p_6 & = & 2x_6 - 2 \\
p_7 & = & x_7 - x_1 \\
p_8 & = & x_8 + x_2 \\
p_9 & = & x_9 + x_5 - x_3 \\
p_{10} & = & x_{10} + x_6 - x_4 \\
p_{11} & = & x_{11} - \\
p_{12} & = & x_{12} + x_{11}x_8 \\
p_{13} & = & x_{13} - x_{11}x_7 \\
p_{14} & = & x_{14} + x_{12}x_1 \\
p_{15} & = & x_{15} + x_{11}x_{10} \\
p_{16} & = & x_{16} - x_{11}x_9 \\
p_{17} & = & x_{17} + x_{16}x_4 + x_{15}x_3 \\
p_{18} & = & x_{18} + 1 \\
p_{19} & = & x_{19} + 1 \\
p_{20} & = & x_{20} \\
p_{21} & = & x_{21}x_{19}x_{13} + x_{21}x_{18}x_{12} + x_{18}x_{14} \\
p_{22} & = & x_{22}x_{13} + x_{21}x_{12} + x_{14} \\
p_{23} & = & -x_{23}x_{18} + x_{21}x_{20} + x_{18} \\
p_{24} & = & -x_{24}x_{18} + x_{21} \\
p_{25} & = & x_{25}x_{19}x_{16} + x_{25}x_{18}x_{15} + x_{18}x_{17} \\
p_{26} & = & x_{26}x_{16} + x_{25}x_{15} + x_{17} \\
p_{27} & = & -x_{27}x_{18} + x_{25}x_{20} + x_{18} \\
p_{28} & = & -x_{28}x_{18} + x_{25}
\end{array}
$$

1.8 Triangulation, step 8

Choosing variable: Trying the variable with index 21.

Variable x_{21} selected: The number of polynomials with this variable, with indexes from 1 to 21, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_{21}. No reduction needed.

The triangular system has not been changed.

1.9 Triangulation, step 9

Choosing variable: Trying the variable with index 20.

Variable x_{20} selected: The number of polynomials with this variable, with indexes from 1 to 20, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_{20}. No reduction needed.

The triangular system has not been changed.

1.10 Triangulation, step 10

Choosing variable: Trying the variable with index 19.

Variable x_{19} selected: The number of polynomials with this variable, with indexes from 1 to 19, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_{19}. No reduction needed.

The triangular system has not been changed.

1.11 Triangulation, step 11

Choosing variable: Trying the variable with index 18.

Variable x_{18} selected: The number of polynomials with this variable, with indexes from 1 to 18, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_{18}. No reduction needed.

The triangular system has not been changed.

1.12 Triangulation, step 12

Choosing variable: Trying the variable with index 17.

Variable x_{17} selected: The number of polynomials with this variable, with indexes from 1 to 17, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_{17}. No reduction needed.

The triangular system has not been changed.

1.13 Triangulation, step 13

Choosing variable: Trying the variable with index 16.

Variable x_{16} selected: The number of polynomials with this variable, with indexes from 1 to 16, is 1.

Single polynomial with chosen variable: Chosen polynomial is p_{16}. No reduction needed.

The triangular system has not been changed.

1.14 Triangulation, step 14

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 1.

Single polynomial with chosen variable: Chosen polynomial is p_{15}. No reduction needed.

The triangular system has not been changed.

1.15 Triangulation, step 15

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 1.

Single polynomial with chosen variable: Chosen polynomial is p_{14}. No reduction needed.

The triangular system has not been changed.

1.16 Triangulation, step 16

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 1.

Single polynomial with chosen variable: Chosen polynomial is p_{13}. No reduction needed.

The triangular system has not been changed.

1.17 Triangulation, step 17

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 1.

Single polynomial with chosen variable: Chosen polynomial is p_{12}. No reduction needed.

The triangular system has not been changed.

1.18 Triangulation, step 18

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.

1.19 Triangulation, step 19

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 1.

Single polynomial with chosen variable: Chosen polynomial is p_{10}. No reduction needed.

The triangular system has not been changed.

1.20 Triangulation, step 20

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.

1.21 Triangulation, step 21

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 1.

Single polynomial with chosen variable: Chosen polynomial is p_8. No reduction needed.

The triangular system has not been changed.

1.22 Triangulation, step 22

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.

1.23 Triangulation, step 23

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 1.

Single polynomial with chosen variable: Chosen polynomial is p_6. No reduction needed.

The triangular system has not been changed.

1.24 Triangulation, step 24

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.

1.25 Triangulation, step 25

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 1.

Single polynomial with chosen variable: Chosen polynomial is p_4. No reduction needed.

The triangular system has not been changed.

1.26 Triangulation, step 26

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.

1.27 Triangulation, step 27

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.

1.28 Triangulation, step 28

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:

$$
\begin{array}{rcl}
p_1 & = & 2x_1 - \\
p_2 & = & 2x_2 - \\
p_3 & = & 2x_3 - 2 \\
p_4 & = & 2x_4 - \\
p_5 & = & 2x_5 - \\
p_6 & = & 2x_6 - 2 \\
p_7 & = & x_7 - x_1 \\
p_8 & = & x_8 + x_2 \\
p_9 & = & x_9 + x_5 - x_3 \\
p_{10} & = & x_{10} + x_6 - x_4 \\
p_{11} & = & x_{11} - \\
p_{12} & = & x_{12} + x_{11}x_8
\end{array}
$$

$$
\begin{aligned}
p_{13} &= x_{13} - x_{11}x_7 \\
p_{14} &= x_{14} + x_{12}x_1 \\
p_{15} &= x_{15} + x_{11}x_{10} \\
p_{16} &= x_{16} - x_{11}x_9 \\
p_{17} &= x_{17} + x_{16}x_4 + x_{15}x_3 \\
p_{18} &= x_{18} + 1 \\
p_{19} &= x_{19} + 1 \\
p_{20} &= x_{20} \\
p_{21} &= x_{21}x_{19}x_{13} + x_{21}x_{18}x_{12} + x_{18}x_{14} \\
p_{22} &= x_{22}x_{13} + x_{21}x_{12} + x_{14} \\
p_{23} &= -x_{23}x_{18} + x_{21}x_{20} + x_{18} \\
p_{24} &= -x_{24}x_{18} + x_{21} \\
p_{25} &= x_{25}x_{19}x_{16} + x_{25}x_{18}x_{15} + x_{18}x_{17} \\
p_{26} &= x_{26}x_{16} + x_{25}x_{15} + x_{17} \\
p_{27} &= -x_{27}x_{18} + x_{25}x_{20} + x_{18} \\
p_{28} &= -x_{28}x_{18} + x_{25}
\end{aligned}
$$

2 Final Remainder

2.1 Final remainder for conjecture geothm_zadatak

Calculating final remainder of the conclusion:

$$
\begin{aligned}
g = & -x_{27}^2 + 2x_{27} - x_{26}^2 + 2x_{26} - x_{25}^2 + 2x_{25} + x_{23}^2 - 2x_{23} + x_{22}^2 + \\
& x_{21}^2 - 2
\end{aligned}
$$

with respect to the triangular system.

1. Pseudo remainder with p_{28} over variable x_{28}:

$$
\begin{aligned}
g = & -x_{27}^2 + 2x_{27} - x_{26}^2 + 2x_{26} - x_{25}^2 + 2x_{25} + x_{23}^2 - 2x_{23} + x_{22}^2 + \\
& x_{21}^2 - 2
\end{aligned}
$$

2. Pseudo remainder with p_{27} over variable x_{27}:

$$
\begin{aligned}
g = & -x_{26}^2x_{18}^2 + 2x_{26}x_{18}^2 - x_{25}^2x_{20}^2 - x_{25}^2x_{18}^2 + \\
& 2x_{25}x_{18}^2 + x_{23}^2x_{18}^2 - 2x_{23}x_{18}^2 + x_{22}^2x_{18}^2 + \\
& x_{21}^2x_{18}^2 - x_{18}^2
\end{aligned}
$$

3. Pseudo remainder with p_{26} over variable x_{26}:

$$
\begin{aligned}
g \;=\; & -x_{25}^2x_{20}^2x_{16}^2 - x_{25}^2x_{18}^2x_{16}^2 \\
& -x_{25}^2x_{18}^2x_{15}^2 - 2x_{25}x_{18}^2x_{17}x_{15} + 2x_{25}x_{18}^2x_{16}^2 \\
& -2x_{25}x_{18}^2x_{16}x_{15} + x_{23}^2x_{18}^2x_{16}^2 - 2x_{23}x_{18}^2x_{16}^2 + \\
& x_{22}^2x_{18}^2x_{16}^2 + x_{21}^2x_{18}^2x_{16}^2 - x_{18}^2x_{17}^2 \\
& -2x_{18}^2x_{17}x_{16} - x_{18}^2x_{16}^2
\end{aligned}
$$

4. Pseudo remainder with p_{25} over variable x_{25}:

$$
\begin{aligned}
g \;=\; & x_{23}^2x_{19}^2x_{18}^2x_{16}^4 + 2x_{23}^2x_{19}x_{18}^3x_{16}^3x_{15} + \\
& x_{23}^2x_{18}^4x_{16}^2x_{15}^2 - 2x_{23}x_{19}^2x_{18}^2x_{16}^4 \\
& -4x_{23}x_{19}x_{18}^3x_{16}^3x_{15} - 2x_{23}x_{18}^4x_{16}^2x_{15}^2 + \\
& x_{22}^2x_{19}^2x_{18}^2x_{16}^4 + 2x_{22}^2x_{19}x_{18}^3x_{16}^3x_{15} + \\
& x_{22}^2x_{18}^4x_{16}^2x_{15}^2 + x_{21}^2x_{19}^2x_{18}^2x_{16}^4 + \\
& 2x_{21}^2x_{19}x_{18}^3x_{16}^3x_{15} + x_{21}^2x_{18}^4x_{16}^2x_{15}^2 \\
& -x_{20}^2x_{18}^2x_{17}^2x_{16}^2 - x_{19}^2x_{18}^2x_{17}^2x_{16}^2 \\
& -2x_{19}^2x_{18}^2x_{17}x_{16}^3 - x_{19}^2x_{18}^2x_{16}^4 \\
& -2x_{19}x_{18}^3x_{17}x_{16}^3 - 2x_{19}x_{18}^3x_{17}x_{16}^2x_{15} \\
& -2x_{19}x_{18}^3x_{16}^3x_{15} - x_{18}^4x_{17}^2x_{16}^2 \\
& -2x_{18}^4x_{17}x_{16}^2x_{15} - x_{18}^4x_{16}^2x_{15}^2
\end{aligned}
$$

5. Pseudo remainder with p_{24} over variable x_{24}:

$$
\begin{aligned}
g \;=\; & x_{23}^2x_{19}^2x_{18}^2x_{16}^4 + 2x_{23}^2x_{19}x_{18}^3x_{16}^3x_{15} + \\
& x_{23}^2x_{18}^4x_{16}^2x_{15}^2 - 2x_{23}x_{19}^2x_{18}^2x_{16}^4 \\
& -4x_{23}x_{19}x_{18}^3x_{16}^3x_{15} - 2x_{23}x_{18}^4x_{16}^2x_{15}^2 + \\
& x_{22}^2x_{19}^2x_{18}^2x_{16}^4 + 2x_{22}^2x_{19}x_{18}^3x_{16}^3x_{15} + \\
& x_{22}^2x_{18}^4x_{16}^2x_{15}^2 + x_{21}^2x_{19}^2x_{18}^2x_{16}^4 + \\
& 2x_{21}^2x_{19}x_{18}^3x_{16}^3x_{15} + x_{21}^2x_{18}^4x_{16}^2x_{15}^2 \\
& -x_{20}^2x_{18}^2x_{17}^2x_{16}^2 - x_{19}^2x_{18}^2x_{17}^2x_{16}^2 \\
& -2x_{19}^2x_{18}^2x_{17}x_{16}^3 - x_{19}^2x_{18}^2x_{16}^4 \\
& -2x_{19}x_{18}^3x_{17}x_{16}^3 - 2x_{19}x_{18}^3x_{17}x_{16}^2x_{15} \\
& -2x_{19}x_{18}^3x_{16}^3x_{15} - x_{18}^4x_{17}^2x_{16}^2 \\
& -2x_{18}^4x_{17}x_{16}^2x_{15} - x_{18}^4x_{16}^2x_{15}^2
\end{aligned}
$$

6. Pseudo remainder with p_{23} over variable x_{23}:

$$
\begin{aligned}
g \;=\; & x_{22}^2x_{19}^2x_{18}^4x_{16}^4 + 2x_{22}^2x_{19}x_{18}^5x_{16}^3x_{15} + \\
& x_{22}^2x_{18}^6x_{16}^2x_{15}^2 + x_{21}^2x_{20}^2x_{19}^2x_{18}^2x_{16}^4 +
\end{aligned}
$$

$$
\begin{aligned}
& 2x_{21}^2x_{20}^2x_{19}x_{18}^3x_{16}^3x_{15} + \\
& x_{21}^2x_{20}^2x_{18}^4x_{16}^2x_{15}^2 + x_{21}^2x_{19}^2x_{18}^4x_{16}^4 + \\
& 2x_{21}^2x_{19}x_{18}^5x_{16}^3x_{15} + x_{21}^2x_{18}^6x_{16}^2x_{15}^2 \\
& -x_{20}^2x_{18}^4x_{17}^2x_{16}^2 - x_{19}^2x_{18}^4x_{17}^2x_{16}^2 \\
& -2x_{19}^2x_{18}^4x_{17}x_{16}^3 - 2x_{19}^2x_{18}^4x_{16}^4 \\
& -2x_{19}x_{18}^5x_{17}x_{16}^3 - 2x_{19}x_{18}^5x_{17}x_{16}^2x_{15} \\
& -4x_{19}x_{18}^5x_{16}^3x_{15} - x_{18}^6x_{17}^2x_{16}^2 \\
& -2x_{18}^6x_{17}x_{16}^2x_{15} - 2x_{18}^6x_{16}^2x_{15}^2
\end{aligned}
$$

7. Pseudo remainder with p_{22} over variable x_{22}:

$$
\begin{aligned}
g \quad = \quad & x_{21}^2x_{20}^2x_{19}^2x_{18}^2x_{16}^4x_{13}^2 + \\
& 2x_{21}^2x_{20}^2x_{19}x_{18}^3x_{16}^3x_{15}x_{13}^2 + \\
& x_{21}^2x_{20}^2x_{18}^4x_{16}^2x_{15}^2x_{13}^2 + \\
& x_{21}^2x_{19}^2x_{18}^4x_{16}^4x_{13}^2 + \\
& x_{21}^2x_{19}^2x_{18}^4x_{16}^4x_{12}^2 + \\
& 2x_{21}^2x_{19}x_{18}^5x_{16}^3x_{15}x_{13}^2 + \\
& 2x_{21}^2x_{19}x_{18}^5x_{16}^3x_{15}x_{12}^2 + \\
& x_{21}^2x_{18}^6x_{16}^2x_{15}^2x_{13}^2 + \\
& x_{21}^2x_{18}^6x_{16}^2x_{15}^2x_{12}^2 + \\
& 2x_{21}x_{19}^2x_{18}^4x_{16}^4x_{14}x_{12} + \\
& 4x_{21}x_{19}x_{18}^5x_{16}^3x_{15}x_{14}x_{12} + \\
& 2x_{21}x_{18}^6x_{16}^2x_{15}^2x_{14}x_{12} \\
& -x_{20}^2x_{18}^4x_{17}^2x_{16}^2x_{13}^2 \\
& -x_{19}^2x_{18}^4x_{17}^2x_{16}^2x_{13}^2 \\
& -2x_{19}^2x_{18}^4x_{17}x_{16}^3x_{13}^2 + x_{19}^2x_{18}^4x_{16}^4x_{14}^2 \\
& -2x_{19}^2x_{18}^4x_{16}^4x_{13}^2 - 2x_{19}x_{18}^5x_{17}x_{16}^3x_{13}^2 \\
& -2x_{19}x_{18}^5x_{17}x_{16}^2x_{15}x_{13}^2 + \\
& 2x_{19}x_{18}^5x_{16}^3x_{15}x_{14}^2 - 4x_{19}x_{18}^5x_{16}^3x_{15}x_{13}^2 \\
& -x_{18}^6x_{17}^2x_{16}^2x_{13}^2 - 2x_{18}^6x_{17}x_{16}^2x_{15}x_{13}^2 + \\
& x_{18}^6x_{16}^2x_{15}^2x_{14}^2 - 2x_{18}^6x_{16}^2x_{15}^2x_{13}^2
\end{aligned}
$$

8. Pseudo remainder with p_{21} over variable x_{21}:

   Polynomial too big for output (text size is 2228 characters, number of terms is 39)

9. Pseudo remainder with p_{20} over variable x_{20}:

$$
\begin{aligned}
g \quad = \quad & -x_{19}^4x_{18}^4x_{17}^2x_{16}^2x_{13}^4 \\
& -2x_{19}^4x_{18}^4x_{17}x_{16}^3x_{13}^4 + \\
& x_{19}^4x_{18}^4x_{16}^4x_{14}^2x_{13}^2
\end{aligned}
$$

$$-2x_{19}^4x_{18}^4x_{16}^4x_{13}^4$$
$$-2x_{19}^3x_{18}^5x_{17}^2x_{16}^2x_{13}^3x_{12}$$
$$-2x_{19}^3x_{18}^5x_{17}x_{16}^3x_{13}^4$$
$$-4x_{19}^3x_{18}^5x_{17}x_{16}^3x_{13}^3x_{12}$$
$$-2x_{19}^3x_{18}^5x_{17}x_{16}^2x_{15}x_{13}^4$$
$$-4x_{19}^3x_{18}^5x_{16}^4x_{13}^3x_{12} +$$
$$2x_{19}^3x_{18}^5x_{16}^3x_{15}x_{14}^2x_{13}^2$$
$$-4x_{19}^3x_{18}^5x_{16}^3x_{15}x_{13}^4$$
$$-x_{19}^2x_{18}^6x_{17}^2x_{16}^2x_{13}^4$$
$$-x_{19}^2x_{18}^6x_{17}^2x_{16}^2x_{13}^2x_{12}^2$$
$$-4x_{19}^2x_{18}^6x_{17}x_{16}^3x_{13}^3x_{12}$$
$$-2x_{19}^2x_{18}^6x_{17}x_{16}^3x_{13}^2x_{12}^2$$
$$-2x_{19}^2x_{18}^6x_{17}x_{16}^2x_{15}x_{13}^4$$
$$-4x_{19}^2x_{18}^6x_{17}x_{16}^2x_{15}x_{13}^3x_{12} +$$
$$x_{19}^2x_{18}^6x_{16}^4x_{14}^2x_{13}^2$$
$$-2x_{19}^2x_{18}^6x_{16}^4x_{13}^2x_{12}^2$$
$$-8x_{19}^2x_{18}^6x_{16}^3x_{15}x_{13}^3x_{12} +$$
$$x_{19}^2x_{18}^6x_{16}^2x_{15}^2x_{14}^2x_{13}^2$$
$$-2x_{19}^2x_{18}^6x_{16}^2x_{15}^2x_{13}^4$$
$$-2x_{19}x_{18}^7x_{17}^2x_{16}^2x_{13}^3x_{12}$$
$$-2x_{19}x_{18}^7x_{17}x_{16}^3x_{13}^2x_{12}^2$$
$$-4x_{19}x_{18}^7x_{17}x_{16}^2x_{15}x_{13}^3x_{12}$$
$$-2x_{19}x_{18}^7x_{17}x_{16}^2x_{15}x_{13}^2x_{12}^2 +$$
$$2x_{19}x_{18}^7x_{16}^3x_{15}x_{14}^2x_{13}^2$$
$$-4x_{19}x_{18}^7x_{16}^3x_{15}x_{13}^2x_{12}^2$$
$$-4x_{19}x_{18}^7x_{16}^2x_{15}^2x_{13}^3x_{12}$$
$$-x_{18}^8x_{17}^2x_{16}^2x_{13}^2x_{12}^2$$
$$-2x_{18}^8x_{17}x_{16}^2x_{15}x_{13}^2x_{12}^2 +$$
$$x_{18}^8x_{16}^2x_{15}^2x_{14}^2x_{13}^2$$
$$-2x_{18}^8x_{16}^2x_{15}^2x_{13}^2x_{12}^2$$

10. Pseudo remainder with p_{19} over variable x_{19}:

$$\begin{aligned}
g \quad = \quad & -x_{18}^8x_{17}^2x_{16}^2x_{13}^2x_{12}^2 \\
& -2x_{18}^8x_{17}x_{16}^2x_{15}x_{13}^2x_{12}^2 + \\
& x_{18}^8x_{16}^2x_{15}^2x_{14}^2x_{13}^2 \\
& -2x_{18}^8x_{16}^2x_{15}^2x_{13}^2x_{12}^2 + \\
& 2x_{18}^7x_{17}^2x_{16}^2x_{13}^3x_{12} + \\
& 2x_{18}^7x_{17}x_{16}^3x_{13}^2x_{12}^2 + \\
& 4x_{18}^7x_{17}x_{16}^2x_{15}x_{13}^3x_{12} +
\end{aligned}$$

$$
\begin{aligned}
&2x_{18}^7x_{17}x_{16}^2x_{15}x_{13}^2x_{12}^2\\
&-2x_{18}^7x_{16}^3x_{15}x_{14}^2x_{13}^2+\\
&4x_{18}^7x_{16}^3x_{15}x_{13}^2x_{12}^2+\\
&4x_{18}^7x_{16}^2x_{15}^2x_{13}^3x_{12}-x_{18}^6x_{17}^2x_{16}^2x_{13}^4\\
&-x_{18}^6x_{17}^2x_{16}^2x_{13}^2x_{12}^2\\
&-4x_{18}^6x_{17}x_{16}^3x_{13}^3x_{12}\\
&-2x_{18}^6x_{17}x_{16}^3x_{13}^2x_{12}^2\\
&-2x_{18}^6x_{17}x_{16}^2x_{15}x_{13}^4\\
&-4x_{18}^6x_{17}x_{16}^2x_{15}x_{13}^3x_{12}+x_{18}^6x_{16}^4x_{14}^2x_{13}^2\\
&-2x_{18}^6x_{16}^4x_{13}^2x_{12}^2-8x_{18}^6x_{16}^3x_{15}x_{13}^3x_{12}+\\
&x_{18}^6x_{16}^2x_{15}^2x_{14}^2x_{13}^2\\
&-2x_{18}^6x_{16}^2x_{15}^2x_{13}^4+2x_{18}^5x_{17}^2x_{16}^2x_{13}^3x_{12}+\\
&2x_{18}^5x_{17}x_{16}^3x_{13}^4+4x_{18}^5x_{17}x_{16}^3x_{13}^3x_{12}+\\
&2x_{18}^5x_{17}x_{16}^2x_{15}x_{13}^4+4x_{18}^5x_{16}^4x_{13}^3x_{12}\\
&-2x_{18}^5x_{16}^3x_{15}x_{14}^2x_{13}^2+4x_{18}^5x_{16}^3x_{15}x_{13}^4\\
&-x_{18}^4x_{17}^2x_{16}^2x_{13}^4-2x_{18}^4x_{17}x_{16}^3x_{13}^4+\\
&x_{18}^4x_{16}^4x_{14}^2x_{13}^2-2x_{18}^4x_{16}^4x_{13}^4
\end{aligned}
$$

11. Pseudo remainder with p_{18} over variable x_{18}:

$$
\begin{aligned}
g \quad = \quad &-2x_{17}^2x_{16}^2x_{13}^4-4x_{17}^2x_{16}^2x_{13}^3x_{12}\\
&-2x_{17}^2x_{16}^2x_{13}^2x_{12}^2-4x_{17}x_{16}^3x_{13}^4\\
&-8x_{17}x_{16}^3x_{13}^3x_{12}-4x_{17}x_{16}^3x_{13}^2x_{12}^2\\
&-4x_{17}x_{16}^2x_{15}x_{13}^4-8x_{17}x_{16}^2x_{15}x_{13}^3x_{12}\\
&-4x_{17}x_{16}^2x_{15}x_{13}^2x_{12}^2+2x_{16}^4x_{14}^2x_{13}^2\\
&-2x_{16}^4x_{13}^4-4x_{16}^4x_{13}^3x_{12}-2x_{16}^4x_{13}^2x_{12}^2+\\
&4x_{16}^3x_{15}x_{14}^2x_{13}^2-4x_{16}^3x_{15}x_{13}^4\\
&-8x_{16}^3x_{15}x_{13}^3x_{12}-4x_{16}^3x_{15}x_{13}^2x_{12}^2+\\
&2x_{16}^2x_{15}^2x_{14}^2x_{13}^2-2x_{16}^2x_{15}^2x_{13}^4\\
&-4x_{16}^2x_{15}^2x_{13}^3x_{12}-2x_{16}^2x_{15}^2x_{13}^2x_{12}^2
\end{aligned}
$$

12. Pseudo remainder with p_{17} over variable x_{17}:

$$
\begin{aligned}
g \quad = \quad &2x_{16}^4x_{14}^2x_{13}^2-2x_{16}^4x_{13}^4x_4^2+4x_{16}^4x_{13}^4x_4\\
&-2x_{16}^4x_{13}^4-4x_{16}^4x_{13}^3x_{12}x_4^2+\\
&8x_{16}^4x_{13}^3x_{12}x_4-4x_{16}^4x_{13}^3x_{12}\\
&-2x_{16}^4x_{13}^2x_{12}^2x_4^2+4x_{16}^4x_{13}^2x_{12}^2x_4\\
&-2x_{16}^4x_{13}^2x_{12}^2+4x_{16}^3x_{15}x_{14}^2x_{13}^2\\
&-4x_{16}^3x_{15}x_{13}^4x_4x_3+4x_{16}^3x_{15}x_{13}^4x_4+\\
&4x_{16}^3x_{15}x_{13}^4x_3-4x_{16}^3x_{15}x_{13}^4
\end{aligned}
$$

$$-8x_{16}^3x_{15}x_{13}^3x_{12}x_4x_3+8x_{16}^3x_{15}x_{13}^3x_{12}x_4+$$
$$8x_{16}^3x_{15}x_{13}^3x_{12}x_3-8x_{16}^3x_{15}x_{13}^3x_{12}$$
$$-4x_{16}^3x_{15}x_{13}^2x_{12}^2x_4x_3+4x_{16}^3x_{15}x_{13}^2x_{12}^2x_4+$$
$$4x_{16}^3x_{15}x_{13}^2x_{12}^2x_3-4x_{16}^3x_{15}x_{13}^2x_{12}^2+$$
$$2x_{16}^2x_{15}^2x_{14}^2x_{13}^2-2x_{16}^2x_{15}^2x_{13}^4x_3^2+$$
$$4x_{16}^2x_{15}^2x_{13}^4x_3-2x_{16}^2x_{15}^2x_{13}^4$$
$$-4x_{16}^2x_{15}^2x_{13}^3x_{12}x_3^2+8x_{16}^2x_{15}^2x_{13}^3x_{12}x_3$$
$$-4x_{16}^2x_{15}^2x_{13}^3x_{12}-2x_{16}^2x_{15}^2x_{13}^2x_{12}^2x_3^2+$$
$$4x_{16}^2x_{15}^2x_{13}^2x_{12}^2x_3-2x_{16}^2x_{15}^2x_{13}^2x_{12}^2$$

13. Pseudo remainder with p_{16} over variable x_{16}:

$$\begin{aligned}
g \quad = \quad & 2x_{15}^2x_{14}^2x_{13}^2x_{11}^2x_9^2 \\
& -2x_{15}^2x_{13}^4x_{11}^2x_9^2x_3^2+ \\
& 4x_{15}^2x_{13}^4x_{11}^2x_9^2x_3-2x_{15}^2x_{13}^4x_{11}^2x_9^2 \\
& -4x_{15}^2x_{13}^3x_{12}x_{11}^2x_9^2x_3^2+ \\
& 8x_{15}^2x_{13}^3x_{12}x_{11}^2x_9^2x_3 \\
& -4x_{15}^2x_{13}^3x_{12}x_{11}^2x_9^2 \\
& -2x_{15}^2x_{13}^2x_{12}^2x_{11}^2x_9^2x_3^2+ \\
& 4x_{15}^2x_{13}^2x_{12}^2x_{11}^2x_9^2x_3 \\
& -2x_{15}^2x_{13}^2x_{12}^2x_{11}^2x_9^2+ \\
& 4x_{15}x_{14}^2x_{13}^2x_{11}^3x_9^3 \\
& -4x_{15}x_{13}^4x_{11}^3x_9^3x_4x_3+4x_{15}x_{13}^4x_{11}^3x_9^3x_4+ \\
& 4x_{15}x_{13}^4x_{11}^3x_9^3x_3-4x_{15}x_{13}^4x_{11}^3x_9^3 \\
& -8x_{15}x_{13}^3x_{12}x_{11}^3x_9^3x_4x_3+ \\
& 8x_{15}x_{13}^3x_{12}x_{11}^3x_9^3x_4+ \\
& 8x_{15}x_{13}^3x_{12}x_{11}^3x_9^3x_3-8x_{15}x_{13}^3x_{12}x_{11}^3x_9^3 \\
& -4x_{15}x_{13}^2x_{12}^2x_{11}^3x_9^3x_4x_3+ \\
& 4x_{15}x_{13}^2x_{12}^2x_{11}^3x_9^3x_4+ \\
& 4x_{15}x_{13}^2x_{12}^2x_{11}^3x_9^3x_3 \\
& -4x_{15}x_{13}^2x_{12}^2x_{11}^3x_9^3+2x_{14}^2x_{13}^2x_{11}^4x_9^4 \\
& -2x_{13}^4x_{11}^4x_9^4x_4^2+4x_{13}^4x_{11}^4x_9^4x_4 \\
& -2x_{13}^4x_{11}^4x_9^4-4x_{13}^3x_{12}x_{11}^4x_9^4x_4^2+ \\
& 8x_{13}^3x_{12}x_{11}^4x_9^4x_4-4x_{13}^3x_{12}x_{11}^4x_9^4 \\
& -2x_{13}^2x_{12}^2x_{11}^4x_9^4x_4^2+ \\
& 4x_{13}^2x_{12}^2x_{11}^4x_9^4x_4-2x_{13}^2x_{12}^2x_{11}^4x_9^4
\end{aligned}$$

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

$$g \quad = \quad 2x_{14}^2x_{13}^2x_{11}^4x_{10}^2x_9^2$$

$$-4x_{14}^2x_{13}^2x_{11}^4x_{10}x_9^3 + 2x_{14}^2x_{13}^2x_{11}^4x_9^4$$
$$-2x_{13}^4x_{11}^4x_{10}^2x_9^2x_3^2 +$$
$$4x_{13}^4x_{11}^4x_{10}^2x_9^2x_3 - 2x_{13}^4x_{11}^4x_{10}^2x_9^2 +$$
$$4x_{13}^4x_{11}^4x_{10}x_9^3x_4x_3 - 4x_{13}^4x_{11}^4x_{10}x_9^3x_4$$
$$-4x_{13}^4x_{11}^4x_{10}x_9^3x_3 + 4x_{13}^4x_{11}^4x_{10}x_9^3$$
$$-2x_{13}^4x_{11}^4x_9^4x_4^2 + 4x_{13}^4x_{11}^4x_9^4x_4$$
$$-2x_{13}^4x_{11}^4x_9^4 - 4x_{13}^3x_{12}x_{11}^4x_{10}^2x_9^2x_3^2 +$$
$$8x_{13}^3x_{12}x_{11}^4x_{10}^2x_9^2x_3$$
$$-4x_{13}^3x_{12}x_{11}^4x_{10}^2x_9^2 +$$
$$8x_{13}^3x_{12}x_{11}^4x_{10}x_9^3x_4x_3$$
$$-8x_{13}^3x_{12}x_{11}^4x_{10}x_9^3x_4$$
$$-8x_{13}^3x_{12}x_{11}^4x_{10}x_9^3x_3 + 8x_{13}^3x_{12}x_{11}^4x_{10}x_9^3$$
$$-4x_{13}^3x_{12}x_{11}^4x_9^4x_4^2 + 8x_{13}^3x_{12}x_{11}^4x_9^4x_4$$
$$-4x_{13}^3x_{12}x_{11}^4x_9^4$$
$$-2x_{13}^2x_{12}^2x_{11}^4x_{10}^2x_9^2x_3^2 +$$
$$4x_{13}^2x_{12}^2x_{11}^4x_{10}^2x_9^2x_3$$
$$-2x_{13}^2x_{12}^2x_{11}^4x_{10}^2x_9^2 +$$
$$4x_{13}^2x_{12}^2x_{11}^4x_{10}x_9^3x_4x_3$$
$$-4x_{13}^2x_{12}^2x_{11}^4x_{10}x_9^3x_4$$
$$-4x_{13}^2x_{12}^2x_{11}^4x_{10}x_9^3x_3 +$$
$$4x_{13}^2x_{12}^2x_{11}^4x_{10}x_9^3$$
$$-2x_{13}^2x_{12}^2x_{11}^4x_9^4x_4^2 +$$
$$4x_{13}^2x_{12}^2x_{11}^4x_9^4x_4 - 2x_{13}^2x_{12}^2x_{11}^4x_9^4$$

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

$$
\begin{aligned}
g \quad = \quad & -2x_{13}^4x_{11}^4x_{10}^2x_9^2x_3^2 + \\
& 4x_{13}^4x_{11}^4x_{10}^2x_9^2x_3 - 2x_{13}^4x_{11}^4x_{10}^2x_9^2 + \\
& 4x_{13}^4x_{11}^4x_{10}x_9^3x_4x_3 - 4x_{13}^4x_{11}^4x_{10}x_9^3x_4 \\
& -4x_{13}^4x_{11}^4x_{10}x_9^3x_3 + 4x_{13}^4x_{11}^4x_{10}x_9^3 \\
& -2x_{13}^4x_{11}^4x_9^4x_4^2 + 4x_{13}^4x_{11}^4x_9^4x_4 \\
& -2x_{13}^4x_{11}^4x_9^4 - 4x_{13}^3x_{12}x_{11}^4x_{10}^2x_9^2x_3^2 + \\
& 8x_{13}^3x_{12}x_{11}^4x_{10}^2x_9^2x_3 \\
& -4x_{13}^3x_{12}x_{11}^4x_{10}^2x_9^2 + \\
& 8x_{13}^3x_{12}x_{11}^4x_{10}x_9^3x_4x_3 \\
& -8x_{13}^3x_{12}x_{11}^4x_{10}x_9^3x_4 \\
& -8x_{13}^3x_{12}x_{11}^4x_{10}x_9^3x_3 + 8x_{13}^3x_{12}x_{11}^4x_{10}x_9^3 \\
& -4x_{13}^3x_{12}x_{11}^4x_9^4x_4^2 + 8x_{13}^3x_{12}x_{11}^4x_9^4x_4 \\
& -4x_{13}^3x_{12}x_{11}^4x_9^4 \\
& -2x_{13}^2x_{12}^2x_{11}^4x_{10}^2x_9^2x_3^2 +
\end{aligned}
$$

$$
\begin{aligned}
& 4x_{13}^2x_{12}^2x_{11}^4x_{10}^2x_9^2x_3 + \\
& 2x_{13}^2x_{12}^2x_{11}^4x_{10}^2x_9^2x_1^2 \\
& -2x_{13}^2x_{12}^2x_{11}^4x_{10}^2x_9^2 + \\
& 4x_{13}^2x_{12}^2x_{11}^4x_{10}x_9^3x_4x_3 \\
& -4x_{13}^2x_{12}^2x_{11}^4x_{10}x_9^3x_4 \\
& -4x_{13}^2x_{12}^2x_{11}^4x_{10}x_9^3x_3 \\
& -4x_{13}^2x_{12}^2x_{11}^4x_{10}x_9^3x_1^2 + \\
& 4x_{13}^2x_{12}^2x_{11}^4x_{10}x_9^3 \\
& -2x_{13}^2x_{12}^2x_{11}^4x_9^4x_4^2 + \\
& 4x_{13}^2x_{12}^2x_{11}^4x_9^4x_4 + \\
& 2x_{13}^2x_{12}^2x_{11}^4x_9^4x_1^2 - 2x_{13}^2x_{12}^2x_{11}^4x_9^4
\end{aligned}
$$

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

$$
\begin{aligned}
g \;=\; & -2x_{12}^2x_{11}^6x_{10}^2x_9^2x_7^2x_3^2 + \\
& 4x_{12}^2x_{11}^6x_{10}^2x_9^2x_7^2x_3 + \\
& 2x_{12}^2x_{11}^6x_{10}^2x_9^2x_7^2x_1^2 \\
& -2x_{12}^2x_{11}^6x_{10}^2x_9^2x_7^2 + \\
& 4x_{12}^2x_{11}^6x_{10}x_9^3x_7^2x_4x_3 \\
& -4x_{12}^2x_{11}^6x_{10}x_9^3x_7^2x_4 \\
& -4x_{12}^2x_{11}^6x_{10}x_9^3x_7^2x_3 \\
& -4x_{12}^2x_{11}^6x_{10}x_9^3x_7^2x_1^2 + \\
& 4x_{12}^2x_{11}^6x_{10}x_9^3x_7^2 \\
& -2x_{12}^2x_{11}^6x_9^4x_7^2x_4^2 + \\
& 4x_{12}^2x_{11}^6x_9^4x_7^2x_4 + \\
& 2x_{12}^2x_{11}^6x_9^4x_7^2x_1^2 - 2x_{12}^2x_{11}^6x_9^4x_7^2 \\
& -4x_{12}x_{11}^7x_{10}^2x_9^2x_7^3x_3^2 + \\
& 8x_{12}x_{11}^7x_{10}^2x_9^2x_7^3x_3 \\
& -4x_{12}x_{11}^7x_{10}^2x_9^2x_7^3 + \\
& 8x_{12}x_{11}^7x_{10}x_9^3x_7^3x_4x_3 \\
& -8x_{12}x_{11}^7x_{10}x_9^3x_7^3x_4 \\
& -8x_{12}x_{11}^7x_{10}x_9^3x_7^3x_3 + 8x_{12}x_{11}^7x_{10}x_9^3x_7^3 \\
& -4x_{12}x_{11}^7x_9^4x_7^3x_4^2 + 8x_{12}x_{11}^7x_9^4x_7^3x_4 \\
& -4x_{12}x_{11}^7x_9^4x_7^3 - 2x_{11}^8x_{10}^2x_9^2x_7^4x_3^2 + \\
& 4x_{11}^8x_{10}^2x_9^2x_7^4x_3 - 2x_{11}^8x_{10}^2x_9^2x_7^4 + \\
& 4x_{11}^8x_{10}x_9^3x_7^4x_4x_3 - 4x_{11}^8x_{10}x_9^3x_7^4x_4 \\
& -4x_{11}^8x_{10}x_9^3x_7^4x_3 + 4x_{11}^8x_{10}x_9^3x_7^4 \\
& -2x_{11}^8x_9^4x_7^4x_4^2 + 4x_{11}^8x_9^4x_7^4x_4 \\
& -2x_{11}^8x_9^4x_7^4
\end{aligned}
$$

17. Pseudo remainder with p_{12} over variable x_{12}:

$$
\begin{aligned}
g \quad = \quad & -2x_{11}^8x_{10}^2x_9^2x_8^2x_7^2x_3^2 + \\
& 4x_{11}^8x_{10}^2x_9^2x_8^2x_7^2x_3 + \\
& 2x_{11}^8x_{10}^2x_9^2x_8^2x_7^2x_1^2 \\
& -2x_{11}^8x_{10}^2x_9^2x_8^2x_7^2 + \\
& 4x_{11}^8x_{10}^2x_9^2x_8x_7^3x_3^2 \\
& -8x_{11}^8x_{10}^2x_9^2x_8x_7^3x_3 + \\
& 4x_{11}^8x_{10}^2x_9^2x_8x_7^3 \\
& -2x_{11}^8x_{10}^2x_9^2x_7^4x_3^2 + \\
& 4x_{11}^8x_{10}^2x_9^2x_7^4x_3 - 2x_{11}^8x_{10}^2x_9^2x_7^4 + \\
& 4x_{11}^8x_{10}x_9^3x_8^2x_7^2x_4x_3 \\
& -4x_{11}^8x_{10}x_9^3x_8^2x_7^2x_4 \\
& -4x_{11}^8x_{10}x_9^3x_8^2x_7^2x_3 \\
& -4x_{11}^8x_{10}x_9^3x_8^2x_7^2x_1^2 + \\
& 4x_{11}^8x_{10}x_9^3x_8^2x_7^2 \\
& -8x_{11}^8x_{10}x_9^3x_8x_7^3x_4x_3 + \\
& 8x_{11}^8x_{10}x_9^3x_8x_7^3x_4 + 8x_{11}^8x_{10}x_9^3x_8x_7^3x_3 \\
& -8x_{11}^8x_{10}x_9^3x_8x_7^3 + 4x_{11}^8x_{10}x_9^3x_7^4x_4x_3 \\
& -4x_{11}^8x_{10}x_9^3x_7^4x_4 - 4x_{11}^8x_{10}x_9^3x_7^4x_3 + \\
& 4x_{11}^8x_{10}x_9^3x_7^4 - 2x_{11}^8x_9^4x_8^2x_7^2x_4^2 + \\
& 4x_{11}^8x_9^4x_8^2x_7^2x_4 + 2x_{11}^8x_9^4x_8^2x_7^2x_1^2 \\
& -2x_{11}^8x_9^4x_8^2x_7^2 + 4x_{11}^8x_9^4x_8x_7^3x_4^2 \\
& -8x_{11}^8x_9^4x_8x_7^3x_4 + 4x_{11}^8x_9^4x_8x_7^3 \\
& -2x_{11}^8x_9^4x_7^4x_4^2 + 4x_{11}^8x_9^4x_7^4x_4 \\
& -2x_{11}^8x_9^4x_7^4
\end{aligned}
$$

18. Pseudo remainder with p_{11} over variable x_{11}:

$$
\begin{aligned}
g \quad = \quad & -2x_{10}^2x_9^2x_8^2x_7^2x_3^2 + \\
& 4x_{10}^2x_9^2x_8^2x_7^2x_3 + 2x_{10}^2x_9^2x_8^2x_7^2x_1^2 \\
& -2x_{10}^2x_9^2x_8^2x_7^2 + 4x_{10}^2x_9^2x_8x_7^3x_3^2 \\
& -8x_{10}^2x_9^2x_8x_7^3x_3 + 4x_{10}^2x_9^2x_8x_7^3 \\
& -2x_{10}^2x_9^2x_7^4x_3^2 + 4x_{10}^2x_9^2x_7^4x_3 \\
& -2x_{10}^2x_9^2x_7^4 + 4x_{10}x_9^3x_8^2x_7^2x_4x_3 \\
& -4x_{10}x_9^3x_8^2x_7^2x_4 - 4x_{10}x_9^3x_8^2x_7^2x_3 \\
& -4x_{10}x_9^3x_8^2x_7^2x_1^2 + 4x_{10}x_9^3x_8^2x_7^2 \\
& -8x_{10}x_9^3x_8x_7^3x_4x_3 + 8x_{10}x_9^3x_8x_7^3x_4 + \\
& 8x_{10}x_9^3x_8x_7^3x_3 - 8x_{10}x_9^3x_8x_7^3 + \\
& 4x_{10}x_9^3x_7^4x_4x_3 - 4x_{10}x_9^3x_7^4x_4 \\
& -4x_{10}x_9^3x_7^4x_3 + 4x_{10}x_9^3x_7^4
\end{aligned}
$$

$$-2x_9^4x_8^2x_7^2x_4^2 + 4x_9^4x_8^2x_7^2x_4 +$$
$$2x_9^4x_8^2x_7^2x_1^2 - 2x_9^4x_8^2x_7^2 +$$
$$4x_9^4x_8x_7^3x_4^2 - 8x_9^4x_8x_7^3x_4 + 4x_9^4x_8x_7^3$$
$$-2x_9^4x_7^4x_4^2 + 4x_9^4x_7^4x_4 - 2x_9^4x_7^4$$

19. Pseudo remainder with p_{10} over variable x_{10}:
    Polynomial too big for output (text size is 2529 *characters, number of terms is* 66*)*
20. Pseudo remainder with p_9 over variable x_9:
    Polynomial too big for output (text size is 6495 *characters, number of terms is* 169*)*
21. Pseudo remainder with p_8 over variable x_8:
    Polynomial too big for output (text size is 6493 *characters, number of terms is* 169*)*
22. Pseudo remainder with p_7 over variable x_7:
    Polynomial too big for output (text size is 6293 *characters, number of terms is* 169*)*
23. Pseudo remainder with p_6 over variable x_6:
    Polynomial too big for output (text size is 3617 *characters, number of terms is* 103*)*
24. Pseudo remainder with p_5 over variable x_5:

$$\begin{aligned} g \;=\; & 128x_4^2x_3^2x_2^2x_1^4 - 32x_4^2x_3^2x_2^2x_1^2 \\ & -64x_4^2x_3^2x_2x_1^3 - 32x_4^2x_3^2x_1^4 \\ & -128x_4^2x_3x_2^2x_1^4 + 32x_4^2x_3x_2^2x_1^2 + \\ & 64x_4^2x_3x_2x_1^3 + 32x_4^2x_3x_1^4 + 32x_4^2x_2^2x_1^4 \\ & -8x_4^2x_2^2x_1^2 - 16x_4^2x_2x_1^3 - 8x_4^2x_1^4 \\ & -256x_4x_3^3x_2^2x_1^4 + 128x_4x_3^2x_2^2x_1^4 + \\ & 64x_4x_3^2x_2^2x_1^2 + 128x_4x_3^2x_2x_1^3 + 64x_4x_3^2x_1^4 + \\ & 64x_4x_3x_2^2x_1^4 - 64x_4x_3x_2^2x_1^2 - 128x_4x_3x_2x_1^3 \\ & -64x_4x_3x_1^4 - 32x_4x_2^2x_1^4 + 16x_4x_2^2x_1^2 + \\ & 32x_4x_2x_1^3 + 16x_4x_1^4 + 128x_3^4x_2^2x_1^4 \\ & -64x_3^2x_2^2x_1^4 - 32x_3^2x_2^2x_1^2 - 64x_3^2x_2x_1^3 \\ & -32x_3^2x_1^4 + 32x_3x_2^2x_1^2 + 64x_3x_2x_1^3 + 32x_3x_1^4 + \\ & 8x_2^2x_1^4 - 8x_2^2x_1^2 - 16x_2x_1^3 - 8x_1^4 \end{aligned}$$

25. Pseudo remainder with p_4 over variable x_4:

$$\begin{aligned} g \;=\; & 512x_3^4x_2^2x_1^4 - 512x_3^3x_2^2x_1^4 + \\ & 128x_3^2x_2^2x_1^4 - 32x_3^2x_2^2x_1^2 - 64x_3^2x_2x_1^3 \\ & -32x_3^2x_1^4 + 32x_3x_2^2x_1^2 + 64x_3x_2x_1^3 + 32x_3x_1^4 \\ & -8x_2^2x_1^2 - 16x_2x_1^3 - 8x_1^4 \end{aligned}$$

26. Pseudo remainder with p_3 over variable x_3:

$$g = 1024x_2^2x_1^4 - 64x_2^2x_1^2 - 128x_2x_1^3 - 64x_1^4$$

27. Pseudo remainder with p_2 over variable x_2:

$$g = 768x_1^4 - 256x_1^3 - 64x_1^2$$

28. Pseudo remainder with p_1 over variable x_1:

$$g = 0$$

3 Prover results

Status: Theorem has been proved.

Space Complexity: The biggest polynomial obtained during prover execution contains 169 terms.

Time Complexity: Time spent by the prover is 0.22 seconds.

4 NDG Conditions

NDG Conditions in readable form

- Failed to translate NDG Conditions to readable form