

Minimal Constraint Subsets Detected for differential trail in Table 11 DDH21+ SKINNY-128-256

the 0 th Minimal Constraint set is:

$$\begin{aligned} y^{0_3} + x^{1_7} + k_{1_3} + k_{2_3_0} &= 0 \\ y^{0_3} + [y^{0_9}] + [x^{1_{15}}] + k_{1_3} + k_{2_3_0} &= 0 \\ y^{1_0} + x^{2_4} + k_{1_9} + k_{2_9_0} &= 0 \\ y^{1_0} + y^{1_{10}} + x^{2_{12}} + k_{1_9} + k_{2_9_0} &= 0 \\ [y^{1_2}] + [y^{1_8}] + [y^{1_{15}}] + x^{2_2} + k_{1_8} + k_{2_8_0} &= 0 \\ y^{1_7} + y^{1_{10}} + x^{2_8} + k_{1_{11}} + k_{2_{11_0}} &= 0 \\ [y^{2_1}] + y^{2_{11}} + [x^{3_{13}}] + k_{1_7} + k_{2_7_1} &= 0 \\ y^{2_2} + y^{2_8} + x^{3_{14}} + k_{1_0} + k_{2_0_1} &= 0 \\ y^{2_3} + y^{2_9} + y^{2_{12}} + x^{3_3} + k_{1_5} + k_{2_5_1} &= 0 \\ y^{2_3} + x^{3_7} + k_{1_5} + k_{2_5_1} &= 0 \\ y^{2_4} + y^{2_{11}} + x^{3_9} + k_{1_2} + k_{2_2_1} &= 0 \\ [y^{2_6}] + y^{2_9} + [x^{3_{11}}] + k_{1_4} + k_{2_4_1} &= 0 \\ y^{3_0} + y^{3_{10}} + [y^{3_{13}}] + [x^{4_0}] + k_{1_{15}} + k_{2_{15_1}} &= 0 \\ y^{3_0} + x^{4_4} + k_{1_{15}} + k_{2_{15_1}} &= 0 \\ y^{3_1} + [y^{3_{11}}] + y^{3_{14}} + [x^{4_1}] + k_{1_{11}} + k_{2_{11_1}} &= 0 \\ y^{3_1} + x^{4_5} + k_{1_{11}} + k_{2_{11_1}} &= 0 \\ y^{3_3} + y^{3_9} + [x^{4_{15}}] + k_{1_{14}} + k_{2_{14_1}} &= 0 \\ y^{3_7} + y^{3_{10}} + x^{4_8} + k_{1_{13}} + k_{2_{13_1}} &= 0 \\ [y^{4_1}] + y^{4_{11}} + [x^{5_{13}}] + k_{1_3} + k_{2_3_2} &= 0 \\ y^{4_4} + y^{4_{11}} + x^{5_9} + k_{1_0} + k_{2_0_2} &= 0 \\ y^{4_5} + y^{4_8} + x^{5_{10}} + k_{1_4} + k_{2_4_2} &= 0 \\ [y^{4_7}] + [y^{4_{10}}] + x^{5_8} + k_{1_5} + k_{2_5_2} &= 0 \\ y^{5_0} + x^{6_4} + k_{1_{11}} + k_{2_{11_2}} &= 0 \\ y^{5_0} + y^{5_{10}} + x^{6_{12}} + k_{1_{11}} + k_{2_{11_2}} &= 0 \\ [y^{5_1}] + [y^{5_{11}}] + x^{6_{13}} + k_{1_{13}} + k_{2_{13_2}} &= 0 \\ [y^{5_2}] + y^{5_8} + [y^{5_{15}}] + x^{6_2} + k_{1_{15}} + k_{2_{15_2}} &= 0 \\ [y^{5_3}] + y^{5_9} + [y^{5_{12}}] + x^{6_3} + k_{1_{12}} + k_{2_{12_2}} &= 0 \\ [y^{6_0}] + [y^{6_{10}}] + y^{6_{13}} + x^{7_0} + k_{1_3} + k_{2_3_3} &= 0 \\ y^{6_1} + x^{7_5} + k_{1_5} + k_{2_5_3} &= 0 \\ y^{6_1} + y^{6_{11}} + x^{7_{13}} + k_{1_5} + k_{2_5_3} &= 0 \\ y^{6_2} + [y^{6_8}] + [y^{6_{15}}] + x^{7_2} + k_{1_7} + k_{2_7_3} &= 0 \\ y^{6_3} + y^{6_9} + y^{6_{12}} + x^{7_3} + k_{1_4} + k_{2_4_3} &= 0 \\ y^{6_4} + y^{6_{11}} + x^{7_9} + k_{1_1} + k_{2_1_3} &= 0 \\ [y^{6_6}] + y^{6_9} + [x^{7_{11}}] + k_{1_0} + k_{2_0_3} &= 0 \\ y^{7_0} + y^{7_{10}} + y^{7_{13}} + x^{8_0} + k_{1_{13}} + k_{2_{13_3}} &= 0 \\ y^{7_0} + x^{8_4} + k_{1_{13}} + k_{2_{13_3}} &= 0 \\ y^{7_0} + y^{7_{10}} + x^{8_{12}} + k_{1_{13}} + k_{2_{13_3}} &= 0 \\ [y^{7_1}] + x^{8_5} + k_{1_{14}} + k_{2_{14_3}} &= 0 \\ y^{7_2} + y^{7_8} + x^{8_{14}} + k_{1_{11}} + k_{2_{11_3}} &= 0 \\ y^{7_3} + y^{7_9} + x^{8_{15}} + k_{1_{10}} + k_{2_{10_3}} &= 0 \\ y^{7_5} + y^{7_8} + x^{8_{10}} + k_{1_8} + k_{2_8_3} &= 0 \end{aligned}$$

$$\begin{aligned}
&y^8_{8_0} + y^8_{10} + x^9_{12} + k1_5 + k2_{5_4} = 0 \\
&y^8_{8_1} + y^8_{11} + y^8_{14} + x^9_{1_1} + k1_6 + k2_{6_4} = 0 \\
&y^8_{8_1} + x^9_{5_5} + k1_6 + k2_{6_4} = 0 \\
&y^8_{8_2} + y^8_{8_8} + y^8_{15} + x^9_{2_2} + k1_3 + k2_{3_4} = 0 \\
&y^8_{8_2} + x^9_{6_6} + k1_3 + k2_{3_4} = 0 \\
&y^8_{8_3} + y^8_{9_9} + y^8_{12} + x^9_{3_3} + k1_2 + k2_{2_4} = 0 \\
&y^8_{8_3} + y^8_{9_9} + x^9_{15_15} + k1_2 + k2_{2_4} = 0 \\
&y^8_{8_4} + y^8_{11} + x^9_{9_9} + k1_7 + k2_{7_4} = 0 \\
&y^8_{8_5} + y^8_{8_8} + x^9_{10_10} + k1_0 + k2_{0_4} = 0 \\
&[y^9_{9_0}] + x^{10}_{4_4} + k1_{14} + k2_{14_4} = 0 \\
&[y^9_{9_0}] + y^9_{10_10} + x^{10}_{12_12} + k1_{14} + k2_{14_4} = 0 \\
&y^9_{9_1} + x^{10}_{5_5} + k1_{12} + k2_{12_4} = 0 \\
&y^9_{9_2} + y^9_{8_8} + y^9_{15_15} + x^{10}_{2_2} + k1_{13} + k2_{13_4} = 0 \\
&y^9_{9_3} + y^9_{9_9} + y^9_{12_12} + x^{10}_{3_3} + k1_8 + k2_{8_4} = 0 \\
&y^9_{9_3} + x^{10}_{7_7} + k1_8 + k2_{8_4} = 0 \\
&y^9_{9_3} + y^9_{9_9} + x^{10}_{15_15} + k1_8 + k2_{8_4} = 0 \\
&y^9_{9_5} + y^9_{8_8} + x^{10}_{10_10} + k1_9 + k2_{9_4} = 0 \\
&y^9_{9_6} + y^9_{9_9} + x^{10}_{11_11} + k1_{15} + k2_{15_4} = 0 \\
&y^{10}_{10_2} + y^{10}_{8_8} + y^{10}_{15_15} + x^{11}_{2_2} + k1_5 + k2_{5_5} = 0 \\
&y^{10}_{10_3} + y^{10}_{9_9} + y^{10}_{12_12} + x^{11}_{3_3} + k1_0 + k2_{0_5} = 0 \\
&y^{10}_{10_3} + x^{11}_{7_7} + k1_0 + k2_{0_5} = 0 \\
&y^{10}_{10_3} + y^{10}_{9_9} + x^{11}_{15_15} + k1_0 + k2_{0_5} = 0 \\
&y^{10}_{10_4} + y^{10}_{11_11} + x^{11}_{9_9} + k1_3 + k2_{3_5} = 0 \\
&y^{10}_{10_5} + y^{10}_{8_8} + x^{11}_{10_10} + k1_1 + k2_{1_5} = 0 \\
&y^{10}_{10_7} + y^{10}_{10_10} + x^{11}_{8_8} + k1_2 + k2_{2_5} = 0 \\
&y^{11}_{11_2} + y^{11}_{8_8} + y^{11}_{15_15} + x^{12}_{2_2} + k1_{14} + k2_{14_5} = 0 \\
&y^{11}_{11_3} + y^{11}_{9_9} + x^{12}_{15_15} + k1_9 + k2_{9_5} = 0 \\
&y^{11}_{11_7} + y^{11}_{10_10} + x^{12}_{8_8} + k1_8 + k2_{8_5} = 0 \\
&y^{12}_{12_2} + y^{12}_{8_8} + y^{12}_{15_15} + x^{13}_{2_2} + k1_6 + k2_{6_6} = 0 \\
&y^{13}_{13_2} + x^{14}_{6_6} + k1_{12} + k2_{12_6} = 0 \\
&y^{14}_{14_6} + [y^{14}_{14_9}] + [x^{15}_{15_11}] + k1_5 + k2_{5_7} = 0 \\
&S(x^{1_7}) + y^{1_7} = 0 \\
&S(x^{2_2}) + y^{2_2} = 0 \\
&S(x^{2_4}) + y^{2_4} = 0 \\
&S(x^{2_8}) + y^{2_8} = 0 \\
&S(x^{2_{12}}) + y^{2_{12}} = 0 \\
&S(x^{3_3}) + y^{3_3} = 0 \\
&S(x^{3_7}) + y^{3_7} = 0 \\
&S(x^{3_9}) + y^{3_9} = 0 \\
&S(x^{3_{14}}) + y^{3_{14}} = 0 \\
&S(x^{4_4}) + y^{4_4} = 0 \\
&S(x^{4_5}) + y^{4_5} = 0 \\
&S(x^{4_8}) + y^{4_8} = 0 \\
&S(x^{5_8}) + y^{5_8} = 0
\end{aligned}$$

$$\begin{aligned}
&S(x^5_9) + y^5_9 = 0 \\
&S(x^5_{10}) + y^5_{10} = 0 \\
&S(x^6_2) + y^6_2 = 0 \\
&S(x^6_3) + y^6_3 = 0 \\
&S(x^6_4) + y^6_4 = 0 \\
&S(x^6_{12}) + y^6_{12} = 0 \\
&S(x^6_{13}) + y^6_{13} = 0 \\
&S(x^7_0) + y^7_0 = 0 \\
&S(x^7_2) + y^7_2 = 0 \\
&S(x^7_3) + y^7_3 = 0 \\
&S(x^7_5) + y^7_5 = 0 \\
&S(x^7_9) + y^7_9 = 0 \\
&S(x^7_{13}) + y^7_{13} = 0 \\
&S(x^8_0) + y^8_0 = 0 \\
&S(x^8_4) + y^8_4 = 0 \\
&S(x^8_5) + y^8_5 = 0 \\
&S(x^8_{10}) + y^8_{10} = 0 \\
&S(x^8_{12}) + y^8_{12} = 0 \\
&S(x^8_{14}) + y^8_{14} = 0 \\
&S(x^8_{15}) + y^8_{15} = 0 \\
&S(x^9_1) + y^9_1 = 0 \\
&S(x^9_2) + y^9_2 = 0 \\
&S(x^9_3) + y^9_3 = 0 \\
&S(x^9_5) + y^9_5 = 0 \\
&S(x^9_6) + y^9_6 = 0 \\
&S(x^9_9) + y^9_9 = 0 \\
&S(x^9_{10}) + y^9_{10} = 0 \\
&S(x^9_{12}) + y^9_{12} = 0 \\
&S(x^9_{15}) + y^9_{15} = 0 \\
&S(x^{10}_2) + y^{10}_2 = 0 \\
&S(x^{10}_3) + y^{10}_3 = 0 \\
&S(x^{10}_4) + y^{10}_4 = 0 \\
&S(x^{10}_5) + y^{10}_5 = 0 \\
&S(x^{10}_7) + y^{10}_7 = 0 \\
&S(x^{10}_{10}) + y^{10}_{10} = 0 \\
&S(x^{10}_{11}) + y^{10}_{11} = 0 \\
&S(x^{10}_{12}) + y^{10}_{12} = 0 \\
&S(x^{10}_{15}) + y^{10}_{15} = 0 \\
&S(x^{11}_2) + y^{11}_2 = 0 \\
&S(x^{11}_3) + y^{11}_3 = 0 \\
&S(x^{11}_7) + y^{11}_7 = 0 \\
&S(x^{11}_8) + y^{11}_8 = 0 \\
&S(x^{11}_9) + y^{11}_9 = 0 \\
&S(x^{11}_{10}) + y^{11}_{10} = 0
\end{aligned}$$

$$\begin{aligned}
S(x^{11}_{15}) + y^{11}_{15} &= 0 \\
S(x^{12}_2) + y^{12}_2 &= 0 \\
S(x^{12}_8) + y^{12}_8 &= 0 \\
S(x^{12}_{15}) + y^{12}_{15} &= 0 \\
S(x^{13}_2) + y^{13}_2 &= 0 \\
S(x^{14}_6) + y^{14}_6 &= 0
\end{aligned}$$

the 1 th Minimal Constraint set is:

$$\begin{aligned}
y^0_0 + x^1_4 + k1_0 + k2_0_0 &= 0 \\
y^0_0 + y^0_{10} + x^1_{12} + k1_0 + k2_0_0 &= 0 \\
[y^0_6] + [y^0_9] + x^1_{11} + k1_6 + k2_6_0 &= 0 \\
[y^0_7] + y^0_{10} + [x^1_8] + k1_7 + k2_7_0 &= 0 \\
y^1_3 + y^1_9 + y^1_{12} + x^2_3 + k1_{13} + k2_{13}_0 &= 0 \\
y^1_3 + y^1_9 + x^2_{15} + k1_{13} + k2_{13}_0 &= 0 \\
y^1_4 + y^1_{11} + x^2_9 + k1_{10} + k2_{10}_0 &= 0 \\
y^2_2 + y^2_8 + y^2_{15} + x^3_2 + k1_0 + k2_0_1 &= 0 \\
y^2_2 + y^2_8 + x^3_{14} + k1_0 + k2_0_1 &= 0 \\
y^2_3 + y^2_9 + x^3_{15} + k1_5 + k2_5_1 &= 0 \\
y^3_1 + [y^3_{11}] + y^3_{14} + [x^4_1] + k1_{11} + k2_{11}_1 &= 0 \\
y^3_1 + x^4_5 + k1_{11} + k2_{11}_1 &= 0 \\
y^3_2 + y^3_8 + y^3_{15} + x^4_2 + k1_9 + k2_9_1 &= 0 \\
[y^3_5] + y^3_8 + [x^4_{10}] + k1_{12} + k2_{12}_1 &= 0 \\
[y^4_0] + [y^4_{10}] + [y^4_{13}] + x^5_0 + k1_7 + k2_7_2 &= 0 \\
y^4_2 + y^4_8 + x^5_{14} + k1_1 + k2_1_2 &= 0 \\
y^4_5 + y^4_8 + x^5_{10} + k1_4 + k2_4_2 &= 0 \\
y^5_0 + y^5_{10} + x^6_{12} + k1_{11} + k2_{11}_2 &= 0 \\
[y^5_1] + [y^5_{11}] + y^5_{14} + x^6_1 + k1_{13} + k2_{13}_2 &= 0 \\
[y^5_1] + [y^5_{11}] + x^6_{13} + k1_{13} + k2_{13}_2 &= 0 \\
[y^6_0] + [y^6_{10}] + y^6_{13} + x^7_0 + k1_3 + k2_3_3 &= 0 \\
y^6_1 + x^7_5 + k1_5 + k2_5_3 &= 0 \\
y^6_2 + [y^6_8] + [y^6_{15}] + x^7_2 + k1_7 + k2_7_3 &= 0 \\
y^6_2 + x^7_6 + k1_7 + k2_7_3 &= 0 \\
y^6_3 + y^6_9 + y^6_{12} + x^7_3 + k1_4 + k2_4_3 &= 0 \\
y^6_3 + x^7_7 + k1_4 + k2_4_3 &= 0 \\
[y^6_5] + [y^6_8] + x^7_{10} + k1_2 + k2_2_3 &= 0 \\
[y^6_6] + y^6_9 + [x^7_{11}] + k1_0 + k2_0_3 &= 0 \\
[y^6_7] + [y^6_{10}] + x^7_8 + k1_6 + k2_6_3 &= 0 \\
y^7_0 + x^8_4 + k1_{13} + k2_{13}_3 &= 0 \\
[y^7_1] + x^8_5 + k1_{14} + k2_{14}_3 &= 0 \\
y^7_2 + x^8_6 + k1_{11} + k2_{11}_3 &= 0 \\
y^7_3 + y^7_9 + x^8_{15} + k1_{10} + k2_{10}_3 &= 0 \\
[y^7_4] + [y^7_{11}] + x^8_9 + k1_{15} + k2_{15}_3 &= 0 \\
y^7_5 + y^7_8 + x^8_{10} + k1_8 + k2_8_3 &= 0 \\
y^7_6 + y^7_9 + x^8_{11} + k1_9 + k2_9_3 &= 0
\end{aligned}$$

$$\begin{aligned}
&y^7_7 + y^7_{10} + x^8_8 + k1_{12} + k2_{12_3} = 0 \\
&y^8_0 + x^9_4 + k1_5 + k2_{5_4} = 0 \\
&y^8_0 + y^8_{10} + x^9_{12} + k1_5 + k2_{5_4} = 0 \\
&y^8_2 + y^8_8 + y^8_{15} + x^9_2 + k1_3 + k2_{3_4} = 0 \\
&y^8_2 + y^8_8 + x^9_{14} + k1_3 + k2_{3_4} = 0 \\
&y^8_4 + y^8_{11} + x^9_9 + k1_7 + k2_{7_4} = 0 \\
&y^8_5 + y^8_8 + x^9_{10} + k1_0 + k2_{0_4} = 0 \\
&y^8_6 + y^8_9 + x^9_{11} + k1_1 + k2_{1_4} = 0 \\
&[y^9_0] + x^{10}_4 + k1_{14} + k2_{14_4} = 0 \\
&[y^9_0] + y^9_{10} + x^{10}_{12} + k1_{14} + k2_{14_4} = 0 \\
&y^9_1 + y^9_{11} + y^9_{14} + x^{10}_1 + k1_{12} + k2_{12_4} = 0 \\
&y^9_1 + y^9_{11} + x^{10}_{13} + k1_{12} + k2_{12_4} = 0 \\
&y^9_2 + x^{10}_6 + k1_{13} + k2_{13_4} = 0 \\
&y^9_3 + y^9_9 + y^9_{12} + x^{10}_3 + k1_8 + k2_{8_4} = 0 \\
&y^9_3 + x^{10}_7 + k1_8 + k2_{8_4} = 0 \\
&y^9_4 + y^9_{11} + x^{10}_9 + k1_{11} + k2_{11_4} = 0 \\
&y^{10}_0 + y^{10}_{10} + y^{10}_{13} + x^{11}_0 + k1_6 + k2_{6_5} = 0 \\
&y^{10}_0 + x^{11}_4 + k1_6 + k2_{6_5} = 0 \\
&y^{10}_1 + y^{10}_{11} + x^{11}_{13} + k1_4 + k2_{4_5} = 0 \\
&y^{10}_3 + y^{10}_9 + y^{10}_{12} + x^{11}_3 + k1_0 + k2_{0_5} = 0 \\
&y^{10}_3 + x^{11}_7 + k1_0 + k2_{0_5} = 0 \\
&y^{10}_3 + y^{10}_9 + x^{11}_{15} + k1_0 + k2_{0_5} = 0 \\
&y^{10}_4 + y^{10}_{11} + x^{11}_9 + k1_3 + k2_{3_5} = 0 \\
&y^{10}_6 + y^{10}_9 + x^{11}_{11} + k1_7 + k2_{7_5} = 0 \\
&y^{10}_7 + y^{10}_{10} + x^{11}_8 + k1_2 + k2_{2_5} = 0 \\
&y^{11}_0 + y^{11}_{10} + y^{11}_{13} + x^{12}_0 + k1_{12} + k2_{12_5} = 0 \\
&y^{11}_2 + y^{11}_8 + y^{11}_{15} + x^{12}_2 + k1_{14} + k2_{14_5} = 0 \\
&y^{11}_2 + x^{12}_6 + k1_{14} + k2_{14_5} = 0 \\
&y^{11}_3 + y^{11}_9 + x^{12}_{15} + k1_9 + k2_{9_5} = 0 \\
&y^{11}_4 + y^{11}_{11} + x^{12}_9 + k1_{13} + k2_{13_5} = 0 \\
&y^{11}_7 + y^{11}_{10} + x^{12}_8 + k1_8 + k2_{8_5} = 0 \\
&y^{12}_0 + x^{13}_4 + k1_4 + k2_{4_6} = 0 \\
&y^{12}_2 + y^{12}_8 + y^{12}_{15} + x^{13}_2 + k1_6 + k2_{6_6} = 0 \\
&y^{12}_6 + y^{12}_9 + x^{13}_{11} + k1_3 + k2_{3_6} = 0 \\
&y^{13}_2 + x^{14}_6 + k1_{12} + k2_{12_6} = 0 \\
&y^{13}_4 + y^{13}_{11} + [x^{14}_9] + k1_{14} + k2_{14_6} = 0 \\
&y^{14}_6 + [y^{14}_9] + [x^{15}_{11}] + k1_5 + k2_{5_7} = 0 \\
&S(x^1_4) + y^1_4 = 0 \\
&S(x^1_{11}) + y^1_{11} = 0 \\
&S(x^1_{12}) + y^1_{12} = 0 \\
&S(x^2_3) + y^2_3 = 0 \\
&S(x^2_9) + y^2_9 = 0 \\
&S(x^2_{15}) + y^2_{15} = 0 \\
&S(x^3_2) + y^3_2 = 0
\end{aligned}$$

$$\begin{aligned}
&S(x^{3_{14}}) + y^{3_{14}} = 0 \\
&S(x^{3_{15}}) + y^{3_{15}} = 0 \\
&S(x^{4_2}) + y^{4_2} = 0 \\
&S(x^{4_5}) + y^{4_5} = 0 \\
&S(x^{5_0}) + y^{5_0} = 0 \\
&S(x^{5_{10}}) + y^{5_{10}} = 0 \\
&S(x^{5_{14}}) + y^{5_{14}} = 0 \\
&S(x^{6_1}) + y^{6_1} = 0 \\
&S(x^{6_{12}}) + y^{6_{12}} = 0 \\
&S(x^{6_{13}}) + y^{6_{13}} = 0 \\
&S(x^{7_0}) + y^{7_0} = 0 \\
&S(x^{7_2}) + y^{7_2} = 0 \\
&S(x^{7_3}) + y^{7_3} = 0 \\
&S(x^{7_5}) + y^{7_5} = 0 \\
&S(x^{7_6}) + y^{7_6} = 0 \\
&S(x^{7_7}) + y^{7_7} = 0 \\
&S(x^{7_8}) + y^{7_8} = 0 \\
&S(x^{7_{10}}) + y^{7_{10}} = 0 \\
&S(x^{8_4}) + y^{8_4} = 0 \\
&S(x^{8_5}) + y^{8_5} = 0 \\
&S(x^{8_6}) + y^{8_6} = 0 \\
&S(x^{8_8}) + y^{8_8} = 0 \\
&S(x^{8_9}) + y^{8_9} = 0 \\
&S(x^{8_{10}}) + y^{8_{10}} = 0 \\
&S(x^{8_{11}}) + y^{8_{11}} = 0 \\
&S(x^{8_{15}}) + y^{8_{15}} = 0 \\
&S(x^{9_2}) + y^{9_2} = 0 \\
&S(x^{9_4}) + y^{9_4} = 0 \\
&S(x^{9_9}) + y^{9_9} = 0 \\
&S(x^{9_{10}}) + y^{9_{10}} = 0 \\
&S(x^{9_{11}}) + y^{9_{11}} = 0 \\
&S(x^{9_{12}}) + y^{9_{12}} = 0 \\
&S(x^{9_{14}}) + y^{9_{14}} = 0 \\
&S(x^{10_1}) + y^{10_1} = 0 \\
&S(x^{10_3}) + y^{10_3} = 0 \\
&S(x^{10_4}) + y^{10_4} = 0 \\
&S(x^{10_6}) + y^{10_6} = 0 \\
&S(x^{10_7}) + y^{10_7} = 0 \\
&S(x^{10_9}) + y^{10_9} = 0 \\
&S(x^{10_{12}}) + y^{10_{12}} = 0 \\
&S(x^{10_{13}}) + y^{10_{13}} = 0 \\
&S(x^{11_0}) + y^{11_0} = 0 \\
&S(x^{11_3}) + y^{11_3} = 0 \\
&S(x^{11_4}) + y^{11_4} = 0
\end{aligned}$$

$$\begin{aligned}
S(x^{11}_7) + y^{11}_7 &= 0 \\
S(x^{11}_8) + y^{11}_8 &= 0 \\
S(x^{11}_9) + y^{11}_9 &= 0 \\
S(x^{11}_{11}) + y^{11}_{11} &= 0 \\
S(x^{11}_{13}) + y^{11}_{13} &= 0 \\
S(x^{11}_{15}) + y^{11}_{15} &= 0 \\
S(x^{12}_0) + y^{12}_0 &= 0 \\
S(x^{12}_2) + y^{12}_2 &= 0 \\
S(x^{12}_6) + y^{12}_6 &= 0 \\
S(x^{12}_8) + y^{12}_8 &= 0 \\
S(x^{12}_9) + y^{12}_9 &= 0 \\
S(x^{12}_{15}) + y^{12}_{15} &= 0 \\
S(x^{13}_2) + y^{13}_2 &= 0 \\
S(x^{13}_4) + y^{13}_4 &= 0 \\
S(x^{13}_{11}) + y^{13}_{11} &= 0 \\
S(x^{14}_6) + y^{14}_6 &= 0
\end{aligned}$$

the 2 th Minimal Constraint set is:

$$\begin{aligned}
y^0_0 + x^1_4 + k1_0 + k2_0_0 &= 0 \\
y^0_0 + y^0_{10} + x^1_{12} + k1_0 + k2_0_0 &= 0 \\
y^0_3 + x^1_7 + k1_3 + k2_3_0 &= 0 \\
y^0_3 + [y^0_9] + [x^1_{15}] + k1_3 + k2_3_0 &= 0 \\
[y^0_6] + [y^0_9] + x^1_{11} + k1_6 + k2_6_0 &= 0 \\
[y^0_7] + y^0_{10} + [x^1_8] + k1_7 + k2_7_0 &= 0 \\
y^1_0 + x^2_4 + k1_9 + k2_9_0 &= 0 \\
y^1_0 + y^1_{10} + x^2_{12} + k1_9 + k2_9_0 &= 0 \\
[y^1_2] + [y^1_8] + [y^1_{15}] + x^2_2 + k1_8 + k2_8_0 &= 0 \\
y^1_3 + y^1_9 + y^1_{12} + x^2_3 + k1_{13} + k2_{13}_0 &= 0 \\
y^1_3 + y^1_9 + x^2_{15} + k1_{13} + k2_{13}_0 &= 0 \\
y^1_4 + y^1_{11} + x^2_9 + k1_{10} + k2_{10}_0 &= 0 \\
y^1_7 + y^1_{10} + x^2_8 + k1_{11} + k2_{11}_0 &= 0 \\
[y^2_1] + y^2_{11} + [x^3_{13}] + k1_7 + k2_7_1 &= 0 \\
y^2_2 + y^2_8 + y^2_{15} + x^3_2 + k1_0 + k2_0_1 &= 0 \\
y^2_3 + y^2_9 + y^2_{12} + x^3_3 + k1_5 + k2_5_1 &= 0 \\
y^2_3 + x^3_7 + k1_5 + k2_5_1 &= 0 \\
y^2_3 + y^2_9 + x^3_{15} + k1_5 + k2_5_1 &= 0 \\
y^2_4 + y^2_{11} + x^3_9 + k1_2 + k2_2_1 &= 0 \\
[y^2_6] + y^2_9 + [x^3_{11}] + k1_4 + k2_4_1 &= 0 \\
y^3_0 + y^3_{10} + [y^3_{13}] + [x^4_0] + k1_{15} + k2_{15}_1 &= 0 \\
y^3_0 + x^4_4 + k1_{15} + k2_{15}_1 &= 0 \\
y^3_2 + y^3_8 + y^3_{15} + x^4_2 + k1_9 + k2_9_1 &= 0 \\
y^3_3 + y^3_9 + [x^4_{15}] + k1_{14} + k2_{14}_1 &= 0 \\
[y^3_5] + y^3_8 + [x^4_{10}] + k1_{12} + k2_{12}_1 &= 0 \\
y^3_7 + y^3_{10} + x^4_8 + k1_{13} + k2_{13}_1 &= 0 \\
[y^4_1] + y^4_{11} + [x^5_{13}] + k1_3 + k2_3_2 &= 0
\end{aligned}$$

$$\begin{aligned}
&y^4_{2} + y^4_{8} + x^5_{14} + k1_1 + k2_{1_2} = 0 \\
&y^4_{4} + y^4_{11} + x^5_{9} + k1_0 + k2_{0_2} = 0 \\
&[y^5_1] + [y^5_{11}] + y^5_{14} + x^6_1 + k1_{13} + k2_{13_2} = 0 \\
&[y^5_3] + y^5_9 + [y^5_{12}] + x^6_3 + k1_{12} + k2_{12_2} = 0 \\
&[y^6_0] + [y^6_{10}] + x^7_{12} + k1_3 + k2_{3_3} = 0 \\
&y^6_1 + x^7_5 + k1_5 + k2_{5_3} = 0 \\
&y^6_3 + y^6_9 + x^7_{15} + k1_4 + k2_{4_3} = 0 \\
&[y^6_6] + y^6_9 + [x^7_{11}] + k1_0 + k2_{0_3} = 0 \\
&[y^7_1] + [y^7_{11}] + [y^7_{14}] + x^8_1 + k1_{14} + k2_{14_3} = 0 \\
&[y^7_1] + x^8_5 + k1_{14} + k2_{14_3} = 0 \\
&y^7_2 + y^7_8 + y^7_{15} + x^8_2 + k1_{11} + k2_{11_3} = 0 \\
&y^7_2 + x^8_6 + k1_{11} + k2_{11_3} = 0 \\
&y^7_3 + y^7_9 + y^7_{12} + x^8_3 + k1_{10} + k2_{10_3} = 0 \\
&y^7_3 + y^7_9 + x^8_{15} + k1_{10} + k2_{10_3} = 0 \\
&y^7_5 + y^7_8 + x^8_{10} + k1_8 + k2_{8_3} = 0 \\
&y^8_0 + y^8_{10} + [y^8_{13}] + [x^9_0] + k1_5 + k2_{5_4} = 0 \\
&y^8_0 + x^9_4 + k1_5 + k2_{5_4} = 0 \\
&y^8_1 + x^9_5 + k1_6 + k2_{6_4} = 0 \\
&y^8_2 + y^8_8 + y^8_{15} + x^9_2 + k1_3 + k2_{3_4} = 0 \\
&y^8_3 + y^8_9 + x^9_{15} + k1_2 + k2_{2_4} = 0 \\
&y^8_5 + y^8_8 + x^9_{10} + k1_0 + k2_{0_4} = 0 \\
&y^8_6 + y^8_9 + x^9_{11} + k1_1 + k2_{1_4} = 0 \\
&[y^9_0] + y^9_{10} + x^{10}_{12} + k1_{14} + k2_{14_4} = 0 \\
&y^9_2 + y^9_8 + y^9_{15} + x^{10}_2 + k1_{13} + k2_{13_4} = 0 \\
&y^9_4 + y^9_{11} + x^{10}_9 + k1_{11} + k2_{11_4} = 0 \\
&y^9_5 + y^9_8 + x^{10}_{10} + k1_9 + k2_{9_4} = 0 \\
&y^{10}_0 + x^{11}_4 + k1_6 + k2_{6_5} = 0 \\
&y^{10}_0 + y^{10}_{10} + x^{11}_{12} + k1_6 + k2_{6_5} = 0 \\
&y^{10}_2 + x^{11}_6 + k1_5 + k2_{5_5} = 0 \\
&y^{10}_3 + y^{10}_9 + y^{10}_{12} + x^{11}_3 + k1_0 + k2_{0_5} = 0 \\
&y^{10}_3 + x^{11}_7 + k1_0 + k2_{0_5} = 0 \\
&y^{11}_0 + x^{12}_4 + k1_{12} + k2_{12_5} = 0 \\
&y^{11}_0 + y^{11}_{10} + x^{12}_{12} + k1_{12} + k2_{12_5} = 0 \\
&y^{11}_1 + x^{12}_5 + k1_{10} + k2_{10_5} = 0 \\
&y^{11}_1 + y^{11}_{11} + x^{12}_{13} + k1_{10} + k2_{10_5} = 0 \\
&y^{11}_3 + y^{11}_9 + y^{11}_{12} + x^{12}_3 + k1_9 + k2_{9_5} = 0 \\
&y^{11}_4 + y^{11}_{11} + x^{12}_9 + k1_{13} + k2_{13_5} = 0 \\
&y^{11}_6 + y^{11}_9 + x^{12}_{11} + k1_{11} + k2_{11_5} = 0 \\
&y^{11}_7 + y^{11}_{10} + x^{12}_8 + k1_8 + k2_{8_5} = 0 \\
&y^{12}_0 + y^{12}_{10} + y^{12}_{13} + x^{13}_0 + k1_4 + k2_{4_6} = 0 \\
&y^{12}_0 + y^{12}_{10} + x^{13}_{12} + k1_4 + k2_{4_6} = 0 \\
&y^{12}_3 + y^{12}_9 + y^{12}_{12} + x^{13}_3 + k1_1 + k2_{1_6} = 0 \\
&y^{12}_4 + y^{12}_{11} + x^{13}_9 + k1_5 + k2_{5_6} = 0 \\
&y^{12}_5 + y^{12}_8 + x^{13}_{10} + k1_7 + k2_{7_6} = 0
\end{aligned}$$

$$\begin{aligned}
&y^{13}_0 + y^{13}_{10} + x^{14}_{12} + k1_{10} + k2_{10}_6 = 0 \\
&y^{13}_3 + y^{13}_9 + y^{13}_{12} + x^{14}_3 + k1_{15} + k2_{15}_6 = 0 \\
&y^{14}_3 + [y^{14}_9] + y^{14}_{12} + [x^{15}_3] + k1_7 + k2_7_7 = 0 \\
&S(x^{14}_4) + y^{14}_4 = 0 \\
&S(x^{14}_7) + y^{14}_7 = 0 \\
&S(x^{14}_{11}) + y^{14}_{11} = 0 \\
&S(x^{14}_{12}) + y^{14}_{12} = 0 \\
&S(x^{15}_2) + y^{15}_2 = 0 \\
&S(x^{15}_3) + y^{15}_3 = 0 \\
&S(x^{15}_4) + y^{15}_4 = 0 \\
&S(x^{15}_8) + y^{15}_8 = 0 \\
&S(x^{15}_9) + y^{15}_9 = 0 \\
&S(x^{15}_{12}) + y^{15}_{12} = 0 \\
&S(x^{15}_{15}) + y^{15}_{15} = 0 \\
&S(x^{16}_2) + y^{16}_2 = 0 \\
&S(x^{16}_3) + y^{16}_3 = 0 \\
&S(x^{16}_7) + y^{16}_7 = 0 \\
&S(x^{16}_9) + y^{16}_9 = 0 \\
&S(x^{16}_{15}) + y^{16}_{15} = 0 \\
&S(x^{17}_2) + y^{17}_2 = 0 \\
&S(x^{17}_4) + y^{17}_4 = 0 \\
&S(x^{17}_8) + y^{17}_8 = 0 \\
&S(x^{18}_9) + y^{18}_9 = 0 \\
&S(x^{18}_{14}) + y^{18}_{14} = 0 \\
&S(x^{19}_1) + y^{19}_1 = 0 \\
&S(x^{19}_3) + y^{19}_3 = 0 \\
&S(x^{19}_5) + y^{19}_5 = 0 \\
&S(x^{19}_{12}) + y^{19}_{12} = 0 \\
&S(x^{19}_{15}) + y^{19}_{15} = 0 \\
&S(x^{20}_1) + y^{20}_1 = 0 \\
&S(x^{20}_2) + y^{20}_2 = 0 \\
&S(x^{20}_3) + y^{20}_3 = 0 \\
&S(x^{20}_5) + y^{20}_5 = 0 \\
&S(x^{20}_6) + y^{20}_6 = 0 \\
&S(x^{20}_{10}) + y^{20}_{10} = 0 \\
&S(x^{20}_{15}) + y^{20}_{15} = 0 \\
&S(x^{21}_2) + y^{21}_2 = 0 \\
&S(x^{21}_4) + y^{21}_4 = 0 \\
&S(x^{21}_5) + y^{21}_5 = 0 \\
&S(x^{21}_{10}) + y^{21}_{10} = 0 \\
&S(x^{21}_{11}) + y^{21}_{11} = 0 \\
&S(x^{21}_{15}) + y^{21}_{15} = 0 \\
&S(x^{22}_{10}_2) + y^{22}_{10}_2 = 0 \\
&S(x^{22}_{10}_9) + y^{22}_{10}_9 = 0
\end{aligned}$$

$$S(x^{10}_{10}) + y^{10}_{10} = 0$$

$$S(x^{10}_{12}) + y^{10}_{12} = 0$$

$$S(x^{11}_3) + y^{11}_3 = 0$$

$$S(x^{11}_4) + y^{11}_4 = 0$$

$$S(x^{11}_6) + y^{11}_6 = 0$$

$$S(x^{11}_7) + y^{11}_7 = 0$$

$$S(x^{11}_{12}) + y^{11}_{12} = 0$$

$$S(x^{12}_3) + y^{12}_3 = 0$$

$$S(x^{12}_4) + y^{12}_4 = 0$$

$$S(x^{12}_5) + y^{12}_5 = 0$$

$$S(x^{12}_8) + y^{12}_8 = 0$$

$$S(x^{12}_9) + y^{12}_9 = 0$$

$$S(x^{12}_{11}) + y^{12}_{11} = 0$$

$$S(x^{12}_{12}) + y^{12}_{12} = 0$$

$$S(x^{12}_{13}) + y^{12}_{13} = 0$$

$$S(x^{13}_0) + y^{13}_0 = 0$$

$$S(x^{13}_3) + y^{13}_3 = 0$$

$$S(x^{13}_9) + y^{13}_9 = 0$$

$$S(x^{13}_{10}) + y^{13}_{10} = 0$$

$$S(x^{13}_{12}) + y^{13}_{12} = 0$$

$$S(x^{14}_3) + y^{14}_3 = 0$$

$$S(x^{14}_{12}) + y^{14}_{12} = 0$$

the 3 th Minimal Constraint set is:

$$y^0_3 + x^1_7 + k1_3 + k2_3_0 = 0$$

$$y^0_3 + [y^0_9] + [x^1_{15}] + k1_3 + k2_3_0 = 0$$

$$y^1_0 + x^2_4 + k1_9 + k2_9_0 = 0$$

$$y^1_0 + y^1_{10} + x^2_{12} + k1_9 + k2_9_0 = 0$$

$$[y^1_2] + [y^1_8] + [y^1_{15}] + x^2_2 + k1_8 + k2_8_0 = 0$$

$$y^1_7 + y^1_{10} + x^2_8 + k1_{11} + k2_{11}_0 = 0$$

$$[y^2_1] + y^2_{11} + [x^3_{13}] + k1_7 + k2_7_1 = 0$$

$$y^2_2 + y^2_8 + x^3_{14} + k1_0 + k2_0_1 = 0$$

$$y^2_3 + y^2_9 + y^2_{12} + x^3_3 + k1_5 + k2_5_1 = 0$$

$$y^2_3 + x^3_7 + k1_5 + k2_5_1 = 0$$

$$y^2_4 + y^2_{11} + x^3_9 + k1_2 + k2_2_1 = 0$$

$$[y^2_6] + y^2_9 + [x^3_{11}] + k1_4 + k2_4_1 = 0$$

$$y^3_0 + y^3_{10} + [y^3_{13}] + [x^4_0] + k1_{15} + k2_{15}_1 = 0$$

$$y^3_0 + x^4_4 + k1_{15} + k2_{15}_1 = 0$$

$$y^3_1 + [y^3_{11}] + y^3_{14} + [x^4_1] + k1_{11} + k2_{11}_1 = 0$$

$$y^3_1 + x^4_5 + k1_{11} + k2_{11}_1 = 0$$

$$y^3_3 + y^3_9 + [x^4_{15}] + k1_{14} + k2_{14}_1 = 0$$

$$y^3_7 + y^3_{10} + x^4_8 + k1_{13} + k2_{13}_1 = 0$$

$$[y^4_1] + y^4_{11} + [x^5_{13}] + k1_3 + k2_3_2 = 0$$

$$y^4_4 + y^4_{11} + x^5_9 + k1_0 + k2_0_2 = 0$$

$$y^4_5 + y^4_8 + x^5_{10} + k1_4 + k2_4_2 = 0$$

$$\begin{aligned}
&[y^4_7] + [y^4_{10}] + x^5_8 + k1_5 + k2_5_2 = 0 \\
&y^5_0 + x^6_4 + k1_{11} + k2_{11}_2 = 0 \\
&y^5_0 + y^5_{10} + x^6_{12} + k1_{11} + k2_{11}_2 = 0 \\
&[y^5_1] + [y^5_{11}] + x^6_{13} + k1_{13} + k2_{13}_2 = 0 \\
&[y^5_2] + y^5_8 + [y^5_{15}] + x^6_2 + k1_{15} + k2_{15}_2 = 0 \\
&[y^5_3] + y^5_9 + [x^6_{15}] + k1_{12} + k2_{12}_2 = 0 \\
&[y^6_0] + [y^6_{10}] + y^6_{13} + x^7_0 + k1_3 + k2_3_3 = 0 \\
&[y^6_0] + [y^6_{10}] + x^7_{12} + k1_3 + k2_3_3 = 0 \\
&y^6_1 + x^7_5 + k1_5 + k2_5_3 = 0 \\
&y^6_1 + y^6_{11} + x^7_{13} + k1_5 + k2_5_3 = 0 \\
&y^6_2 + [y^6_8] + [y^6_{15}] + x^7_2 + k1_7 + k2_7_3 = 0 \\
&y^6_3 + y^6_9 + y^6_{12} + x^7_3 + k1_4 + k2_4_3 = 0 \\
&y^6_3 + y^6_9 + x^7_{15} + k1_4 + k2_4_3 = 0 \\
&y^6_4 + y^6_{11} + x^7_9 + k1_1 + k2_1_3 = 0 \\
&[y^6_5] + [y^6_8] + x^7_{10} + k1_2 + k2_2_3 = 0 \\
&[y^6_7] + [y^6_{10}] + x^7_8 + k1_6 + k2_6_3 = 0 \\
&y^7_0 + y^7_{10} + y^7_{13} + x^8_0 + k1_{13} + k2_{13}_3 = 0 \\
&[y^7_1] + [y^7_{11}] + [y^7_{14}] + x^8_1 + k1_{14} + k2_{14}_3 = 0 \\
&y^7_2 + y^7_8 + y^7_{15} + x^8_2 + k1_{11} + k2_{11}_3 = 0 \\
&y^7_2 + x^8_6 + k1_{11} + k2_{11}_3 = 0 \\
&y^7_2 + y^7_8 + x^8_{14} + k1_{11} + k2_{11}_3 = 0 \\
&y^7_3 + y^7_9 + y^7_{12} + x^8_3 + k1_{10} + k2_{10}_3 = 0 \\
&y^7_5 + y^7_8 + x^8_{10} + k1_8 + k2_8_3 = 0 \\
&y^8_0 + y^8_{10} + x^9_{12} + k1_5 + k2_5_4 = 0 \\
&y^8_1 + y^8_{11} + y^8_{14} + x^9_1 + k1_6 + k2_6_4 = 0 \\
&y^8_1 + x^9_5 + k1_6 + k2_6_4 = 0 \\
&y^8_1 + y^8_{11} + x^9_{13} + k1_6 + k2_6_4 = 0 \\
&y^8_2 + x^9_6 + k1_3 + k2_3_4 = 0 \\
&y^8_3 + y^8_9 + x^9_{15} + k1_2 + k2_2_4 = 0 \\
&y^8_6 + y^8_9 + x^9_{11} + k1_1 + k2_1_4 = 0 \\
&[y^9_0] + y^9_{10} + y^9_{13} + x^{10}_0 + k1_{14} + k2_{14}_4 = 0 \\
&[y^9_0] + y^9_{10} + x^{10}_{12} + k1_{14} + k2_{14}_4 = 0 \\
&y^9_1 + y^9_{11} + x^{10}_{13} + k1_{12} + k2_{12}_4 = 0 \\
&y^9_2 + y^9_8 + y^9_{15} + x^{10}_2 + k1_{13} + k2_{13}_4 = 0 \\
&y^9_2 + x^{10}_6 + k1_{13} + k2_{13}_4 = 0 \\
&y^9_3 + y^9_9 + y^9_{12} + x^{10}_3 + k1_8 + k2_8_4 = 0 \\
&y^9_3 + x^{10}_7 + k1_8 + k2_8_4 = 0 \\
&y^9_5 + y^9_8 + x^{10}_{10} + k1_9 + k2_9_4 = 0 \\
&y^9_6 + y^9_9 + x^{10}_{11} + k1_{15} + k2_{15}_4 = 0 \\
&y^{10}_0 + y^{10}_{10} + y^{10}_{13} + x^{11}_0 + k1_6 + k2_6_5 = 0 \\
&y^{10}_0 + x^{11}_4 + k1_6 + k2_6_5 = 0 \\
&y^{10}_0 + y^{10}_{10} + x^{11}_{12} + k1_6 + k2_6_5 = 0 \\
&y^{10}_1 + x^{11}_5 + k1_4 + k2_4_5 = 0 \\
&y^{10}_1 + y^{10}_{11} + x^{11}_{13} + k1_4 + k2_4_5 = 0
\end{aligned}$$

$$\begin{aligned}
&y^{10}_2 + x^{11}_6 + k1_5 + k2_5_5 = 0 \\
&y^{10}_3 + y^{10}_9 + y^{10}_{12} + x^{11}_3 + k1_0 + k2_0_5 = 0 \\
&y^{10}_6 + y^{10}_9 + x^{11}_{11} + k1_7 + k2_7_5 = 0 \\
&y^{10}_7 + y^{10}_{10} + x^{11}_8 + k1_2 + k2_2_5 = 0 \\
&y^{11}_0 + y^{11}_{10} + y^{11}_{13} + x^{12}_0 + k1_{12} + k2_{12}_5 = 0 \\
&y^{11}_0 + x^{12}_4 + k1_{12} + k2_{12}_5 = 0 \\
&y^{11}_0 + y^{11}_{10} + x^{12}_{12} + k1_{12} + k2_{12}_5 = 0 \\
&y^{11}_3 + y^{11}_9 + y^{11}_{12} + x^{12}_3 + k1_9 + k2_9_5 = 0 \\
&y^{11}_4 + y^{11}_{11} + x^{12}_9 + k1_{13} + k2_{13}_5 = 0 \\
&y^{11}_5 + y^{11}_8 + x^{12}_{10} + k1_{15} + k2_{15}_5 = 0 \\
&y^{11}_6 + y^{11}_9 + x^{12}_{11} + k1_{11} + k2_{11}_5 = 0 \\
&y^{12}_0 + y^{12}_{10} + x^{13}_{12} + k1_4 + k2_4_6 = 0 \\
&y^{12}_3 + y^{12}_9 + y^{12}_{12} + x^{13}_3 + k1_1 + k2_1_6 = 0 \\
&y^{12}_4 + y^{12}_{11} + x^{13}_9 + k1_5 + k2_5_6 = 0 \\
&y^{13}_3 + y^{13}_9 + y^{13}_{12} + x^{14}_3 + k1_{15} + k2_{15}_6 = 0 \\
&y^{14}_3 + [y^{14}_9] + [x^{15}_{15}] + k1_7 + k2_7_7 = 0 \\
&S(x^1_7) + y^1_7 = 0 \\
&S(x^2_2) + y^2_2 = 0 \\
&S(x^2_4) + y^2_4 = 0 \\
&S(x^2_8) + y^2_8 = 0 \\
&S(x^2_{12}) + y^2_{12} = 0 \\
&S(x^3_3) + y^3_3 = 0 \\
&S(x^3_7) + y^3_7 = 0 \\
&S(x^3_9) + y^3_9 = 0 \\
&S(x^3_{14}) + y^3_{14} = 0 \\
&S(x^4_4) + y^4_4 = 0 \\
&S(x^4_5) + y^4_5 = 0 \\
&S(x^4_8) + y^4_8 = 0 \\
&S(x^5_8) + y^5_8 = 0 \\
&S(x^5_9) + y^5_9 = 0 \\
&S(x^5_{10}) + y^5_{10} = 0 \\
&S(x^6_2) + y^6_2 = 0 \\
&S(x^6_4) + y^6_4 = 0 \\
&S(x^6_{12}) + y^6_{12} = 0 \\
&S(x^6_{13}) + y^6_{13} = 0 \\
&S(x^7_0) + y^7_0 = 0 \\
&S(x^7_2) + y^7_2 = 0 \\
&S(x^7_3) + y^7_3 = 0 \\
&S(x^7_5) + y^7_5 = 0 \\
&S(x^7_8) + y^7_8 = 0 \\
&S(x^7_9) + y^7_9 = 0 \\
&S(x^7_{10}) + y^7_{10} = 0 \\
&S(x^7_{12}) + y^7_{12} = 0 \\
&S(x^7_{13}) + y^7_{13} = 0
\end{aligned}$$

$S(x^{7_{15}}) + y^{7_{15}} = 0$
 $S(x^{8_0}) + y^{8_0} = 0$
 $S(x^{8_1}) + y^{8_1} = 0$
 $S(x^{8_2}) + y^{8_2} = 0$
 $S(x^{8_3}) + y^{8_3} = 0$
 $S(x^{8_6}) + y^{8_6} = 0$
 $S(x^{8_{10}}) + y^{8_{10}} = 0$
 $S(x^{8_{14}}) + y^{8_{14}} = 0$
 $S(x^{9_1}) + y^{9_1} = 0$
 $S(x^{9_5}) + y^{9_5} = 0$
 $S(x^{9_6}) + y^{9_6} = 0$
 $S(x^{9_{11}}) + y^{9_{11}} = 0$
 $S(x^{9_{12}}) + y^{9_{12}} = 0$
 $S(x^{9_{13}}) + y^{9_{13}} = 0$
 $S(x^{9_{15}}) + y^{9_{15}} = 0$
 $S(x^{10_0}) + y^{10_0} = 0$
 $S(x^{10_2}) + y^{10_2} = 0$
 $S(x^{10_3}) + y^{10_3} = 0$
 $S(x^{10_6}) + y^{10_6} = 0$
 $S(x^{10_7}) + y^{10_7} = 0$
 $S(x^{10_{10}}) + y^{10_{10}} = 0$
 $S(x^{10_{11}}) + y^{10_{11}} = 0$
 $S(x^{10_{12}}) + y^{10_{12}} = 0$
 $S(x^{10_{13}}) + y^{10_{13}} = 0$
 $S(x^{11_0}) + y^{11_0} = 0$
 $S(x^{11_3}) + y^{11_3} = 0$
 $S(x^{11_4}) + y^{11_4} = 0$
 $S(x^{11_5}) + y^{11_5} = 0$
 $S(x^{11_6}) + y^{11_6} = 0$
 $S(x^{11_8}) + y^{11_8} = 0$
 $S(x^{11_{11}}) + y^{11_{11}} = 0$
 $S(x^{11_{12}}) + y^{11_{12}} = 0$
 $S(x^{11_{13}}) + y^{11_{13}} = 0$
 $S(x^{12_0}) + y^{12_0} = 0$
 $S(x^{12_3}) + y^{12_3} = 0$
 $S(x^{12_4}) + y^{12_4} = 0$
 $S(x^{12_9}) + y^{12_9} = 0$
 $S(x^{12_{10}}) + y^{12_{10}} = 0$
 $S(x^{12_{11}}) + y^{12_{11}} = 0$
 $S(x^{12_{12}}) + y^{12_{12}} = 0$
 $S(x^{13_3}) + y^{13_3} = 0$
 $S(x^{13_9}) + y^{13_9} = 0$
 $S(x^{13_{12}}) + y^{13_{12}} = 0$
 $S(x^{14_3}) + y^{14_3} = 0$

the 4 th Minimal Constraint set is:

$$\begin{aligned}y^0_0 + x^1_4 + k_1_0 + k_2_0_0 &= 0 \\y^0_0 + y^0_{10} + x^1_{12} + k_1_0 + k_2_0_0 &= 0 \\[y^0_6] + [y^0_9] + x^1_{11} + k_1_6 + k_2_6_0 &= 0 \\[y^0_7] + y^0_{10} + [x^1_8] + k_1_7 + k_2_7_0 &= 0 \\y^1_3 + y^1_9 + y^1_{12} + x^2_3 + k_1_{13} + k_2_{13}_0 &= 0 \\y^1_3 + y^1_9 + x^2_{15} + k_1_{13} + k_2_{13}_0 &= 0 \\y^1_4 + y^1_{11} + x^2_9 + k_1_{10} + k_2_{10}_0 &= 0 \\[y^2_1] + y^2_{11} + [y^2_{14}] + x^3_1 + k_1_7 + k_2_7_1 &= 0 \\[y^2_1] + y^2_{11} + [x^3_{13}] + k_1_7 + k_2_7_1 &= 0 \\y^2_2 + y^2_8 + y^2_{15} + x^3_2 + k_1_0 + k_2_0_1 &= 0 \\y^2_2 + y^2_8 + x^3_{14} + k_1_0 + k_2_0_1 &= 0 \\y^2_3 + y^2_9 + x^3_{15} + k_1_5 + k_2_5_1 &= 0 \\y^3_1 + [y^3_{11}] + y^3_{14} + [x^4_1] + k_1_{11} + k_2_{11}_1 &= 0 \\y^3_2 + y^3_8 + y^3_{15} + x^4_2 + k_1_9 + k_2_9_1 &= 0 \\[y^3_5] + y^3_8 + [x^4_{10}] + k_1_{12} + k_2_{12}_1 &= 0 \\y^4_2 + x^5_6 + k_1_1 + k_2_1_2 &= 0 \\[y^5_1] + [y^5_{11}] + x^6_{13} + k_1_{13} + k_2_{13}_2 &= 0 \\[y^5_3] + y^5_9 + [x^6_{15}] + k_1_{12} + k_2_{12}_2 &= 0 \\y^5_6 + y^5_9 + x^6_{11} + k_1_8 + k_2_8_2 &= 0 \\[y^6_0] + [y^6_{10}] + y^6_{13} + x^7_0 + k_1_3 + k_2_3_3 &= 0 \\y^6_1 + x^7_5 + k_1_5 + k_2_5_3 &= 0 \\y^6_1 + y^6_{11} + x^7_{13} + k_1_5 + k_2_5_3 &= 0 \\[y^6_5] + [y^6_8] + x^7_{10} + k_1_2 + k_2_2_3 &= 0 \\[y^6_7] + [y^6_{10}] + x^7_8 + k_1_6 + k_2_6_3 &= 0 \\y^7_0 + y^7_{10} + y^7_{13} + x^8_0 + k_1_{13} + k_2_{13}_3 &= 0 \\y^7_5 + y^7_8 + x^8_{10} + k_1_8 + k_2_8_3 &= 0 \\y^8_0 + y^8_{10} + [y^8_{13}] + [x^9_0] + k_1_5 + k_2_5_4 &= 0 \\S(x^1_4) + y^1_4 &= 0 \\S(x^1_{11}) + y^1_{11} &= 0 \\S(x^1_{12}) + y^1_{12} &= 0 \\S(x^2_3) + y^2_3 &= 0 \\S(x^2_9) + y^2_9 &= 0 \\S(x^2_{15}) + y^2_{15} &= 0 \\S(x^3_1) + y^3_1 &= 0 \\S(x^3_2) + y^3_2 &= 0 \\S(x^3_{14}) + y^3_{14} &= 0 \\S(x^3_{15}) + y^3_{15} &= 0 \\S(x^4_2) + y^4_2 &= 0 \\S(x^5_6) + y^5_6 &= 0 \\S(x^6_{11}) + y^6_{11} &= 0 \\S(x^6_{13}) + y^6_{13} &= 0 \\S(x^7_0) + y^7_0 &= 0 \\S(x^7_5) + y^7_5 &= 0\end{aligned}$$

$$S(x^{7_8}) + y^{7_8} = 0$$

$$S(x^{7_{10}}) + y^{7_{10}} = 0$$

$$S(x^{7_{13}}) + y^{7_{13}} = 0$$

$$S(x^{8_0}) + y^{8_0} = 0$$

$$S(x^{8_{10}}) + y^{8_{10}} = 0$$

the 5 th Minimal Constraint set is:

$$y^{0_0} + x^{1_4} + k_{1_0} + k_{2_0_0} = 0$$

$$y^{0_0} + y^{0_{10}} + x^{1_{12}} + k_{1_0} + k_{2_0_0} = 0$$

$$y^{0_3} + x^{1_7} + k_{1_3} + k_{2_3_0} = 0$$

$$y^{0_3} + [y^{0_9}] + [x^{1_{15}}] + k_{1_3} + k_{2_3_0} = 0$$

$$[y^{0_6}] + [y^{0_9}] + x^{1_{11}} + k_{1_6} + k_{2_6_0} = 0$$

$$[y^{0_7}] + y^{0_{10}} + [x^{1_8}] + k_{1_7} + k_{2_7_0} = 0$$

$$y^{1_0} + x^{2_4} + k_{1_9} + k_{2_9_0} = 0$$

$$y^{1_0} + y^{1_{10}} + x^{2_{12}} + k_{1_9} + k_{2_9_0} = 0$$

$$[y^{1_2}] + [y^{1_8}] + [y^{1_{15}}] + x^{2_2} + k_{1_8} + k_{2_8_0} = 0$$

$$y^{1_3} + y^{1_9} + y^{1_{12}} + x^{2_3} + k_{1_{13}} + k_{2_{13_0}} = 0$$

$$y^{1_3} + y^{1_9} + x^{2_{15}} + k_{1_{13}} + k_{2_{13_0}} = 0$$

$$y^{1_4} + y^{1_{11}} + x^{2_9} + k_{1_{10}} + k_{2_{10_0}} = 0$$

$$y^{1_7} + y^{1_{10}} + x^{2_8} + k_{1_{11}} + k_{2_{11_0}} = 0$$

$$[y^{2_1}] + y^{2_{11}} + [x^{3_{13}}] + k_{1_7} + k_{2_7_1} = 0$$

$$y^{2_2} + y^{2_8} + y^{2_{15}} + x^{3_2} + k_{1_0} + k_{2_0_1} = 0$$

$$y^{2_3} + y^{2_9} + y^{2_{12}} + x^{3_3} + k_{1_5} + k_{2_5_1} = 0$$

$$y^{2_3} + x^{3_7} + k_{1_5} + k_{2_5_1} = 0$$

$$y^{2_3} + y^{2_9} + x^{3_{15}} + k_{1_5} + k_{2_5_1} = 0$$

$$y^{2_4} + y^{2_{11}} + x^{3_9} + k_{1_2} + k_{2_2_1} = 0$$

$$[y^{2_6}] + y^{2_9} + [x^{3_{11}}] + k_{1_4} + k_{2_4_1} = 0$$

$$y^{3_0} + y^{3_{10}} + [y^{3_{13}}] + [x^{4_0}] + k_{1_{15}} + k_{2_{15_1}} = 0$$

$$y^{3_0} + x^{4_4} + k_{1_{15}} + k_{2_{15_1}} = 0$$

$$y^{3_2} + y^{3_8} + y^{3_{15}} + x^{4_2} + k_{1_9} + k_{2_9_1} = 0$$

$$y^{3_3} + y^{3_9} + [x^{4_{15}}] + k_{1_{14}} + k_{2_{14_1}} = 0$$

$$[y^{3_5}] + y^{3_8} + [x^{4_{10}}] + k_{1_{12}} + k_{2_{12_1}} = 0$$

$$y^{3_7} + y^{3_{10}} + x^{4_8} + k_{1_{13}} + k_{2_{13_1}} = 0$$

$$[y^{4_1}] + y^{4_{11}} + [x^{5_{13}}] + k_{1_3} + k_{2_3_2} = 0$$

$$y^{4_2} + y^{4_8} + x^{5_{14}} + k_{1_1} + k_{2_1_2} = 0$$

$$y^{4_4} + y^{4_{11}} + x^{5_9} + k_{1_0} + k_{2_0_2} = 0$$

$$[y^{5_1}] + [y^{5_{11}}] + y^{5_{14}} + x^{6_1} + k_{1_{13}} + k_{2_{13_2}} = 0$$

$$[y^{5_1}] + [y^{5_{11}}] + x^{6_{13}} + k_{1_{13}} + k_{2_{13_2}} = 0$$

$$[y^{5_3}] + y^{5_9} + [x^{6_{15}}] + k_{1_{12}} + k_{2_{12_2}} = 0$$

$$[y^{6_0}] + [y^{6_{10}}] + y^{6_{13}} + x^{7_0} + k_{1_3} + k_{2_3_3} = 0$$

$$y^{6_1} + y^{6_{11}} + [y^{6_{14}}] + [x^{7_1}] + k_{1_5} + k_{2_5_3} = 0$$

$$y^{6_1} + x^{7_5} + k_{1_5} + k_{2_5_3} = 0$$

$$y^{6_1} + y^{6_{11}} + x^{7_{13}} + k_{1_5} + k_{2_5_3} = 0$$

$$[y^{6_5}] + [y^{6_8}] + x^{7_{10}} + k_{1_2} + k_{2_2_3} = 0$$

$$[y^{6_7}] + [y^{6_{10}}] + x^{7_8} + k_{1_6} + k_{2_6_3} = 0$$

$$\begin{aligned}
&y^7_0 + y^7_{10} + y^7_{13} + x^8_0 + k1_{13} + k2_{13}_3 = 0 \\
&y^7_5 + y^7_8 + x^8_{10} + k1_8 + k2_8_3 = 0 \\
&y^8_0 + y^8_{10} + [y^8_{13}] + [x^9_0] + k1_5 + k2_5_4 = 0 \\
&S(x^1_4) + y^1_4 = 0 \\
&S(x^1_7) + y^1_7 = 0 \\
&S(x^1_{11}) + y^1_{11} = 0 \\
&S(x^1_{12}) + y^1_{12} = 0 \\
&S(x^2_2) + y^2_2 = 0 \\
&S(x^2_3) + y^2_3 = 0 \\
&S(x^2_4) + y^2_4 = 0 \\
&S(x^2_8) + y^2_8 = 0 \\
&S(x^2_9) + y^2_9 = 0 \\
&S(x^2_{12}) + y^2_{12} = 0 \\
&S(x^2_{15}) + y^2_{15} = 0 \\
&S(x^3_2) + y^3_2 = 0 \\
&S(x^3_3) + y^3_3 = 0 \\
&S(x^3_7) + y^3_7 = 0 \\
&S(x^3_9) + y^3_9 = 0 \\
&S(x^3_{15}) + y^3_{15} = 0 \\
&S(x^4_2) + y^4_2 = 0 \\
&S(x^4_4) + y^4_4 = 0 \\
&S(x^4_8) + y^4_8 = 0 \\
&S(x^5_9) + y^5_9 = 0 \\
&S(x^5_{14}) + y^5_{14} = 0 \\
&S(x^6_1) + y^6_1 = 0 \\
&S(x^6_{13}) + y^6_{13} = 0 \\
&S(x^7_0) + y^7_0 = 0 \\
&S(x^7_5) + y^7_5 = 0 \\
&S(x^7_8) + y^7_8 = 0 \\
&S(x^7_{10}) + y^7_{10} = 0 \\
&S(x^7_{13}) + y^7_{13} = 0 \\
&S(x^8_0) + y^8_0 = 0 \\
&S(x^8_{10}) + y^8_{10} = 0
\end{aligned}$$

the 6 th Minimal Constraint set is:

$$\begin{aligned}
&y^0_3 + x^1_7 + k1_3 + k2_3_0 = 0 \\
&y^0_3 + [y^0_9] + [x^1_{15}] + k1_3 + k2_3_0 = 0 \\
&y^1_0 + x^2_4 + k1_9 + k2_9_0 = 0 \\
&y^1_0 + y^1_{10} + x^2_{12} + k1_9 + k2_9_0 = 0 \\
&[y^1_2] + [y^1_8] + [y^1_{15}] + x^2_2 + k1_8 + k2_8_0 = 0 \\
&y^1_7 + y^1_{10} + x^2_8 + k1_{11} + k2_{11}_0 = 0 \\
&[y^2_1] + y^2_{11} + [x^3_{13}] + k1_7 + k2_7_1 = 0 \\
&y^2_2 + y^2_8 + x^3_{14} + k1_0 + k2_0_1 = 0 \\
&y^2_3 + y^2_9 + y^2_{12} + x^3_3 + k1_5 + k2_5_1 = 0 \\
&y^2_3 + x^3_7 + k1_5 + k2_5_1 = 0
\end{aligned}$$

$$\begin{aligned}
&y^2_{2_4} + y^2_{2_{11}} + x^3_{3_9} + k1_{2_2} + k2_{2_1} = 0 \\
&[y^2_{2_6}] + y^2_{2_9} + [x^3_{3_{11}}] + k1_{4_4} + k2_{4_1} = 0 \\
&y^3_{3_0} + y^3_{3_{10}} + [y^3_{3_{13}}] + [x^4_{4_0}] + k1_{15} + k2_{15_1} = 0 \\
&y^3_{3_0} + x^4_{4_4} + k1_{15} + k2_{15_1} = 0 \\
&y^3_{3_1} + [y^3_{3_{11}}] + y^3_{3_{14}} + [x^4_{4_1}] + k1_{11} + k2_{11_1} = 0 \\
&y^3_{3_1} + x^4_{4_5} + k1_{11} + k2_{11_1} = 0 \\
&y^3_{3_3} + y^3_{3_9} + [x^4_{4_{15}}] + k1_{14} + k2_{14_1} = 0 \\
&y^3_{3_7} + y^3_{3_{10}} + x^4_{4_8} + k1_{13} + k2_{13_1} = 0 \\
&[y^4_{4_1}] + y^4_{4_{11}} + [x^5_{5_{13}}] + k1_{3_3} + k2_{3_2} = 0 \\
&y^4_{4_4} + y^4_{4_{11}} + x^5_{5_9} + k1_{0_0} + k2_{0_2} = 0 \\
&y^4_{4_5} + y^4_{4_8} + x^5_{5_{10}} + k1_{4_4} + k2_{4_2} = 0 \\
&[y^5_{5_3}] + y^5_{5_9} + [x^6_{6_{15}}] + k1_{12} + k2_{12_2} = 0 \\
&[y^5_{5_7}] + y^5_{5_{10}} + [x^6_{6_8}] + k1_{14} + k2_{14_2} = 0 \\
&S(x^1_{1_7}) + y^1_{1_7} = 0 \\
&S(x^2_{2_2}) + y^2_{2_2} = 0 \\
&S(x^2_{2_4}) + y^2_{2_4} = 0 \\
&S(x^2_{2_8}) + y^2_{2_8} = 0 \\
&S(x^2_{2_{12}}) + y^2_{2_{12}} = 0 \\
&S(x^3_{3_3}) + y^3_{3_3} = 0 \\
&S(x^3_{3_7}) + y^3_{3_7} = 0 \\
&S(x^3_{3_9}) + y^3_{3_9} = 0 \\
&S(x^3_{3_{14}}) + y^3_{3_{14}} = 0 \\
&S(x^4_{4_4}) + y^4_{4_4} = 0 \\
&S(x^4_{4_5}) + y^4_{4_5} = 0 \\
&S(x^4_{4_8}) + y^4_{4_8} = 0 \\
&S(x^5_{5_9}) + y^5_{5_9} = 0 \\
&S(x^5_{5_{10}}) + y^5_{5_{10}} = 0
\end{aligned}$$

the 7 th Minimal Constraint set is:

$$\begin{aligned}
&[y^0_{0_6}] + [y^0_{0_9}] + x^1_{1_{11}} + k1_{6_6} + k2_{6_0} = 0 \\
&y^1_{1_1} + y^1_{1_{11}} + [y^1_{1_{14}}] + [x^2_{2_1}] + k1_{15} + k2_{15_0} = 0 \\
&y^1_{1_1} + x^2_{2_5} + k1_{15} + k2_{15_0} = 0 \\
&[y^1_{1_2}] + [y^1_{1_8}] + [y^1_{1_{15}}] + x^2_{2_2} + k1_{8_8} + k2_{8_0} = 0 \\
&[y^2_{2_1}] + y^2_{2_{11}} + [y^2_{2_{14}}] + x^3_{3_1} + k1_{7_7} + k2_{7_1} = 0 \\
&[y^2_{2_1}] + y^2_{2_{11}} + [x^3_{3_{13}}] + k1_{7_7} + k2_{7_1} = 0 \\
&y^2_{2_2} + y^2_{2_8} + x^3_{3_{14}} + k1_{0_0} + k2_{0_1} = 0 \\
&y^2_{2_5} + y^2_{2_8} + x^3_{3_{10}} + k1_{6_6} + k2_{6_1} = 0 \\
&y^3_{3_0} + y^3_{3_{10}} + [y^3_{3_{13}}] + [x^4_{4_0}] + k1_{15} + k2_{15_1} = 0 \\
&y^3_{3_0} + x^4_{4_4} + k1_{15} + k2_{15_1} = 0 \\
&y^3_{3_1} + [y^3_{3_{11}}] + y^3_{3_{14}} + [x^4_{4_1}] + k1_{11} + k2_{11_1} = 0 \\
&[y^4_{4_1}] + y^4_{4_{11}} + [x^5_{5_{13}}] + k1_{3_3} + k2_{3_2} = 0 \\
&y^4_{4_4} + y^4_{4_{11}} + x^5_{5_9} + k1_{0_0} + k2_{0_2} = 0 \\
&[y^5_{5_3}] + y^5_{5_9} + [x^6_{6_{15}}] + k1_{12} + k2_{12_2} = 0 \\
&S(x^1_{1_{11}}) + y^1_{1_{11}} = 0 \\
&S(x^2_{2_2}) + y^2_{2_2} = 0
\end{aligned}$$

$$\begin{aligned}
S(x^2_5) + y^2_5 &= 0 \\
S(x^3_1) + y^3_1 &= 0 \\
S(x^3_{10}) + y^3_{10} &= 0 \\
S(x^3_{14}) + y^3_{14} &= 0 \\
S(x^4_4) + y^4_4 &= 0 \\
S(x^5_9) + y^5_9 &= 0
\end{aligned}$$

the 8 th Minimal Constraint set is:

$$\begin{aligned}
y^1_1 + y^1_{11} + [y^1_{14}] + [x^2_1] + k_{1,15} + k_{2,15,0} &= 0 \\
y^1_1 + y^1_{11} + x^2_{13} + k_{1,15} + k_{2,15,0} &= 0 \\
y^2_0 + y^2_{10} + y^2_{13} + x^3_0 + k_{1,1} + k_{2,1,1} &= 0 \\
y^2_0 + y^2_{10} + x^3_{12} + k_{1,1} + k_{2,1,1} &= 0 \\
y^3_0 + x^4_4 + k_{1,15} + k_{2,15,1} &= 0 \\
y^3_3 + y^3_9 + y^3_{12} + [x^4_3] + k_{1,14} + k_{2,14,1} &= 0 \\
y^3_3 + y^3_9 + [x^4_{15}] + k_{1,14} + k_{2,14,1} &= 0 \\
[y^4_1] + y^4_{11} + [x^5_{13}] + k_{1,3} + k_{2,3,2} &= 0 \\
y^4_4 + y^4_{11} + x^5_9 + k_{1,0} + k_{2,0,2} &= 0 \\
[y^5_3] + y^5_9 + [x^6_{15}] + k_{1,12} + k_{2,12,2} &= 0 \\
S(x^2_{13}) + y^2_{13} &= 0 \\
S(x^3_0) + y^3_0 &= 0 \\
S(x^3_{12}) + y^3_{12} &= 0 \\
S(x^4_4) + y^4_4 &= 0 \\
S(x^5_9) + y^5_9 &= 0
\end{aligned}$$

the 9 th Minimal Constraint set is:

$$\begin{aligned}
y^0_3 + [y^0_9] + [y^0_{12}] + x^1_3 + k_{1,3} + k_{2,3,0} &= 0 \\
y^0_3 + [y^0_9] + [x^1_{15}] + k_{1,3} + k_{2,3,0} &= 0 \\
y^1_1 + y^1_{11} + [y^1_{14}] + [x^2_1] + k_{1,15} + k_{2,15,0} &= 0 \\
y^1_1 + y^1_{11} + x^2_{13} + k_{1,15} + k_{2,15,0} &= 0 \\
y^1_3 + x^2_7 + k_{1,13} + k_{2,13,0} &= 0 \\
y^2_0 + y^2_{10} + y^2_{13} + x^3_0 + k_{1,1} + k_{2,1,1} &= 0 \\
y^2_0 + x^3_4 + k_{1,1} + k_{2,1,1} &= 0 \\
y^2_7 + y^2_{10} + x^3_8 + k_{1,3} + k_{2,3,1} &= 0 \\
y^3_0 + x^4_4 + k_{1,15} + k_{2,15,1} &= 0 \\
y^3_4 + [y^3_{11}] + [x^4_9] + k_{1,8} + k_{2,8,1} &= 0 \\
[y^3_5] + y^3_8 + [x^4_{10}] + k_{1,12} + k_{2,12,1} &= 0 \\
[y^4_1] + y^4_{11} + [x^5_{13}] + k_{1,3} + k_{2,3,2} &= 0 \\
y^4_4 + y^4_{11} + x^5_9 + k_{1,0} + k_{2,0,2} &= 0 \\
[y^5_3] + y^5_9 + [x^6_{15}] + k_{1,12} + k_{2,12,2} &= 0 \\
S(x^1_3) + y^1_3 &= 0 \\
S(x^2_7) + y^2_7 &= 0 \\
S(x^2_{13}) + y^2_{13} &= 0 \\
S(x^3_0) + y^3_0 &= 0 \\
S(x^3_4) + y^3_4 &= 0 \\
S(x^3_8) + y^3_8 &= 0 \\
S(x^4_4) + y^4_4 &= 0
\end{aligned}$$

$$S(x^{5_9}) + y^{5_9} = 0$$

the 10 th Minimal Constraint set is:

$$y^{0_0} + x^{1_4} + k_{1_0} + k_{2_0_0} = 0$$

$$y^{0_0} + y^{0_{10}} + x^{1_{12}} + k_{1_0} + k_{2_0_0} = 0$$

$$y^{0_3} + x^{1_7} + k_{1_3} + k_{2_3_0} = 0$$

$$y^{0_3} + [y^{0_9}] + [x^{1_{15}}] + k_{1_3} + k_{2_3_0} = 0$$

$$[y^{0_6}] + [y^{0_9}] + x^{1_{11}} + k_{1_6} + k_{2_6_0} = 0$$

$$[y^{0_7}] + y^{0_{10}} + [x^{1_8}] + k_{1_7} + k_{2_7_0} = 0$$

$$y^{1_0} + x^{2_4} + k_{1_9} + k_{2_9_0} = 0$$

$$y^{1_0} + y^{1_{10}} + x^{2_{12}} + k_{1_9} + k_{2_9_0} = 0$$

$$[y^{1_2}] + [y^{1_8}] + [y^{1_{15}}] + x^{2_2} + k_{1_8} + k_{2_8_0} = 0$$

$$y^{1_3} + y^{1_9} + y^{1_{12}} + x^{2_3} + k_{1_{13}} + k_{2_{13_0}} = 0$$

$$y^{1_3} + y^{1_9} + x^{2_{15}} + k_{1_{13}} + k_{2_{13_0}} = 0$$

$$y^{1_4} + y^{1_{11}} + x^{2_9} + k_{1_{10}} + k_{2_{10_0}} = 0$$

$$y^{1_7} + y^{1_{10}} + x^{2_8} + k_{1_{11}} + k_{2_{11_0}} = 0$$

$$[y^{2_1}] + y^{2_{11}} + [x^{3_{13}}] + k_{1_7} + k_{2_7_1} = 0$$

$$y^{2_2} + y^{2_8} + y^{2_{15}} + x^{3_2} + k_{1_0} + k_{2_0_1} = 0$$

$$y^{2_3} + y^{2_9} + y^{2_{12}} + x^{3_3} + k_{1_5} + k_{2_5_1} = 0$$

$$y^{2_3} + x^{3_7} + k_{1_5} + k_{2_5_1} = 0$$

$$y^{2_3} + y^{2_9} + x^{3_{15}} + k_{1_5} + k_{2_5_1} = 0$$

$$y^{2_4} + y^{2_{11}} + x^{3_9} + k_{1_2} + k_{2_2_1} = 0$$

$$[y^{2_6}] + y^{2_9} + [x^{3_{11}}] + k_{1_4} + k_{2_4_1} = 0$$

$$y^{3_0} + y^{3_{10}} + [y^{3_{13}}] + [x^{4_0}] + k_{1_{15}} + k_{2_{15_1}} = 0$$

$$y^{3_0} + x^{4_4} + k_{1_{15}} + k_{2_{15_1}} = 0$$

$$y^{3_2} + y^{3_8} + y^{3_{15}} + x^{4_2} + k_{1_9} + k_{2_9_1} = 0$$

$$y^{3_3} + y^{3_9} + [x^{4_{15}}] + k_{1_{14}} + k_{2_{14_1}} = 0$$

$$[y^{3_5}] + y^{3_8} + [x^{4_{10}}] + k_{1_{12}} + k_{2_{12_1}} = 0$$

$$y^{3_7} + y^{3_{10}} + x^{4_8} + k_{1_{13}} + k_{2_{13_1}} = 0$$

$$[y^{4_1}] + y^{4_{11}} + [x^{5_{13}}] + k_{1_3} + k_{2_3_2} = 0$$

$$y^{4_2} + y^{4_8} + [y^{4_{15}}] + [x^{5_2}] + k_{1_1} + k_{2_1_2} = 0$$

$$y^{4_4} + y^{4_{11}} + x^{5_9} + k_{1_0} + k_{2_0_2} = 0$$

$$[y^{5_3}] + y^{5_9} + [x^{6_{15}}] + k_{1_{12}} + k_{2_{12_2}} = 0$$

$$S(x^{1_4}) + y^{1_4} = 0$$

$$S(x^{1_7}) + y^{1_7} = 0$$

$$S(x^{1_{11}}) + y^{1_{11}} = 0$$

$$S(x^{1_{12}}) + y^{1_{12}} = 0$$

$$S(x^{2_2}) + y^{2_2} = 0$$

$$S(x^{2_3}) + y^{2_3} = 0$$

$$S(x^{2_4}) + y^{2_4} = 0$$

$$S(x^{2_8}) + y^{2_8} = 0$$

$$S(x^{2_9}) + y^{2_9} = 0$$

$$S(x^{2_{12}}) + y^{2_{12}} = 0$$

$$S(x^{2_{15}}) + y^{2_{15}} = 0$$

$$S(x^{3_2}) + y^{3_2} = 0$$

$$\begin{aligned}
S(x^3_3) + y^3_3 &= 0 \\
S(x^3_7) + y^3_7 &= 0 \\
S(x^3_9) + y^3_9 &= 0 \\
S(x^3_{15}) + y^3_{15} &= 0 \\
S(x^4_2) + y^4_2 &= 0 \\
S(x^4_4) + y^4_4 &= 0 \\
S(x^4_8) + y^4_8 &= 0 \\
S(x^5_9) + y^5_9 &= 0
\end{aligned}$$

the 11 th Minimal Constraint set is:

$$\begin{aligned}
y^0_3 + x^1_7 + k1_3 + k2_3_0 &= 0 \\
y^0_3 + [y^0_9] + [x^1_{15}] + k1_3 + k2_3_0 &= 0 \\
y^1_0 + x^2_4 + k1_9 + k2_9_0 &= 0 \\
y^1_0 + y^1_{10} + x^2_{12} + k1_9 + k2_9_0 &= 0 \\
[y^1_2] + [y^1_8] + [y^1_{15}] + x^2_2 + k1_8 + k2_8_0 &= 0 \\
y^1_7 + y^1_{10} + x^2_8 + k1_{11} + k2_{11}_0 &= 0 \\
[y^2_1] + y^2_{11} + [x^3_{13}] + k1_7 + k2_7_1 &= 0 \\
y^2_2 + y^2_8 + x^3_{14} + k1_0 + k2_0_1 &= 0 \\
y^2_3 + y^2_9 + y^2_{12} + x^3_3 + k1_5 + k2_5_1 &= 0 \\
y^2_3 + x^3_7 + k1_5 + k2_5_1 &= 0 \\
y^2_4 + y^2_{11} + x^3_9 + k1_2 + k2_2_1 &= 0 \\
[y^2_6] + y^2_9 + [x^3_{11}] + k1_4 + k2_4_1 &= 0 \\
y^3_0 + y^3_{10} + [y^3_{13}] + [x^4_0] + k1_{15} + k2_{15}_1 &= 0 \\
y^3_0 + x^4_4 + k1_{15} + k2_{15}_1 &= 0 \\
y^3_1 + [y^3_{11}] + y^3_{14} + [x^4_1] + k1_{11} + k2_{11}_1 &= 0 \\
y^3_1 + x^4_5 + k1_{11} + k2_{11}_1 &= 0 \\
y^3_3 + y^3_9 + [x^4_{15}] + k1_{14} + k2_{14}_1 &= 0 \\
y^3_7 + y^3_{10} + x^4_8 + k1_{13} + k2_{13}_1 &= 0 \\
[y^4_0] + [y^4_{10}] + [y^4_{13}] + x^5_0 + k1_7 + k2_7_2 &= 0 \\
[y^4_1] + y^4_{11} + [x^5_{13}] + k1_3 + k2_3_2 &= 0 \\
y^4_4 + y^4_{11} + x^5_9 + k1_0 + k2_0_2 &= 0 \\
y^4_5 + y^4_8 + x^5_{10} + k1_4 + k2_4_2 &= 0 \\
y^5_0 + y^5_{10} + [y^5_{13}] + [x^6_0] + k1_{11} + k2_{11}_2 &= 0 \\
[y^5_3] + y^5_9 + [x^6_{15}] + k1_{12} + k2_{12}_2 &= 0 \\
S(x^1_7) + y^1_7 &= 0 \\
S(x^2_2) + y^2_2 &= 0 \\
S(x^2_4) + y^2_4 &= 0 \\
S(x^2_8) + y^2_8 &= 0 \\
S(x^2_{12}) + y^2_{12} &= 0 \\
S(x^3_3) + y^3_3 &= 0 \\
S(x^3_7) + y^3_7 &= 0 \\
S(x^3_9) + y^3_9 &= 0 \\
S(x^3_{14}) + y^3_{14} &= 0 \\
S(x^4_4) + y^4_4 &= 0 \\
S(x^4_5) + y^4_5 &= 0
\end{aligned}$$

$$S(x^{4_8}) + y^{4_8} = 0$$

$$S(x^{5_0}) + y^{5_0} = 0$$

$$S(x^{5_9}) + y^{5_9} = 0$$

$$S(x^{5_{10}}) + y^{5_{10}} = 0$$

the 12 th Minimal Constraint set is:

$$[y^{5_4}] + [y^{5_{11}}] + x^{6_9} + k_{1_9} + k_{2_9_2} = 0$$

$$[y^{6_6}] + y^{6_9} + [x^{7_{11}}] + k_{1_0} + k_{2_0_3} = 0$$

$$S(x^{6_9}) + y^{6_9} = 0$$

the 13 th Minimal Constraint set is:

$$[y^{4_7}] + [y^{4_{10}}] + x^{5_8} + k_{1_5} + k_{2_5_2} = 0$$

$$[y^{5_2}] + y^{5_8} + [y^{5_{15}}] + x^{6_2} + k_{1_{15}} + k_{2_{15_2}} = 0$$

$$y^{6_2} + [y^{6_8}] + [x^{7_{14}}] + k_{1_7} + k_{2_7_3} = 0$$

$$S(x^{5_8}) + y^{5_8} = 0$$

$$S(x^{6_2}) + y^{6_2} = 0$$

the 14 th Minimal Constraint set is:

$$[y^{4_7}] + [y^{4_{10}}] + x^{5_8} + k_{1_5} + k_{2_5_2} = 0$$

$$[y^{5_5}] + y^{5_8} + [x^{6_{10}}] + k_{1_{10}} + k_{2_{10_2}} = 0$$

$$S(x^{5_8}) + y^{5_8} = 0$$

the 15 th Minimal Constraint set is:

$$[y^{4_7}] + [y^{4_{10}}] + x^{5_8} + k_{1_5} + k_{2_5_2} = 0$$

$$[y^{5_2}] + y^{5_8} + [x^{6_{14}}] + k_{1_{15}} + k_{2_{15_2}} = 0$$

$$S(x^{5_8}) + y^{5_8} = 0$$

the 16 th Minimal Constraint set is:

$$y^{0_0} + x^{1_4} + k_{1_0} + k_{2_0_0} = 0$$

$$y^{0_0} + y^{0_{10}} + x^{1_{12}} + k_{1_0} + k_{2_0_0} = 0$$

$$y^{0_2} + x^{1_6} + k_{1_2} + k_{2_2_0} = 0$$

$$y^{0_2} + [y^{0_8}] + [x^{1_{14}}] + k_{1_2} + k_{2_2_0} = 0$$

$$y^{0_3} + [y^{0_9}] + [y^{0_{12}}] + x^{1_3} + k_{1_3} + k_{2_3_0} = 0$$

$$y^{0_3} + x^{1_7} + k_{1_3} + k_{2_3_0} = 0$$

$$[y^{0_6}] + [y^{0_9}] + x^{1_{11}} + k_{1_6} + k_{2_6_0} = 0$$

$$[y^{0_7}] + y^{0_{10}} + [x^{1_8}] + k_{1_7} + k_{2_7_0} = 0$$

$$y^{1_0} + x^{2_4} + k_{1_9} + k_{2_9_0} = 0$$

$$y^{1_0} + y^{1_{10}} + x^{2_{12}} + k_{1_9} + k_{2_9_0} = 0$$

$$[y^{1_2}] + [y^{1_8}] + [y^{1_{15}}] + x^{2_2} + k_{1_8} + k_{2_8_0} = 0$$

$$y^{1_3} + y^{1_9} + y^{1_{12}} + x^{2_3} + k_{1_{13}} + k_{2_{13_0}} = 0$$

$$y^{1_4} + y^{1_{11}} + x^{2_9} + k_{1_{10}} + k_{2_{10_0}} = 0$$

$$y^{1_6} + y^{1_9} + x^{2_{11}} + k_{1_{12}} + k_{2_{12_0}} = 0$$

$$y^{1_7} + y^{1_{10}} + x^{2_8} + k_{1_{11}} + k_{2_{11_0}} = 0$$

$$[y^{2_1}] + y^{2_{11}} + [y^{2_{14}}] + x^{3_1} + k_{1_7} + k_{2_7_1} = 0$$

$$[y^{2_1}] + y^{2_{11}} + [x^{3_{13}}] + k_{1_7} + k_{2_7_1} = 0$$

$$y^{2_2} + y^{2_8} + x^{3_{14}} + k_{1_0} + k_{2_0_1} = 0$$

$$y^{2_3} + y^{2_9} + y^{2_{12}} + x^{3_3} + k_{1_5} + k_{2_5_1} = 0$$

$$y^{2_4} + y^{2_{11}} + x^{3_9} + k_{1_2} + k_{2_2_1} = 0$$

$$y^{3_1} + [y^{3_{11}}] + y^{3_{14}} + [x^{4_1}] + k_{1_{11}} + k_{2_{11_1}} = 0$$

$$y^3_3 + y^3_9 + [x^4_{15}] + k1_{14} + k2_{14}_1 = 0$$

$$S(x^1_3) + y^1_3 = 0$$

$$S(x^1_4) + y^1_4 = 0$$

$$S(x^1_6) + y^1_6 = 0$$

$$S(x^1_7) + y^1_7 = 0$$

$$S(x^1_{11}) + y^1_{11} = 0$$

$$S(x^1_{12}) + y^1_{12} = 0$$

$$S(x^2_2) + y^2_2 = 0$$

$$S(x^2_3) + y^2_3 = 0$$

$$S(x^2_4) + y^2_4 = 0$$

$$S(x^2_8) + y^2_8 = 0$$

$$S(x^2_9) + y^2_9 = 0$$

$$S(x^2_{11}) + y^2_{11} = 0$$

$$S(x^2_{12}) + y^2_{12} = 0$$

$$S(x^3_1) + y^3_1 = 0$$

$$S(x^3_3) + y^3_3 = 0$$

$$S(x^3_9) + y^3_9 = 0$$

$$S(x^3_{14}) + y^3_{14} = 0$$

the 17 th Minimal Constraint set is:

$$y^0_3 + x^1_7 + k1_3 + k2_3_0 = 0$$

$$y^0_3 + [y^0_9] + [x^1_{15}] + k1_3 + k2_3_0 = 0$$

$$[y^0_5] + [y^0_8] + x^1_{10} + k1_5 + k2_5_0 = 0$$

$$[y^1_2] + [y^1_8] + [y^1_{15}] + x^2_2 + k1_8 + k2_8_0 = 0$$

$$y^1_7 + y^1_{10} + x^2_8 + k1_{11} + k2_{11}_0 = 0$$

$$[y^2_1] + y^2_{11} + [y^2_{14}] + x^3_1 + k1_7 + k2_7_1 = 0$$

$$[y^2_1] + y^2_{11} + [x^3_{13}] + k1_7 + k2_7_1 = 0$$

$$y^2_2 + y^2_8 + x^3_{14} + k1_0 + k2_0_1 = 0$$

$$y^3_1 + [y^3_{11}] + y^3_{14} + [x^4_1] + k1_{11} + k2_{11}_1 = 0$$

$$S(x^1_7) + y^1_7 = 0$$

$$S(x^1_{10}) + y^1_{10} = 0$$

$$S(x^2_2) + y^2_2 = 0$$

$$S(x^2_8) + y^2_8 = 0$$

$$S(x^3_1) + y^3_1 = 0$$

$$S(x^3_{14}) + y^3_{14} = 0$$

the 18 th Minimal Constraint set is:

$$y^0_0 + x^1_4 + k1_0 + k2_0_0 = 0$$

$$y^0_0 + y^0_{10} + x^1_{12} + k1_0 + k2_0_0 = 0$$

$$y^0_3 + x^1_7 + k1_3 + k2_3_0 = 0$$

$$y^0_3 + [y^0_9] + [x^1_{15}] + k1_3 + k2_3_0 = 0$$

$$[y^0_6] + [y^0_9] + x^1_{11} + k1_6 + k2_6_0 = 0$$

$$[y^0_7] + y^0_{10} + [x^1_8] + k1_7 + k2_7_0 = 0$$

$$y^1_0 + x^2_4 + k1_9 + k2_9_0 = 0$$

$$y^1_0 + y^1_{10} + x^2_{12} + k1_9 + k2_9_0 = 0$$

$$[y^1_2] + [y^1_8] + [y^1_{15}] + x^2_2 + k1_8 + k2_8_0 = 0$$

$$\begin{aligned}
&y^1_{1,3} + y^1_{1,9} + y^1_{1,12} + x^2_{2,3} + k1_{1,3} + k2_{13,0} = 0 \\
&y^1_{1,3} + y^1_{1,9} + x^2_{2,15} + k1_{1,3} + k2_{13,0} = 0 \\
&y^1_{1,4} + y^1_{1,11} + x^2_{2,9} + k1_{1,10} + k2_{10,0} = 0 \\
&y^1_{1,7} + y^1_{1,10} + x^2_{2,8} + k1_{1,11} + k2_{11,0} = 0 \\
&[y^2_{2,1}] + y^2_{2,11} + [x^3_{3,13}] + k1_{1,7} + k2_{7,1} = 0 \\
&y^2_{2,2} + y^2_{2,8} + y^2_{2,15} + x^3_{3,2} + k1_{1,0} + k2_{0,1} = 0 \\
&y^2_{2,3} + y^2_{2,9} + y^2_{2,12} + x^3_{3,3} + k1_{1,5} + k2_{5,1} = 0 \\
&y^2_{2,4} + y^2_{2,11} + x^3_{3,9} + k1_{1,2} + k2_{2,1} = 0 \\
&y^3_{3,2} + y^3_{3,8} + x^4_{4,14} + k1_{1,9} + k2_{9,1} = 0 \\
&y^3_{3,3} + y^3_{3,9} + [x^4_{4,15}] + k1_{1,14} + k2_{14,1} = 0 \\
&[y^3_{3,5}] + y^3_{3,8} + [x^4_{4,10}] + k1_{1,12} + k2_{12,1} = 0 \\
&[y^4_{4,1}] + y^4_{4,11} + y^4_{4,14} + [x^5_{5,1}] + k1_{1,3} + k2_{3,2} = 0 \\
&[y^4_{4,1}] + y^4_{4,11} + [x^5_{5,13}] + k1_{1,3} + k2_{3,2} = 0 \\
&S(x^1_{1,4}) + y^1_{1,4} = 0 \\
&S(x^1_{1,7}) + y^1_{1,7} = 0 \\
&S(x^1_{1,11}) + y^1_{1,11} = 0 \\
&S(x^1_{1,12}) + y^1_{1,12} = 0 \\
&S(x^2_{2,2}) + y^2_{2,2} = 0 \\
&S(x^2_{2,3}) + y^2_{2,3} = 0 \\
&S(x^2_{2,4}) + y^2_{2,4} = 0 \\
&S(x^2_{2,8}) + y^2_{2,8} = 0 \\
&S(x^2_{2,9}) + y^2_{2,9} = 0 \\
&S(x^2_{2,12}) + y^2_{2,12} = 0 \\
&S(x^2_{2,15}) + y^2_{2,15} = 0 \\
&S(x^3_{3,2}) + y^3_{3,2} = 0 \\
&S(x^3_{3,3}) + y^3_{3,3} = 0 \\
&S(x^3_{3,9}) + y^3_{3,9} = 0 \\
&S(x^4_{4,14}) + y^4_{4,14} = 0
\end{aligned}$$

the 19 th Minimal Constraint set is:

$$\begin{aligned}
&[y^1_{1,2}] + [y^1_{1,8}] + [y^1_{1,15}] + x^2_{2,2} + k1_{1,8} + k2_{8,0} = 0 \\
&y^2_{2,2} + x^3_{3,6} + k1_{1,0} + k2_{0,1} = 0 \\
&y^3_{3,3} + [x^4_{4,7}] + k1_{1,14} + k2_{14,1} = 0 \\
&y^3_{3,3} + y^3_{3,9} + [x^4_{4,15}] + k1_{1,14} + k2_{14,1} = 0 \\
&y^3_{3,6} + y^3_{3,9} + x^4_{4,11} + k1_{1,10} + k2_{10,1} = 0 \\
&[y^4_{4,1}] + y^4_{4,11} + [x^5_{5,13}] + k1_{1,3} + k2_{3,2} = 0 \\
&S(x^2_{2,2}) + y^2_{2,2} = 0 \\
&S(x^3_{3,6}) + y^3_{3,6} = 0 \\
&S(x^4_{4,11}) + y^4_{4,11} = 0
\end{aligned}$$

the 20 th Minimal Constraint set is:

$$\begin{aligned}
&y^3_{3,0} + y^3_{3,10} + [y^3_{3,13}] + [x^4_{4,0}] + k1_{1,15} + k2_{15,1} = 0 \\
&y^3_{3,0} + y^3_{3,10} + x^4_{4,12} + k1_{1,15} + k2_{15,1} = 0 \\
&[y^4_{4,3}] + [y^4_{4,9}] + y^4_{4,12} + [x^5_{5,3}] + k1_{1,6} + k2_{6,2} = 0 \\
&S(x^4_{4,12}) + y^4_{4,12} = 0
\end{aligned}$$

the 21 th Minimal Constraint set is:

$$\begin{aligned}
&y^0_0 + x^1_4 + k1_0 + k2_0 = 0 \\
&y^0_0 + y^0_{10} + x^1_{12} + k1_0 + k2_0 = 0 \\
&y^0_3 + x^1_7 + k1_3 + k2_3 = 0 \\
&y^0_3 + [y^0_9] + [x^1_{15}] + k1_3 + k2_3 = 0 \\
&[y^0_6] + [y^0_9] + x^1_{11} + k1_6 + k2_6 = 0 \\
&[y^0_7] + y^0_{10} + [x^1_8] + k1_7 + k2_7 = 0 \\
&y^1_0 + x^2_4 + k1_9 + k2_9 = 0 \\
&y^1_0 + y^1_{10} + x^2_{12} + k1_9 + k2_9 = 0 \\
&[y^1_2] + [y^1_8] + [y^1_{15}] + x^2_2 + k1_8 + k2_8 = 0 \\
&y^1_3 + y^1_9 + y^1_{12} + x^2_3 + k1_{13} + k2_{13} = 0 \\
&y^1_3 + y^1_9 + x^2_{15} + k1_{13} + k2_{13} = 0 \\
&y^1_4 + y^1_{11} + x^2_9 + k1_{10} + k2_{10} = 0 \\
&y^1_7 + y^1_{10} + x^2_8 + k1_{11} + k2_{11} = 0 \\
&[y^2_1] + y^2_{11} + [x^3_{13}] + k1_7 + k2_7 = 0 \\
&y^2_2 + y^2_8 + y^2_{15} + x^3_2 + k1_0 + k2_0 = 0 \\
&y^2_3 + y^2_9 + y^2_{12} + x^3_3 + k1_5 + k2_5 = 0 \\
&y^2_4 + y^2_{11} + x^3_9 + k1_2 + k2_2 = 0 \\
&y^3_2 + x^4_6 + k1_9 + k2_9 = 0 \\
&y^3_3 + y^3_9 + [x^4_{15}] + k1_{14} + k2_{14} = 0 \\
&y^4_6 + [y^4_9] + [x^5_{11}] + k1_2 + k2_2 = 0 \\
&S(x^1_4) + y^1_4 = 0 \\
&S(x^1_7) + y^1_7 = 0 \\
&S(x^1_{11}) + y^1_{11} = 0 \\
&S(x^1_{12}) + y^1_{12} = 0 \\
&S(x^2_2) + y^2_2 = 0 \\
&S(x^2_3) + y^2_3 = 0 \\
&S(x^2_4) + y^2_4 = 0 \\
&S(x^2_8) + y^2_8 = 0 \\
&S(x^2_9) + y^2_9 = 0 \\
&S(x^2_{12}) + y^2_{12} = 0 \\
&S(x^2_{15}) + y^2_{15} = 0 \\
&S(x^3_2) + y^3_2 = 0 \\
&S(x^3_3) + y^3_3 = 0 \\
&S(x^3_9) + y^3_9 = 0 \\
&S(x^4_6) + y^4_6 = 0
\end{aligned}$$

the 22 th Minimal Constraint set is:

$$\begin{aligned}
&[y^2_1] + y^2_{11} + [y^2_{14}] + x^3_1 + k1_7 + k2_7 = 0 \\
&[y^2_1] + y^2_{11} + [x^3_{13}] + k1_7 + k2_7 = 0 \\
&y^3_1 + [y^3_{11}] + [x^4_{13}] + k1_{11} + k2_{11} = 0 \\
&S(x^3_1) + y^3_1 = 0
\end{aligned}$$

the 23 th Minimal Constraint set is:

$$[y^1_2] + [x^2_6] + k1_8 + k2_8 = 0$$

the 24 th Minimal Constraint set is:

$$[y^1_2] + [y^1_8] + [x^2_{14}] + k1_8 + k2_8 = 0$$

the 25 th Minimal Constraint set is:

$$[y^{2_1}] + [x^{3_5}] + k1_7 + k2_7_1 = 0$$

the 26 th Minimal Constraint set is:

$$[y^{4_0}] + [x^{5_4}] + k1_7 + k2_7_2 = 0$$

the 27 th Minimal Constraint set is:

$$[y^{4_0}] + [y^{4_{10}}] + [x^{5_{12}}] + k1_7 + k2_7_2 = 0$$

the 28 th Minimal Constraint set is:

$$[y^{4_1}] + [x^{5_5}] + k1_3 + k2_3_2 = 0$$

the 29 th Minimal Constraint set is:

$$[y^{4_3}] + [x^{5_7}] + k1_6 + k2_6_2 = 0$$

the 30 th Minimal Constraint set is:

$$[y^{4_3}] + [y^{4_9}] + [x^{5_{15}}] + k1_6 + k2_6_2 = 0$$

the 31 th Minimal Constraint set is:

$$[y^{5_1}] + [x^{6_5}] + k1_{13} + k2_{13_2} = 0$$

the 32 th Minimal Constraint set is:

$$[y^{5_2}] + [x^{6_6}] + k1_{15} + k2_{15_2} = 0$$

the 33 th Minimal Constraint set is:

$$[y^{5_3}] + [x^{6_7}] + k1_{12} + k2_{12_2} = 0$$

the 34 th Minimal Constraint set is:

$$[y^{6_0}] + [x^{7_4}] + k1_3 + k2_3_3 = 0$$

the 35 th Minimal Constraint set is:

$$[y^{7_1}] + [y^{7_{11}}] + [x^{8_{13}}] + k1_{14} + k2_{14_3} = 0$$