

M = 2, n = 3:

Original equation:

$$+10f_{-1}^3f_0^2 + 5f_{-1}^4f_1 + 20f_{-2}f_{-1}f_0^3 + 60f_{-2}f_{-1}^2f_0f_1 + 20f_{-2}f_{-1}^3f_2 \\ + 30f_{-2}^2f_0^2f_1 + 30f_{-2}^2f_{-1}f_1^2 + 60f_{-2}^2f_{-1}f_0f_2 + 20f_{-2}^3f_1f_2 = 0 \quad (1)$$

Simplified equation, where $f_{-j} = \overline{f_j}$:

$$20f_0^3\overline{f_1f_2} + 30f_0^2f_1\overline{f_2}^2 + 10f_0^2\overline{f_1}^3 + 60f_0f_1\overline{f_1}^2\overline{f_2} + 60f_0f_2\overline{f_1f_2}^2 \\ + 30f_1^2\overline{f_1f_2}^2 + 20f_1f_2\overline{f_2}^3 + 5f_1\overline{f_1}^4 + 20f_2\overline{f_1}^3\overline{f_2} = 0 \quad (2)$$

All possible solutions:

$$\{f_1 : 0\} \quad (3)$$

$$\{f_1 : 0, \quad f_2 : 0\} \quad (4)$$