M = 2, n = 2:

Original equation:

$$\begin{gathered}+6f_{-1}^2f_0^2+4f_{-1}^3f_1+4f_{-2}f_0^3+24f_{-2}f_{-1}f_0f_1\\+12f_{-2}f_{-1}^2f_2+6f_{-2}^2f_1^2+12f_{-2}^2f_0f_2=0\end{gathered}\tag{1}$$

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

$$4f_0^3\overline{f_2}+6f_0^2\overline{f_1}^2+24f_0f_1\overline{f_1f_2}+12f_0f_2\overline{f_2}^2+6f_1^2\overline{f_2}^2+4f_1\overline{f_1}^3+12f_2\overline{f_1}^2\overline{f_2}=0\tag{2}$$

All possible solutions:

$$\{f_1:0,\quad f_2:0\}\tag{3}$$

Time elapsed: 0.6505889892578125 seconds