M = 1, n = 1:

Original equation:
$$+3f_{-1}f_0^2 + 3f_{-1}^2 f_1 = 0 \tag{1}$$

Equivalent equation, where $f_{-j} = \overline{f_j}$:
$$3f_0^2\overline{f_1} + 3f_1\overline{f_1}^2 = 0 \tag{2}$$

All possible solutions:
$$\{f_1 : 0\} \tag{3}$$

$$\left\{f_1 : -\sqrt{-f_0^2}\right\} \tag{4}$$

$$\left\{f_1 : \sqrt{-f_0^2}\right\} \tag{5}$$

Time elapsed: 1.0210461616516113 seconds