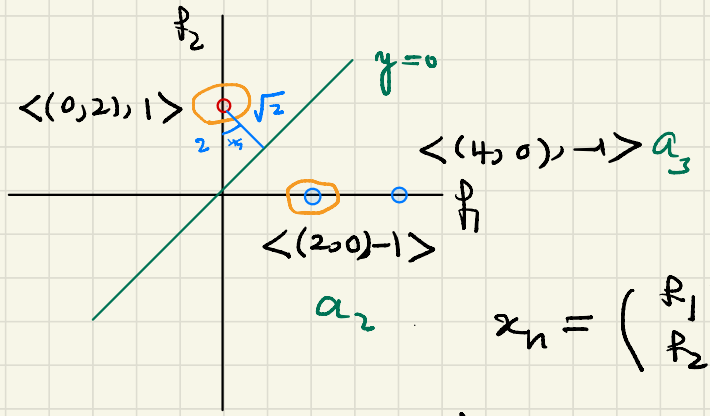

$$x_n = \begin{pmatrix} f_1 \\ f_2 \end{pmatrix}, \quad w = \begin{pmatrix} \omega_1 \\ \omega_2 \end{pmatrix}$$

$$y(f_1, f_2) = \omega_1 f_1 + \omega_2 f_2 + \omega_0 = \omega^T f + \omega_0$$

$$y_n t_n = 1 \longrightarrow \begin{cases} 2\omega_2 + \omega_0 = 1 \\ -2\omega_1 - \omega_0 = 1 \end{cases}$$

$$w = \sum_{n=1}^{3} a_n t_n x_n ,$$

$$\begin{pmatrix} \omega_1 \\ \omega_2 \end{pmatrix} = a_1 \begin{pmatrix} 0 \\ 2 \end{pmatrix} - a_2 \begin{pmatrix} 2 \\ 0 \end{pmatrix} = \begin{pmatrix} -2a_2 \\ 2a_1 \end{pmatrix}$$

$$\sum_{n=1}^{3} a_n t_n = 0 \qquad a_1 = a_2 \ \checkmark$$

$$\omega_1 = -2a_2 \qquad \omega_2 = 2a_2$$

$$\begin{aligned} 4a_2 - \omega_0 &= 1 \\ 4a_2 + \omega_0 &= 1 \end{aligned} \longrightarrow \begin{cases} a_2 = a_1 = 1/4 \\ \omega_1 = -1/2 \\ \omega_2 = 1/2 \\ \omega_0 = 0 \end{cases}$$

$$y(f_1, f_2) = -\tfrac{1}{2} f_1 + \tfrac{1}{2} f_2$$

Margin: $1/\|w\| = \sqrt{2}$