

$$\sigma_1 = (3, 1, 4)$$

$$\sigma_2 = (2, -3, 5)$$

$$\sigma_3 = (5, 9, t)$$

$t = ?$  s.t. vectors are linearly dependent

$$\text{let } \sigma_3 = \alpha \sigma_1 + \beta \sigma_2 : \alpha, \beta \in F$$

$$\begin{cases} 3\alpha + 2\beta = 5 \\ \alpha - 3\beta = 9 \end{cases} \xrightarrow{R_1 - \frac{1}{3}R_2} \begin{cases} 3\alpha + 2\beta = 5 \\ -3\beta - \frac{2}{3}\beta = 9 - \frac{5}{3} \end{cases}$$

$$\begin{aligned} (\Rightarrow) \begin{cases} 3\alpha + 2\beta = 5 \\ -9\beta - 2\beta = 22 \end{cases} & \quad (\Rightarrow) \begin{cases} 3\alpha + 2\beta = 5 \\ \beta = -2 \end{cases} & \quad (\Rightarrow) \begin{cases} \alpha = 3 \\ \beta = -2 \end{cases} \end{aligned}$$

$$t = 4\alpha + 5\beta = 2$$