

Q-3

$$R_1^{2 \times 2} = \{ \alpha_1 = \begin{pmatrix} 1 & 2 \\ 0 & 1 \end{pmatrix}, \alpha_2 = \begin{pmatrix} 0 & 1 \\ 1 & 2 \end{pmatrix} \}$$

$$R_2^{2 \times 2} = \{ \beta_1 = \begin{pmatrix} 1 & -1 \\ 0 & 0 \end{pmatrix}, \beta_2 = \begin{pmatrix} 0 & 0 \\ -1 & 1 \end{pmatrix} \}$$

$R_1^{2 \times 2} + R_2^{2 \times 2}$  - дозв. , можли-мо;  $R_1 \cap R_2 = ?$ ;  $m = \begin{pmatrix} 3 & 5 \\ -10 & 1 \end{pmatrix}$

1.  $R_1 + R_2$

$$\begin{array}{l} \alpha_1 \\ \alpha_2 \\ \beta_1 \\ \beta_2 \end{array} \left( \begin{array}{cccc} 1 & 2 & 0 & 1 \\ 0 & 1 & 1 & 2 \\ 1 & -1 & 0 & 0 \\ 0 & 0 & -1 & 1 \end{array} \right) \xrightarrow{\substack{(-1) \\ 2}} \left( \begin{array}{cccc} 1 & 2 & 0 & 1 \\ 0 & 1 & 1 & 2 \\ 0 & -3 & 0 & -1 \\ 0 & 0 & -1 & 1 \end{array} \right) \xrightarrow{\substack{3 \\ 2}} \left( \begin{array}{cccc} 1 & 2 & 0 & 1 \\ 0 & 1 & 1 & 2 \\ 0 & 0 & 3 & 5 \\ 0 & 0 & -1 & 1 \end{array} \right) \xrightarrow{\frac{1}{3}} \left( \begin{array}{cccc} 1 & 2 & 0 & 1 \\ 0 & 1 & 1 & 2 \\ 0 & 0 & 1 & \frac{5}{3} \\ 0 & 0 & -1 & 1 \end{array} \right)$$



$$\begin{pmatrix} 1 & 2 & 0 & 1 \\ 0 & 1 & 1 & 2 \\ 0 & 0 & 3 & 5 \\ 0 & 0 & 0 & \frac{8}{3} \end{pmatrix}$$

$$\dim = 4, \operatorname{Rg} = 4; \text{ for } \{v_1, v_2, v_3, v_4\}$$

$$m = \begin{pmatrix} 3 & 5 \\ -10 & 1 \end{pmatrix} \Rightarrow m = \alpha_1 v_1 + \alpha_2 v_2 + \beta_1 v_3 + \beta_2 v_4$$

$$\begin{array}{l} 1 \\ 2 \\ 3 \\ 4 \end{array} \left| \begin{array}{cccc|c} 1 & 0 & 1 & 0 & 3 \\ 2 & 1 & -1 & 0 & 5 \\ 0 & 1 & 0 & -1 & -10 \\ 1 & 2 & 0 & 1 & 1 \end{array} \right. \xrightarrow{\substack{(-2) \\ 2}} \begin{array}{l} 1 \\ 2 \\ 3 \\ 4 \end{array} \left| \begin{array}{cccc|c} 1 & 0 & 1 & 0 & 3 \\ 0 & 1 & -3 & 0 & -1 \\ 0 & 1 & 0 & -1 & -10 \\ 1 & 2 & 0 & 1 & 1 \end{array} \right. \xrightarrow{(-1)} \sim$$

$$\begin{array}{l} 1 \\ 2 \\ 3 \\ 4 \end{array} \left| \begin{array}{cccc|c} 1 & 0 & 1 & 0 & 3 \\ 0 & 1 & -3 & 0 & -1 \\ 0 & 0 & 3 & -1 & -9 \\ 0 & 2 & -1 & 1 & -2 \end{array} \right. \xrightarrow{(-2)} \sim \begin{array}{l} 1 \\ 2 \\ 3 \\ 4 \end{array} \left| \begin{array}{cccc|c} 1 & 0 & 1 & 0 & 3 \\ 0 & 1 & -3 & 0 & -1 \\ 0 & 0 & 3 & -1 & -9 \\ 0 & 0 & 5 & 1 & 0 \end{array} \right. \xrightarrow{(-\frac{5}{3})} \sim$$

$$\begin{pmatrix} 1 & 0 & 1 & 0 & 3 \\ 0 & 1 & -3 & 0 & -1 \\ 0 & 0 & 3 & -1 & -9 \\ 0 & 0 & 0 & \frac{8}{3} & 15 \end{pmatrix}$$

$$\begin{cases} \alpha_1 + \beta_1 = 3 \\ \alpha_2 - 3\beta_1 = -1 \\ 3\beta_1 - \beta_2 = -9 \\ \frac{8}{3}\beta_2 = 15 \end{cases} \Leftrightarrow \begin{cases} \alpha_1 = 3 - \beta_1 \\ \alpha_2 = -1 + 3\beta_1 \\ \beta_1 = \frac{-9 + \beta_2}{3} \\ \beta_2 = 15 \cdot \frac{3}{8} \end{cases} \Leftrightarrow \begin{cases} \alpha_1 = \frac{33}{8} \\ \alpha_2 = -\frac{35}{8} \\ \beta_1 = -\frac{9}{8} \\ \beta_2 = \frac{45}{8} \end{cases}$$

$$R_1 \cap R_2 = \emptyset$$