

Equations

Rows / Coefficients / Numbers only

$$\begin{cases} 2x_1 + 4x_2 + 6x_3 - x_4 - 5x_5 = 2 \\ 6x_1 + 12x_2 + 18x_3 - 4x_4 - 20x_5 = 0 \end{cases}$$

$$\begin{bmatrix} 2 & 4 & 6 & -1 & -5 & 2 \\ 6 & 12 & 18 & -4 & -20 & 0 \end{bmatrix}$$

$$E_2 \quad 6x_1 + 12x_2 + 18x_3 - 4x_4 - 20x_5 = 0$$

$$R_2 \quad 6 \quad 12 \quad 18 \quad -4 \quad -20 \quad 0$$

$$-3E_1 \quad 6x_1 + 12x_2 + 18x_3 - 3x_4 - 15x_5 = 6$$

$$-3R_1 \quad 6 \quad 12 \quad 18 \quad -3 \quad -15 \quad 6$$

$$\text{new } E_2 \quad 0 + 0 + 0 - x_4 - 5x_5 = -6$$

$$\text{new } R_2 \quad 0 \quad 0 \quad 0 \quad -1 \quad -5 \quad -6$$

$$-E_2 \quad 0 + 0 + 0 \quad x_4 + 5x_5 = 6$$

$$-R_2 \quad 0 \quad 0 \quad 0 \quad 1 \quad 5 \quad 6$$

$$\begin{cases} 2x_1 + 4x_2 + 6x_3 - x_4 - 5x_5 = 2 \\ 0 \quad 0 \quad 0 \quad x_4 + 5x_5 = 6 \end{cases}$$

$$\begin{bmatrix} 2 & 4 & 6 & -1 & -5 & 2 \\ 0 & 0 & 0 & 1 & 5 & 6 \end{bmatrix}$$

$$E_1 \quad 2x_1 + 4x_2 + 6x_3 - x_4 - 5x_5 = 2$$

$$R_1 \quad 2 \quad 4 \quad 6 \quad -1 \quad -5 \quad 2$$

$$+E_2 \quad 0 \quad 0 \quad 0 \quad x_4 + 5x_5 = 6$$

$$+R_2 \quad 0 \quad 0 \quad 0 \quad 1 \quad 5 \quad 6$$

$$\text{new } E_1 \quad 2x_1 + 4x_2 + 6x_3 + 0 + 0 = 8$$

$$\text{new } R_1 \quad 2 \quad 4 \quad 6 \quad 0 \quad 0 \quad 8$$

$$\frac{1}{2} E_1 \quad x_1 + 2x_2 + 3x_3 + 0 + 0 = 4$$

$$\frac{1}{2} R_1 \quad 1 \quad 2 \quad 3 \quad 0 \quad 0 \quad 4$$

$$\begin{cases} x_1 + 2x_2 + 3x_3 = 4 \\ x_4 + 5x_5 = 6 \end{cases} \text{ these are now separated. no relation. could solve each one individually}$$

$$\begin{bmatrix} 1 & 2 & 3 & 0 & 0 & 4 \\ 0 & 0 & 0 & 1 & 5 & 6 \end{bmatrix}$$

$$\text{Solution } x_1 = 4 - 2x_2 - 3x_3$$

x_2 is free

x_3 is free

$$x_4 = 6 - 5x_5$$

x_5 is free