

$$\begin{cases} 2x_1 + 5x_2 + 4x_3 = 8 \\ 4x_1 + 2x_2 + 8x_3 = 10 \\ 8x_1 - 4x_2 + 10x_3 = 16 \end{cases}$$

$$\begin{pmatrix} 2 & 5 & 4 \\ 4 & 2 & 8 \\ 8 & -4 & 10 \end{pmatrix} \xrightarrow{\text{II} - 2\text{I}} \begin{pmatrix} 2 & 5 & 4 \\ 0 & -8 & 0 \\ 8 & -4 & 10 \end{pmatrix} \xrightarrow{\text{III} - \text{I} \cdot 4} \begin{pmatrix} 2 & 5 & 4 \\ 0 & -8 & 0 \\ 0 & -24 & -6 \end{pmatrix} \xrightarrow{\text{III} - \text{II} \cdot 3} \begin{pmatrix} 2 & 5 & 4 \\ 0 & -8 & 0 \\ 0 & 0 & -6 \end{pmatrix}$$

$$L = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 4 & 3 & 1 \end{pmatrix} \quad U = \begin{pmatrix} 2 & 5 & 4 \\ 0 & -8 & 0 \\ 0 & 0 & -6 \end{pmatrix}$$

$$\begin{cases} Ly = b \\ Ux = y \end{cases}$$

$$(L|b) = \begin{pmatrix} 1 & 0 & 0 & 8 \\ 2 & 1 & 0 & 10 \\ 4 & 3 & 1 & 16 \end{pmatrix} \xrightarrow{\text{II} - \text{I} \cdot 2, \text{III} - \text{I} \cdot 4} \begin{pmatrix} 1 & 0 & 0 & 8 \\ 0 & 1 & 0 & -6 \\ 0 & 3 & 1 & -16 \end{pmatrix} \xrightarrow{\text{III} - \text{I} \cdot 3} \begin{pmatrix} 1 & 0 & 0 & 8 \\ 0 & 1 & 0 & -6 \\ 0 & 0 & 1 & -2 \end{pmatrix} \Rightarrow$$

$$\Rightarrow y = \begin{pmatrix} 8 \\ -6 \\ -2 \end{pmatrix}$$

$$(U|y) = \begin{pmatrix} 2 & 5 & 4 & 8 \\ 0 & -8 & 0 & -6 \\ 0 & 0 & -6 & -2 \end{pmatrix} \Rightarrow x = \begin{pmatrix} 1,46 \\ 0,75 \\ 0,33 \end{pmatrix}$$