

2.5.21 Résoudre les systèmes linéaires ci-dessous :

$$\text{j) } \begin{cases} x + y + z = 25 \\ x - y + z = 5 \\ x + 2z = 2y - 10 \end{cases} \Leftrightarrow \begin{cases} x + y + z = 25 \\ x - y + z = 5 \\ x - 2y + 2z = -10 \end{cases}$$

Matrice augmentée du système :

$$\begin{array}{l} L_1 \\ L_2 \\ L_3 \end{array} \left(\begin{array}{ccc|c} 1 & 1 & 1 & 25 \\ 1 & -1 & 1 & 5 \\ 1 & -2 & 2 & -10 \end{array} \right) \begin{array}{l} \\ L_2 \leftarrow L_2 - L_1 \\ L_3 \leftarrow L_3 - L_1 \end{array} \left(\begin{array}{ccc|c} \boxed{1} & 1 & 1 & 25 \\ 0 & -2 & 0 & -20 \\ 0 & -3 & 1 & -35 \end{array} \right) \begin{array}{l} \\ L_2 \leftarrow -\frac{1}{2} L_2 \end{array}$$

$$\left(\begin{array}{ccc|c} \boxed{1} & 1 & 1 & 25 \\ 0 & 1 & 0 & 10 \\ 0 & -3 & 1 & -35 \end{array} \right) \begin{array}{l} L_1 \leftarrow L_1 - L_2 \\ L_3 \leftarrow L_3 + 3L_2 \end{array} \left(\begin{array}{ccc|c} \boxed{1} & 0 & 1 & 15 \\ 0 & \boxed{1} & 0 & 10 \\ 0 & 0 & 1 & -5 \end{array} \right) \begin{array}{l} \\ L_1 \leftarrow L_1 - L_3 \end{array}$$

$$\left(\begin{array}{ccc|c} 1 & 0 & 0 & 20 \\ 0 & 1 & 0 & 10 \\ 0 & 0 & 1 & -5 \end{array} \right) \Leftrightarrow \begin{cases} x = 20 \\ y = 10 \\ z = -5 \end{cases}$$

$$S = \left\{ (20; 10; -5) \right\}$$

$$\text{m)} \begin{cases} 3x - y + z = 29 \\ x + 3y + 30z = 6 \\ x - y + z = 17 \end{cases}$$

$$\left(\begin{array}{ccc|c} 3 & -1 & 1 & 29 \\ 1 & 3 & 30 & 6 \\ 1 & -1 & 1 & 17 \end{array} \right) \quad \begin{array}{l} L_2 \leftarrow L_1 \\ L_3 \leftarrow L_2 \end{array}$$

$$\left(\begin{array}{ccc|c} 1 & 3 & 30 & 6 \\ 1 & -1 & 1 & 17 \\ 3 & -1 & 1 & 29 \end{array} \right) \quad \begin{array}{l} L_2 \leftarrow L_2 - L_1 \\ L_3 \leftarrow L_3 - 3L_1 \end{array} \quad \left(\begin{array}{ccc|c} \boxed{1} & 3 & 30 & 6 \\ 0 & -4 & -29 & 11 \\ 0 & -10 & -89 & 11 \end{array} \right) \quad L_2 \leftarrow L_2 \div (-4)$$

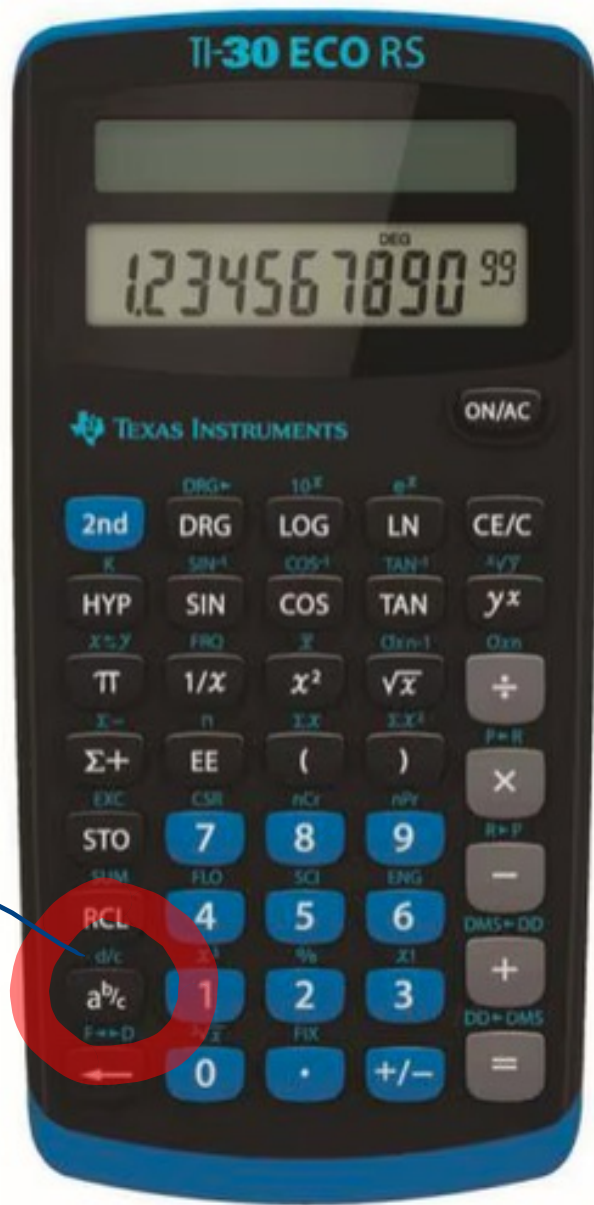
$$\left(\begin{array}{ccc|c} \boxed{1} & 3 & 30 & 6 \\ 0 & 1 & \frac{29}{4} & -\frac{11}{4} \\ 0 & -10 & -89 & 11 \end{array} \right) \quad \begin{array}{l} L_1 \leftarrow L_1 - 3L_2 \\ L_3 \leftarrow L_3 + 10L_2 \end{array} \quad \left(\begin{array}{ccc|c} \boxed{1} & 0 & \frac{33}{4} & \frac{57}{4} \\ 0 & \boxed{1} & \frac{29}{4} & -\frac{11}{4} \\ 0 & 0 & -\frac{33}{2} & -\frac{33}{2} \end{array} \right) \quad L_3 \leftarrow L_3 \cdot \frac{-33}{2}$$

$$\left(\begin{array}{ccc|c} \boxed{1} & 0 & \frac{33}{4} & \frac{57}{4} \\ 0 & \boxed{1} & \frac{29}{4} & -\frac{11}{4} \\ 0 & 0 & 1 & 1 \end{array} \right) \quad \begin{array}{l} L_1 \leftarrow L_1 - \frac{33}{4} \cdot L_3 \\ L_2 \leftarrow L_2 - \frac{29}{4} L_3 \end{array} \quad \left(\begin{array}{ccc|c} \boxed{1} & 0 & 0 & 6 \\ 0 & \boxed{1} & 0 & -10 \\ 0 & 0 & \boxed{1} & 1 \end{array} \right)$$

$$\Rightarrow \begin{cases} x = 6 \\ y = -10 \\ z = 1 \end{cases}$$

$$S = \{ (6; -10; 1) \}$$

d/c



$$a^{b/c}$$

$$\frac{27}{4}$$

$$\boxed{2} \boxed{7} \boxed{a^{b/c}} \boxed{4}$$

$$\boxed{2nd} \boxed{a^{b/c}}$$

$$27 \div 4$$

$$6 + \frac{3}{4}$$

$$w) \begin{cases} x + y + 2z = 4 \\ 3x - y + z = 3 \end{cases}$$

1 degré de liberté

$$\begin{cases} x + y = 4 - 2t \\ 3x - y = 3 - t \\ z = t \end{cases}$$

$$t \in \mathbb{R}$$

$$\begin{cases} x + y = 2 \\ 3x - y = 2 \\ z = 1 \end{cases}$$

$$(1; 1; 1)$$