ESERCIZI IN PIÙ

I SISTEMI DI TRE EQUAZIONI IN TRE INCOGNITE

Risolvi i seguenti sistemi nelle incognite x, y e z. Quando necessario, discuti i sistemi al variare del parametro in $\mathbb{R}$.

1 $\begin{cases} x + 2y + 3z = 1 \\ 3x + 4y + 6z = 3 \\ 10x + 5y - 3z = -4 \end{cases}$ $\left[\left(1; -2; \frac{4}{3}\right)\right]$

2 $\begin{cases} 3x + y + z = 3 \\ 6x - 2y + z = 1 \\ 3x + 3y + 3z = 7 \end{cases}$ $\left[\left(\frac{1}{3}; 1; 1\right)\right]$

3 $\begin{cases} x - y + z = 0 \\ 4x - 5y + 2z = -2 \\ 2x + 3y - 2z = 3 \end{cases}$ $\left[\left(\frac{1}{2}; 1; \frac{1}{2}\right)\right]$

4 $\begin{cases} 3x - y = 10 - 2z \\ 4z - y = 17 - 6x \\ x - 2z = -5 - 2y \end{cases}$ $\left[\left(2; -3; \frac{1}{2}\right)\right]$

5 $\begin{cases} -x + y - z = 1 \\ 10x - 5y + 10z = -3 \\ 2x + y + z = 2 \end{cases}$ $\left[\left(\frac{1}{5}; \frac{7}{5}; \frac{1}{5}\right)\right]$

6 $\begin{cases} \frac{2x-1}{3} - \frac{y}{2} = \frac{z+2}{3} \\ \frac{x}{2} - \frac{3}{4} = \frac{2y-1}{4} + \frac{z}{2} \\ \frac{2}{3}x - \frac{1}{3}y - \frac{1}{6}z = 1 \end{cases}$ $[(1; -2; 2)]$

7 $\begin{cases} \frac{2x-1}{3} - \frac{y-2z}{2} = \frac{z-3}{3} \\ \frac{4x-y}{2} - \frac{1-z}{4} = \frac{4y-7z}{4} \\ \frac{y-2}{3} = \frac{z+2x}{2} \end{cases}$ [impossibile]

8 $\begin{cases} \frac{x-y}{2} - \frac{2z-1}{3} = 1 \\ \frac{6x-3}{4} - \frac{y+4z}{2} = \frac{4y+5}{4} \\ \frac{2x-3y}{2} = \frac{3z-1}{3} \end{cases}$ [indeterminato]

9 $\begin{cases} 3x + 2y + 4z = 2 \\ \dfrac{x - 2y}{2} + \dfrac{x + z}{3} + 1 = 0 \\ \dfrac{x + y + z}{2} + \dfrac{1}{2} = y \end{cases}$ $[(0; 1; 0)]$

10 $\begin{cases} x - 3ay + z = -a \\ 3x - ay - 5z = 5a \\ 2x + 3ay + 2z = 7a \end{cases}$ $[a = 0, \text{indeterminato}; a \neq 0, (2a; 1; 0)]$

11 $\begin{cases} x + y + z = 0 \\ (a - 1)x + (a + 1)y + az = -2 \\ (a + 1)x + (a - 1)y + az = 2 \end{cases}$ $[\forall\, a \in \mathbb{R}, \text{indeterminato}]$

12 $\begin{cases} ax - y + 3z = 4a \\ ax + y - 2z = a \\ 2ax - 3y - z = 0 \end{cases}$ $[a = 0, \text{indeterminato}; a \neq 0, (2; a; a)]$

13 $\begin{cases} bx - ay + z = 0 \\ ax + by - z = a^2 + b^2 \\ bx + ay + z = 2ab \end{cases}$ $[a = 0, a = -b, \text{indeterminato}; a \neq 0 \wedge a \neq -b, (a; b; 0)]$

14 $\begin{cases} 2x - 3az = 5(a - y) \\ 2az - 2y = -5a - 3x \\ 5y + 2x = a(1 + 7z) \end{cases}$ $[a = 0, \text{indeterminato}; a \neq 0, (-a; 2a; 1)]$