

Metodo di Gauss

Risolvere con il metodo di Gauss i seguenti sistemi.

$$63 \quad \begin{cases} x+y=1 \\ y-z=-1 \\ -2x+z=-1 \end{cases} \quad x=1; y=0; z=1$$

$$64 \quad \begin{cases} 2x+y-z=-5 \\ 3x+2y=4 \\ 11x+6y-4z=-1 \end{cases} \quad \text{nessuna soluzione}$$

$$65 \quad \begin{cases} x-2y=-3 \\ 2x+y-5z=4 \\ 2x-5y+z=-8 \end{cases} \quad x=2t+1; y=t+2; z=t$$

$$69 \quad \begin{cases} 5x-y+z=13 \\ x-2y+3z=12 \\ 2x+y+z=9 \end{cases} \quad x=2; y=1; z=4$$

$$70 \quad \begin{cases} 4x-y+5z=-25 \\ 7x+5y-z=17 \\ 3x-y+z=-21 \end{cases} \quad x=-4; y=9; z=0$$

$$71 \quad \begin{cases} x-y+2z=-4 \\ 3x-5y+8z=-14 \\ x+3y-2z=0 \end{cases} \quad x=-3-\lambda; y=1+\lambda; z=\lambda$$

$$72 \quad \begin{cases} x+y+z=2 \\ 3x-2y-z=4 \\ -2x+y+2z=2 \end{cases} \quad x=1; y=-2; z=3$$

$$73 \quad \begin{cases} x+y+z+t=-4 \\ -x+y-z+t=4 \\ 8x+4y+2z+t=1 \\ 3x+2y+z=0 \end{cases} \quad x=1; y=1; z=-5; t=-1$$

$$74 \quad \begin{cases} x-2y+z-3t=0 \\ x-3y+z+2t=-2 \\ 5x-3y+2z+2t=5 \\ 3x-2y-4z=-13 \end{cases} \quad x=1; y=2; z=3; t=0$$

$$66 \quad \begin{cases} x-z=-7 \\ y+z=8 \\ x+2y+3z=19 \end{cases} \quad x=-2; y=3; z=5$$

$$67 \quad \begin{cases} x-y+3z=-4 \\ x+y+z=2 \\ x+2y-z=6 \end{cases} \quad x=1; y=2; z=-1$$

$$68 \quad \begin{cases} 3x+2y+z=6 \\ -2x+y-z=1 \\ 4x-y+2z=0 \end{cases} \quad x=1; y=2; z=-1$$

Discutere i seguenti sistemi.

$$40 \quad \begin{cases} hx + y = 1 \\ x - y = 2 \end{cases}$$

$h \neq -1$: determinato; $h = -1$: impossibile

$$41 \quad \begin{cases} x + y = 6 \\ x + hy = 2h \end{cases}$$

$h \neq 1$: determinato; $h = 1$: impossibile

$$42 \quad \begin{cases} 3x + 2y = h - 3 \\ hx + y = 2 \end{cases}$$

$h \neq \frac{3}{2}$: determinato; $h = \frac{3}{2}$: impossibile

$$43 \quad \begin{cases} hx + y = 2 \\ (2-h)x + hy = 2 \end{cases}$$

$h \neq -2, h \neq 1$: determinato
 $h = -2$: impossibile; $h = 1$: ∞ soluzioni

$$44 \quad \begin{cases} 3hx - (h-1)y = 3 \\ hx - y = 1 \end{cases}$$

$h \neq 0, h \neq 4$: determinato
 $h = 0$: impossibile; $h = 4$: ∞ soluzioni

$$45 \quad \begin{cases} x - 2y = -1 \\ x + (1+k)y - z = -1 \\ 2x - kz = -2 \end{cases}$$

$k \neq -4, k \neq 1$: determinato
 $k = -4, k = 1$: ∞ soluzioni

$$46 \quad \begin{cases} x + y + z = 1 + 3k \\ 2y - z = 0 \\ kx + z = 3k \end{cases}$$

$k \neq \frac{2}{3}$: determinato; $k = \frac{2}{3}$: ∞ soluzioni

$$47 \quad \begin{cases} kx + y + z = 0 \\ x + ky + z = 0 \\ x + y - 2z = 0 \end{cases}$$

$k \neq -2, k \neq 1$: $x = 0, y = 0, z = 0$
 $k = 1, k = -2$: ∞ soluzioni

$$48 \quad \begin{cases} x + y - z = 0 \\ 2x + y + kz = 0 \end{cases}$$

$\forall k \quad ((-k-1)\lambda; (k+2)\lambda; \lambda)$

$$49 \quad \begin{cases} kx + y + z = 0 \\ ky + z = 0 \\ y + z = 0 \end{cases}$$

autosoluzioni per $\begin{cases} k=0 & (\lambda; 0; 0) \\ k=1 & (0; -\lambda; \lambda) \end{cases}$

$$50 \quad \begin{cases} 2x + 3y + mz = 2 \\ x + 3y + z = -1 \\ y + z = 1 \end{cases}$$

$m = -1$: incompatibile
 $m \neq -1$: determinato $\left(\frac{10-4m}{m+1}, \frac{m-6}{m+1}, \frac{7}{m+1} \right)$

$$51 \quad \begin{cases} x + 3y + z = 5 \\ mx + 2z = 0 \\ my - z = 0 \end{cases}$$

$m = 0 \quad (5-3\lambda; \lambda; 0)$
 $m = -1$: incompatibile
 $m \neq 0, m \neq -1$: determinato $\left(\frac{-10}{m+1}, \frac{5}{m+1}, \frac{5m}{m+1} \right)$

$$30 \quad \begin{cases} 2x + 3y - z = 4 \\ 4x - y + z = 2 \\ x + 2y - z = 3 \end{cases}$$

$$31 \quad \begin{cases} x + 2y - z = -1 \\ x + y + z = 0 \\ x + 3y + z = -2 \end{cases}$$

$$32 \quad \begin{cases} x + y - 3z = 4 \\ 7x + 2y = 12 \\ x - 2y + z = 3 \end{cases}$$

$$33 \quad \begin{cases} x - y + 3z = 1 \\ 3x - y + 2z = 3 \\ -2y + 7z = 10 \end{cases}$$

$$34 \quad \begin{cases} x + y - z = -1 \\ x + y - z = -2 \\ x - y + z = -1 \end{cases}$$

$$35 \quad \begin{cases} x - y + 3z = 1 \\ 3x - y + 2z = 3 \\ -2y + 7z = 0 \end{cases}$$

$$36 \quad \begin{cases} 2x + 3y - 5z = 0 \\ x + 4y = 7 \\ 4x + 11y - 5z = 0 \end{cases}$$

$$37 \quad \begin{cases} x - y + 2z = -4 \\ 3x - 5y + 8z = -14 \\ x + 3y - 2z = 0 \end{cases}$$

$$38 \quad \begin{cases} 3x + 2y + z = 1 \\ 8x + 5y + 4z = 3 \\ x + y - z = 1 \end{cases}$$

$$39 \quad \begin{cases} 2x + 5y = 16 \\ 2x + 3y - z = 2 \\ x + z = 4 \end{cases}$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned} \quad (1; 0; -2)$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned} \quad (1; -1; 0)$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned} \quad (2; -1; -1)$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned} \quad \text{incompatibile}$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned} \quad \text{incompatibile}$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned} \quad \left(\frac{\lambda+7}{7}; \lambda; \frac{2}{7}\lambda \right)$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned} \quad \text{incompatibile}$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned} \quad (-3 - \lambda; 1 + \lambda; \lambda)$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned}$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned} \quad \text{incompatibile}$$

$$\begin{aligned} 0 &= 2x + 3y - z \\ 0 &= 4x - y + z \\ 0 &= 2x + 4y - 2z \end{aligned} \quad (-2; 4; 6)$$