SISTEMAS DE ECUACIONES LINEALES con 1 parámetro.   Discutir y resolver

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

● c=8 SCD (2,1)   ● c≠8 SI

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

● c=4 SCD (8/3,1/3)   ● c≠4 SI

3) $\begin{cases} x + 2y = 3 \\ 2x + y = c \end{cases}$

● SCD (2c-3/3,6-c/3)

4) $\begin{cases} x + 2y = 3 \\ ax + y + z = 0 \\ 2z + az = 0 \end{cases}$

● a=1±√33/4 SI   ● a≠1±√33/4 SCD
(-3a/2a²-a-4, 3a²-6/2a²-a-4, 6/2a²-a-4)

5) $\begin{cases} y + at = 1 \\ y + z + t = 2 \\ x + y = 3 \end{cases}$

● SCI   x=2+at; y=1-at; z=1+(a-1)t

6) $\begin{cases} x + y + kz = 2 \\ 3x + 4y + 2z = k \\ 2x + 3y - z = 1 \end{cases}$

● k=3 SCI (5-10α, -3+7α,α)
● k≠3 SCD (6+3k,-4-2k,-1)

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

● k=-5 SI   ● k=2 SCD (3α-3, 4-5α/2, α)
● k≠2; k≠-5 SCD (-3k-3/k+5; 4/k+5, 4/k+5)

8) $\begin{cases} kx + y - z = 0 \\ x - 3y + z = 0 \\ 3x + 10y + 4z = 0 \end{cases}$

● k=-10/11 SCI (22α, α, -19α)   ● k≠-10/11 SCD (0,0,0)

9) $\begin{cases} 2x - ky + 4z = 0 \\ x + y + 7z = 0 \\ kx - y + 13z = 0 \end{cases}$

● k≠3,k≠-12/7 SCD (0,0,0)
● k=3 SCI (-5α, -2α, α) ● k=-12/7 SCI (28α,-35α,α)

10) $\begin{cases} 2x + y + az = 4 \\ x + z = 2 \\ x + y + z = 2 \end{cases}$

● a=2 SCI (2-z,0,z)   ● a≠2 SCD (2,0,0)

11) $\begin{cases} x + y + z = a \\ x + (1+a)y + z = 2a \\ x + y + (1+a)z = 0 \end{cases}$

● a=0 SCD (0,1,-1)   ● a≠0 SCI x=-y-z

12) $\begin{cases} (a+1)x + y + z = a+1 \\ x + (a+1)y + z = a+3 \\ x + y + (a+1)z = -2a-4 \end{cases}$

● a=0 SI   ● a=-3 SCI (3z+4/3, 2+3z/3, z)
● a≠0, a≠-3 SCD (a+1/a, a+3/a, -2a-4/a)

13) $\begin{cases} x + ay + z = a + z \\ x + y + az = -2(a+1) \\ ax + y + z = a \end{cases}$

● a=1 SI   ● a=-2 SCI (3z+4/3, 2+3z/3, z)
● a≠1, a≠-2 SCD (a/a-1, a+2/a-1, 2a+2/1-a)

14) $\begin{cases} (2+a)x + y + z = 0 \\ x + ay + z = 0 \\ 2x + y - z = 0 \end{cases}$

● a=(5+√33)/2 SCI (-(15+√33/2)z, (16+√33)z, z)
● a=(5-√33)/2 SCI (-(15-√33/2)z, (16-√33)z, z)
● a≠(5√±33)/2 SCD (0,0,0)

15) $\begin{cases} x + 2y + kz = 1 \\ 2x + ky + 8z = 3 \end{cases}$

● k=4 SI   ● k≠4 SCI ((k-6)/(k-4)-(k+4)z; 1/(k-4)+2z, z)

16) $\begin{cases} 2y - z = k \\ 3x - 2z = 11 \\ y + z = 6 \\ 2x + y - 4z = k \end{cases}$

● k=6 SCD (5,4,2)   ● k≠6 SI

17) $\begin{cases} 2x + y - 4z = k + 1 \\ -x + 5y - z = k - 12 \\ x + 6y - 5z = k + 2 \\ 2x - 4y + 5z = k \end{cases}$

● k=13 SCD (8,2,1)   ● k≠13 SI

18) $\begin{cases} 2x + y + z + t = 0 \\ kx - 2y + 3z + 4t = 0 \\ 3x - y - z + 4t = 0 \\ -2x + 4y - z - 9t = 0 \end{cases}$

● k=-1 SCI (-t, 8/5t, -3/5t, t)   ● k≠-1 SI

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SISTEMAS DE ECUACIONES   LINEALES con 2parámetros

19) $\begin{cases} x + 2y = 3 \\ 3x + ay = c \end{cases}$

● a=6; c=9 SCD x=3-2y ● a=6; c≠9 SI

● a≠6 SCD ((3a-2c)/(a-6), (c-9)/(a-6))

20) $\begin{cases} z + t = 2 \\ y + z = h \\ x + az = c \end{cases}$

● SCI x=c-2a+aα; y=-2+h+α; z=2-α; t=α

21) $\begin{cases} 2x + y = a \\ 4x + 2y = 1 + b \\ 5x + 3y = 2 \end{cases}$

● 1+b-2a=0 SCD (3a-2, 4-5a) ● 1+b-2a≠0 SI

22) $\begin{cases} -x + 2y = a \\ 2x - 4y = b \\ -3x + 6y = 6 \end{cases}$

● a=2 y b=-4 SCI x=-2+2y

● a=2 y b≠-4 SI ● a≠2 SI

23) $\begin{cases} 3x - y + 2z = 1 \\ x + 4y + z = b \\ 2x - 5y + az = -2 \end{cases}$

● a=1 y b=3 SCI (b-8+9α, α, 8-13α) ● a=1 y b≠3 SI

● a≠1 SCD ((-ab+10b-4a-23)/(13-13a), (-3ab+4b+a-4)/(13-13a), b-3/a-1)

24) $\begin{cases} ax + y - z = b^2 \\ x + ay + z = b \\ x + y + 2az = 2 \end{cases}$

● a = 0 $\begin{cases} b = 1 \; SCI \; (2-\alpha, \alpha, -1+\alpha) \\ b = -2 \; SCI \; (2-\alpha, \alpha, -4+\alpha) \\ b \neq 0; b \neq -1 \; SI \end{cases}$

● a = -1 $\begin{cases} b = 0 \; SCI \left(1+\frac{\alpha}{2}, 1+\frac{3\alpha}{2}, \alpha\right) \\ b = -1 \; SCI \left(\frac{1}{2}+\frac{\alpha}{2}, \frac{3+3\alpha}{2}, \alpha\right) \\ b \neq -2; b \neq -1 \; SI \end{cases}$

● $a \neq 0; a \neq -1 \; SCD \quad x = \dfrac{2a^2b^2 - 2ab + 2a - b^2 - b + 2}{2a(a^2-1)}$

$$y = \frac{2a^2b - 2ab^2 + b^2 + b - 2a - 2}{2a(a^2-1)}$$

$$z = \frac{-b^2 - b + 2a + 2}{2a(a^2-1)}$$

25) $\begin{cases} (1+a)x + y + z = 1 \\ x + (1+a)y + z = b \\ x + y + (1+a)z = b^2 \end{cases}$

● a = 0 y b = 1 SCI $x = 1 - y - z$
● a = 0 y b ≠ 1 SI ● a = -3 SI
● a ≠ 0; a ≠ -3 SCD

$$\left(\frac{-b^2 - b + 2 + a}{a^2 + 3a}, \frac{ab + 2b - b^2 - 1}{a^2 + 3a}, \frac{2b^2 + ab^2 - b - 1}{a^2 + 3a} \right)$$

26) $\begin{cases} x + ay + a^2 z = 1 \\ x + ay + abz = a \\ bx + ay + a^2 bz = a^2 b^2 \end{cases}$

● a = 0 SI ● a = b ≠ 1 SI ● a = b = 1 SCD $x = 1 - y - z$
● a ≠ 0, → b = 1 y a = -1 SCI $(\alpha, \alpha, 1)$
     → b = 1 y a ≠ -1 SI

     → b = -1 SCD $\left(\dfrac{-b^3 a^2 + a^3 b^2 + a^2 b - ab - a^2 + b}{(1-b)(b-a)}, \dfrac{b(a^2 b - 1)}{a(1-b)}, \dfrac{a-1}{a(b-a)} \right)$

27) $\begin{cases} 3x - 7y = a \\ x + y = b \\ 5x - 13y = 5a - 2b \\ x + 2y = a + b - 1 \end{cases}$

● b≠2a SI ● b=2a SCD (3/2a, a/2)

28) $\begin{cases} x - y - 2z = 2 \\ 2x + y + 3z = 1 \\ 3x + z = 3 \\ x + 2y + 5z = a \\ 4x - y - z = b \end{cases}$

● a=-1 y b=5 SCD (3-z/3, -3-7z/3, z) ● a≠-1 y b≠5 SI

29) $\begin{cases} x + y + z + t = 0 \\ x - y + z - t = 12 \\ x + y - z + t = -8 \\ x - y - z + at = c \end{cases}$

● a=-1 y c=4 SCI (2, -6-t, 4,t) ● a=-1 y c≠4 SI

● a≠-1 SCD (2, (-6a-c-2)/(a+1), 4, (c-4)/(a+1))

30) $\begin{cases} x + y + z + t = 0 \\ x - y + z - t = 12 \\ 3x + y + 3z + ht = k \\ x - y - z + t = c \end{cases}$

● h=1 y k=12 SCI ((c/2)-t, -6-t, 6-(c/2)+t, t)

● h=1 y k≠12 SI ● h≠1 SCD

$$\left(\frac{c}{2} - \frac{k-12}{h-1}, -6 - \frac{k-12}{h-1}, \frac{k-12}{h-1} + 6 - \frac{c}{2}, \frac{k-12}{h-1} \right)$$

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