

Problema 1 Discutir y resolver por el método de Gauss los siguientes sistemas:

$$\begin{cases} x- & y+ & z = 1 \\ 2x+ & & z = 1 \\ x+ & 3y- & z = 5 \end{cases} ; \quad \begin{cases} x- & y- & z = 2 \\ 2x+ & y- & z = 1 \\ x- & y+ & 2z = 3 \end{cases}$$

Solución:

$$\begin{cases} x- & y+ & z = 1 \\ 2x+ & & z = 1 \\ x+ & 3y- & z = 5 \end{cases} \text{ Sistema Incompatible } \implies \text{No Tiene Solución}$$

$$\begin{cases} x- & y- & z = 2 \\ 2x+ & y- & z = 1 \\ x- & y+ & 2z = 3 \end{cases} \text{ Sistema Compatible Determinado } \implies \begin{cases} x = 11/9 \\ y = -10/9 \\ z = 1/3 \end{cases}$$

Problema 2 Resolver las ecuaciones:

a) $\log(20x^2 + 10) - 1 = 2\log(x + 3)$

b) $3^{2x+1} + 3^{x-1} - 2 = 0$

c) $1 - \frac{1}{x^2 - 6x - 7} = \frac{x-1}{x+1} - \frac{1}{x-7}$

d) $\frac{x^2 - 6x - 7}{x^2 - x - 6} \leq 0$

e) $\sqrt{x+3} + \sqrt{x+2} = 2$

f) $\sqrt{2x-1} - \sqrt{x-1} = 1$

Solución:

a) $\log(20x^2 + 10) - 1 = 2\log(x + 3) \implies \log \frac{20x^2 + 10}{10} = \log(x + 3)^2 \implies x^2 - 6x - 8 = 0 \implies x = 7, 1231, x = -1, 1231.$

b) $3^{2x+1} + 3^{x-1} - 2 = 0 \implies 3 \cdot t^2 + \frac{t}{3} - 2 = 0 \implies 9t^2 + t - 6 = 0 \implies t = 0,7628, t = -0,873 \text{ (No Vale).}$

$$3^x = 0,728 \implies x = \frac{\log 0,7628}{\log 3} = -0,2465$$

c) $1 - \frac{1}{x^2 - 6x - 7} = \frac{x-1}{x+1} - \frac{1}{x-7} \implies x = \frac{14}{3} = 4,67.$

$$\text{d) } \frac{x^2 - 6x - 7}{x^2 - x - 6} = \frac{(x+1)(x-7)}{(x+2)(x-3)} \leq 0 \implies (-2, -1] \cup (3, 7]$$

$$\text{e) } \sqrt{x+3} + \sqrt{x+2} = 2 \implies x = -\frac{23}{16} = x = -1,4375$$

$$\text{f) } \sqrt{2x-1} - \sqrt{x-1} = 1 \implies x = 5, \quad x = 1$$