

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

$$\begin{cases} 2x - y + 2z = 1 \\ x - z = 2 \\ x - 2y + 7z = -4 \end{cases} ; \begin{cases} x + y - z = 0 \\ 2x + y = 2 \\ x + 2y + z = 1 \end{cases}$$

**Solución:**

$$\begin{cases} 2x - y + 2z = 1 \\ x - z = 2 \\ x - 2y + 7z = -4 \end{cases} \text{ Sistema Compatible Indeterminado} \implies \begin{cases} x = 2 + \lambda \\ y = 3 + 4\lambda \\ z = \lambda \end{cases}$$

$$\begin{cases} x + y - z = 0 \\ 2x + y = 2 \\ x + 2y + z = 1 \end{cases} \text{ Sistema Compatible Determinado} \implies \begin{cases} x = 5/4 \\ y = -1/2 \\ z = 3/4 \end{cases}$$

**Problema 2** Resolver las ecuaciones:

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

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

c)  $\frac{x-1}{x^2-2x-15} - \frac{1}{x+3} = 1 - \frac{1}{x-5}$

d)  $\frac{x^2+2x-15}{x^2-8x+7} \geq 0$

e)  $\sqrt{x+4} - \sqrt{x-1} = 1$

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

**Solución:**

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

$9x^2 + 4x - 14 = 0 \implies x = 1,0446, x = -1,1231$  y no vale ninguna de ellas.

b)  $2^{2x-1} + 2^{x+2} - 1 = 0 \implies \frac{t^2}{2} + 4t - 1 = 0 \implies t = 0,2426 \quad t = -8,2426$  (No Vale).

$2^x = 0,2426 \implies x = \frac{\log 0,4494}{\log 2} = -2,04310$

$$\text{c) } \frac{x-1}{x^2-2x-15} - \frac{1}{x+3} = 1 - \frac{1}{x-5} \implies x^2 - 3x - 22 = 0 \implies$$
$$x = 6.424428900; x = -3.424428900$$

$$\text{d) } \frac{x^2 + 2x - 15}{x^2 - 8x + 7} = \frac{(x+5)(x-3)}{(x-1)(x-7)} \geq 0 \implies$$
$$(-\infty, -5] \cup (1, 3] \cup (7, \infty)$$

$$\sqrt{x+4} - \sqrt{x-1} = 1 \implies x = 5$$

$$\sqrt{2x-1} - \sqrt{x-1} = 2 \implies x = 22,58300524$$