1.

	Decimal	Binário	Octal	Hexadecimal
Decimal	271,6275	100001111, 0100000101	417,50121727024	10F, A0A3D70A3D7
Binário	426,65625	110101010,10101	652,52	1AA, A8
Octal	235,21875	11101011,00111	353,16	EB,38
Hexadecimal	61,70703125	111101,10110101	75,552	3D,B5

2.

$$\begin{cases} x_1 - x_2 + 3x_3 = 17 \\ 2x_1 - 2x_2 + x_3 = 9 \\ -x_1 + x_2 - x_3 = -7 \end{cases}$$

$$\begin{bmatrix} \underset{\text{Pivô}}{1} & -1 & 3 & 17 \\ 2 & -2 & 1 & 9 \\ -1 & 1 & -1 & -7 \end{bmatrix} \begin{matrix} \\ m_{21} = -2 \\ m_{31} = 1 \end{matrix}$$

P/ L_2

$x_1 = -2 + 2 = 0$

$x_2 = -2 \cdot -1 - 2 = 0$

$x_3 = -6 + 1 = -5$

$b = -34 + 9 = -25$

P/ L_3

$x_1 = 1 + (-1) = 0$

$x_2 = -1 + 1 = 0$

$x_3 = 3 - 1 = 2$

$b = 17 - 7 = 10$

Pivô

Pivô

$$\begin{bmatrix} 1 & -1 & 3 & 17 \\ 0 & 0 & -5 & -25 \\ 0 & 0 & 2 & 10 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 3 & -1 & 17 \\ 0 & -5 & 0 & -25 \\ 0 & 2 & 0 & 10 \end{bmatrix} \begin{matrix} m_{1,2} = 3/5 \\ \\ m_{3,2} = 2/5 \end{matrix}$$

p/ L_1

$x_1 = 0 + 1 = 1$

$x_2 = \frac{3}{5} \cdot -5 + 3 = 0$

$x_3 = 0 - 1 = -1$

$b = \frac{3}{5} \cdot -25 + 17 = 2$

p/ L_3

$x_1 = 0$

$x_2 = \frac{2}{5} \cdot -5 + 2 = 0$

$x_3 = 0 \quad 5$

$b = \frac{2}{5} \cdot -25 + 10 = 0$

$$\begin{bmatrix} 1 & 0 & -1 & 2 \\ 0 & -5 & 0 & -25 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 & 2 \\ 0 & -5 & 0 & -25 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

$x_1 = 2$

$x_3 = 5$

$x_2 = 0$ → variável livre

Resposta: Sistema indeterminado

3.

$$\begin{cases} 2x_1 - x_2 + 4x_3 = 0 \\ x_1 - x_2 + 2x_3 = -1 \\ -x_1 + 4x_2 + 2x_3 = 3 \end{cases}$$

Pivô

$$\left[\begin{array}{ccc|c} 2 & -1 & 4 & 0 \\ 1 & -1 & 2 & -1 \\ -1 & 4 & 2 & 3 \end{array}\right] \begin{array}{l} m_2 = -1/2 \\ m_3 = -1/2 \end{array}$$

P/ L_2

$$x_1 = -\frac{1}{2} \cdot 2 + 1 = 0 \quad ; \quad x_2 = -\frac{1}{2} \cdot -1 - 1$$

$$x_2 = \frac{1}{2} - 1 = -\frac{1}{2}$$

$$x_3 = -\frac{1}{2} \cdot 4 + 2$$

$$x_3 = 0$$

$$b = -\frac{1}{2} \cdot 0 - 1 \Rightarrow b = -1$$

P/ L_3

$$x_1 = -\frac{1}{2} \cdot 2 - 1 \qquad x_2 = -\frac{1}{2} \cdot -1 + 4$$

$$x_1 = -2 \qquad x_2 = \frac{1}{2} + 4 = \frac{1+8}{2}$$

$$x_3 = -\frac{1}{2} \cdot 4 + 2 \qquad x_2 = \frac{9}{2}$$

$$x_3 = 0 \qquad b = -\frac{1}{2} \cdot 0 + 3 = 3$$

$$M_1 = \begin{bmatrix} 0 & -\frac{1}{2} & 0 & -1 \\ -2 & \frac{9}{2} & 0 & 3 \end{bmatrix} \times 2$$

$$M_1 = \begin{bmatrix} 0 & -1 & 0 & -2 \\ -4 & 9 & 0 & 6 \end{bmatrix} \quad m_1 = -\left(\frac{-1}{9}\right)$$

$\hookrightarrow$ Pivô

$$m_1 = \frac{1}{9}$$

P/ L_1

$$x_1 = \frac{1}{9} \cdot -4 + 0$$

$$x_1 = -\frac{4}{9}$$

$$x_3 = \frac{1}{9} \cdot 0 + 0$$

$$x_3 = 0$$

$$x_2 = \frac{1}{9} \cdot 9 - 1$$

$$x_2 = 0$$

$$b = \frac{1}{9_3} \cdot 6^{2} - 2$$

$$b = \frac{2}{3} - 2 = \frac{2-6}{3}$$

$$b = -\frac{4}{3}$$

$$M_2 = \left[-\frac{4}{9} \; 0 \; 0 \; -\frac{4}{3}\right]$$

$$M_{2 \times 9} = \left[\frac{-4 \cdot 9^{3}}{9} \; 0 \; 0 \; \frac{-4 \cdot 9^{3}}{3}\right]$$

$$M_2 = [-4 \; 0 \; 0 \; -12]$$

$$M_f = \begin{bmatrix} 2 & -1 & 4 & 0 \\ -4 & 9 & 0 & 6 \\ -4 & 0 & 0 & -12 \end{bmatrix} \rightarrow \begin{bmatrix} 4 & -1 & 2 & 0 \\ 0 & 9 & -4 & 6 \\ 0 & 0 & -4 & -12 \end{bmatrix}$$

$$2x_1 - x_2 + 4x_3 = 0$$

$$-4x_1 + 9x_2 = 6$$

$$-4x_3 = -12$$

$$\begin{cases} x_1 = 3 \\ x_2 = 2 \\ x_3 = -3 \end{cases}$$

Resposta

4.

$$\begin{cases} 6x_1 - x_2 - 2x_3 = 11 \\ x_1 - 4x_2 + x_3 = -2 \\ x_1 + 2x_2 + 4x_3 = 4 \end{cases}$$

$$x_1 = \frac{11 + x_2 + 2x_3}{6}, \quad x_2 = \frac{2 + x_1 + x_3}{4},$$

$$x_3 = \frac{4 - x_1 - 2x_2}{4}$$

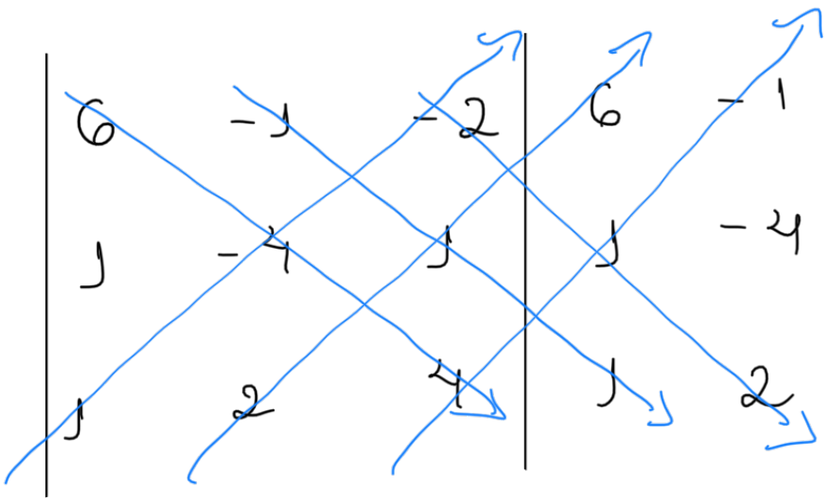
Por Jacobi

	0	1	2	3	4	
x_1	0	1,8333	2,25	2,1319	1,967	
x_2	0	0,5	1,2083	1,1354	0,9913	
x_3	0	1	0,2917	-0,1667	-0,1007	

Por Gauss-Seidel

	0	1	2	3	4	
x_1	0	1,8333	2,0139	1,9988	2,0001	
x_2	0	0,9583	1,0191	0,9965	1,0005	

x_3	0	0,0625	−0,013	0,0021	−0,0003	



$-96 - 1 - 24$

$-8 - 12 + 24$

$\Delta = -117 \Rightarrow |\Delta| = 117$

$$a_1 = \sqrt{6^2 + (-1)^2 + (-2)^2} = \sqrt{41}$$

$$a_2 = \sqrt{1^2 + (-4)^2 + (1)^2} = \sqrt{18}$$

$$a_3 = \sqrt{1^2 + 2^2 + 4^2} = \sqrt{21}$$

$$\det(\text{norma } A) = \frac{117}{\sqrt{41}\cdot\sqrt{18}\sqrt{21}} = \frac{117}{\sqrt{15498}}$$

$$= 0,93982725$$

Resposta: O sistema é bem condicionado

5.

$$\begin{cases} x_1 + (2-i)x_2 = 8 - 2i \\ -x_1 + 3x_2 = 7 - i \end{cases}$$

$$A = \begin{bmatrix} 1+0i & 2-i \\ -1+0i & 3-0i \end{bmatrix} = \underbrace{\begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}}_{M} + i\underbrace{\begin{bmatrix} 0 & -1 \\ 0 & 0 \end{bmatrix}}_{N}$$

$$b = \begin{bmatrix} 8-2i \\ 7-i \end{bmatrix} = \underbrace{\begin{bmatrix} 8 \\ 7 \end{bmatrix}}_{c} + i\underbrace{\begin{bmatrix} -2 \\ -1 \end{bmatrix}}_{d}$$

$$\left[\begin{array}{cccc|c} 1 & 2 & 0 & 1 & 8 \\ -1 & 3 & 0 & 0 & 7 \\ 0 & -1 & 1 & 2 & -2 \\ 0 & 0 & -1 & 3 & -1 \end{array}\right] \begin{array}{l} m_2 = 1 \\ m_3 = 0 \\ m_4 = 0 \end{array}$$

P/ L_2

$x_1 = 1 - 1 = 0$

$x_2 = 5$

$x_3 = 0$

$x_4 = 1$

$b = 15$

P/ L_3

$x_1 = 0$

$x_2 = -1$

$x_3 = 1$

$x_4 = 2$

$b = -2$

P/ L_4

$x_1 = 0$

$x_2 = 0$

$x_3 = -1$

$x_4 = 3$

$b = -1$

$$\begin{bmatrix} 1 & 2 & 0 & 1 & 8 \\ 0 & 5 & 0 & 1 & 15 \\ 0 & -1 & 1 & 2 & -2 \\ 0 & 0 & -1 & 3 & -1 \end{bmatrix} \quad m_3 = 1/5, \; m_4 = 0$$

P/L$_3$

$x_1 = 0$

$x_2 = 0$

$x_3 = 1$

$x_4 = \frac{1}{5} + 2$

$x_4 = \frac{1 + 10}{5} = \frac{11}{5}$

$b = 1$

P/L$_4$

$x_1 = 0$

$x_2 = 0$

$x_3 = -1$

$x_4 = 3$

$b = -1$

$$\begin{bmatrix} 1 & 2 & 0 & 1 & 8 \\ 0 & 5 & 0 & 1 & 15 \\ 0 & 0 & 1 & 11/5 & 1 \\ 0 & 0 & -1 & 3 & -1 \end{bmatrix} \quad m_4 = 1$$

P/L$_4$

$x_1 = 0$

$x_2 = 0$

$x_3 = 0$

$S_1 \quad S_2 \quad T_1 \quad T_2$

$$\begin{bmatrix} 1 & 2 & 0 & 1 & 8 \\ 0 & 5 & 0 & 1 & 15 \end{bmatrix} \quad S_1 = 2, \; S_2 = 3$$

$$x_4 = \frac{11}{5} + 3$$

$$= \frac{11 + 15}{5}$$

$$= \frac{26}{5}$$

$$\left[\begin{array}{ccccc|c} 0 & 0 & 1 & \frac{11}{5} & 1 & r_1 = 1 \\ 0 & 0 & 0 & \frac{26}{5} & 0 & r_2 = 0 \end{array}\right]$$

$b = 0$

$2 + i + (2 - i) \cdot 3 = 8 - 2i$

$2 + i + 6 - 3i = 8 - 2i$ OK!

$-(2+i) + 3 \cdot 3 = 7 - i$

$9 - 2 - i = 7 - i$ OK!

Resposta: $x_1 = 2 + i$

$x_2 = 3$