(3)

12/12/25

$$\begin{cases} 2x_1 + 1x_2 + 4x_3 - 2x_4 = 19 \\ -3x_1 + 4x_2 + 2x_3 - 1x_4 = 1 \\ 3x_1 + 5x_2 - 2x_3 + 1x_4 = 8 \\ -2x_1 + 3x_2 + 2x_3 + 4x_4 = 13 \end{cases} \rightarrow \text{transformar em MATRIZ}$$

$$\left|\begin{array}{cccc|c} 2 & 1 & 4 & -2 & 19 \\ -3 & 4 & 2 & -1 & 1 \\ 3 & 5 & -2 & 1 & 8 \\ -2 & 3 & 2 & 4 & 13 \end{array}\right| \begin{array}{l} \rightarrow E_2 \leftarrow E_2 - \left(\frac{-3}{2}\right) E_1 \\ \\ \rightarrow E_3 \leftarrow E_3 - \left(\frac{3}{2}\right) E_1 \\ \rightarrow E_4 \leftarrow E_4 - \left(\frac{-2}{2}\right) E_1 \end{array}$$

$$\left|\begin{array}{cccc|c} 2 & 1 & 4 & -2 & 19 \\ 0 & 5{,}5 & 8 & -4 & 29{,}5 \\ 0 & 3{,}5 & -8 & 4 & -20{,}5 \\ 0 & 4 & 6 & 2 & 32 \end{array}\right| \begin{array}{l} \\ \rightarrow E''_3 \leftarrow E'_3 - \left(\frac{3{,}5}{5{,}5}\right) E'_2 = E'_3 - \frac{7}{11} \cdot E'_2 \\ \rightarrow E'''_4 \leftarrow E''_4 - \left(\frac{2}{5{,}5}\right) \cdot E'_2 \end{array}$$

$$\left|\begin{array}{cccc|c} 2 & 1 & 4 & -2 & 19 \\ 0 & -5{,}5 & 8 & -4 & 29{,}5 \\ 0 & 0 & -144 & 72 & -438 \\ 0 & 0 & 1 & 27 & 60 \end{array}\right| \rightarrow \text{Aqui, apenas troquei } \underline{L3 \text{ com } L4}$$

→ Trocar L3 com L4 para usar L4 como linha pivô.

$$\left|\begin{array}{cccc|c} 2 & 1 & 4 & -2 & 19 \\ 0 & -5{,}5 & 8 & -4 & 29{,}5 \\ 0 & 0 & 1 & 27 & 60 \\ 0 & 0 & -144 & 72 & -438 \end{array}\right| \rightarrow E_4 \leftarrow E_4 - (-144) E_3 = E_4 + 144 E_3$$

$$\left|\begin{array}{cccc|c} 2 & 1 & 4 & -2 & 19 \\ 0 & 5{,}5 & 8 & -4 & 29{,}5 \\ 0 & 0 & 1 & 27 & 60 \\ 0 & 0 & 0 & 3960 & 8162 \end{array}\right| \rightarrow 3960 x_4 = 8162 \rightarrow x_4 = \frac{8162}{3960}$$

$$\boxed{x_4 \cong 2{,}06110}$$

$$1x_3 + 27x_4 = 60 \Rightarrow 60 - 27 \cdot (2{,}06110) \cong \underline{4{,}35030}$$

$$5x_2 + 8x_3 - 4x_4 = 29{,}5 \Rightarrow x_2 = \frac{29{,}5 - 8(4{,}3503) + 4(2{,}0611)}{5{,}5} \cong \underline{1{,}2599}$$

$$x_1 = \frac{19 - 1{,}2599 - 4(4{,}3503) + 2(2{,}0611)}{2} \cong \underline{2{,}00000}$$

$X_1 \cong 2,00000$ $X_3 \cong 4,350330$

$X_2 \cong 1,259999$ $X_4 \cong 2,061110$