Projeto Mathematical Ramblings

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Em $\mathbb{U} = \mathcal{M}_{5x1}$, resolver o sistema

$$\begin{bmatrix} 1 & 2 & 1 & 3 & 5 \\ 0 & 3 & -2 & 0 & 3 \\ 3 & -1 & 4 & 1 & 3 \\ 2 & 1 & -4 & 1 & 2 \\ 2 & 0 & 5 & -2 & 1 \end{bmatrix} \cdot X = \begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \\ 8 \end{bmatrix}.$$

Resolução:

Seja A a matriz completa do sistema, vamos aplicar escalonamento.

$$A = \begin{bmatrix} 1 & 2 & 1 & 3 & 5 & 1 \\ 0 & 3 & -2 & 0 & 3 & 2 \\ 3 & -1 & 4 & 1 & 3 & 3 \\ 2 & 1 & -4 & 1 & 2 & 4 \\ 2 & 0 & 5 & -2 & 1 & 8 \end{bmatrix} \sim \begin{bmatrix} 1 & 2 & 1 & 3 & 5 & 1 \\ 0 & 1 & -2/3 & 0 & 1 & 2/3 \\ 0 & -7 & 1 & -8 & -12 & 0 \\ 0 & -3 & -6 & -5 & -8 & 2 \\ 0 & -4 & 3 & -8 & -9 & 6 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 0 & 7/3 & 3 & 3 & -1/3 \\ 0 & 1 & -2/3 & 0 & 1 & 2/3 \\ 0 & 0 & -11/3 & -8 & -5 & 14/3 \\ 0 & 0 & -8 & -5 & -5 & 4 \\ 0 & 0 & 1/3 & -8 & -5 & 26/3 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 0 & -23/11 & -2/11 & 29/11 \\ 0 & 1 & 0 & 16/11 & 21/11 & -2/11 \\ 0 & 0 & 1 & 24/11 & 15/11 & -14/11 \\ 0 & 0 & 0 & 137/11 & 65/11 & -68/11 \\ 0 & 0 & 0 & -96/11 & -60/11 & 100/11 \end{bmatrix} \sim$$

$$\sim \begin{bmatrix} 1 & 0 & 0 & 0 & 1221/1507 & 2409/1507 \\ 0 & 1 & 0 & 0 & 1837/1507 & 814/1507 \\ 0 & 0 & 1 & 0 & 495/1507 & -286/1507 \\ 0 & 0 & 0 & 1 & 65/137 & -68/137 \\ 0 & 0 & 0 & 0 & -1980/1507 & 7172/1507 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 69/15 \\ 0 & 1 & 0 & 0 & 0 & 223/45 \\ 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 11/9 \\ 0 & 0 & 0 & 0 & 1 & -163/45 \end{bmatrix}$$

Donde concluímos que $\boxed{S = \{ \begin{bmatrix} 68/15 \\ 223/45 \\ 1 \\ 11/9 \\ -163/45 \end{bmatrix} \}}$

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Última versão do documento (podem haver correções e/ou aprimoramentos):
"bit.ly/mathematicalramblings_public".

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