

Solving a linear system

$$\begin{cases} -2x_1 + 2x_2 + 10x_3 = 2 \\ -3x_1 + x_2 + 9x_3 = 5 \\ 4x_1 - 2x_2 - 14x_3 = -6 \end{cases}$$

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$$\left(\begin{array}{ccc|c} -2 & 2 & 10 & 2 \\ -3 & 1 & 9 & 5 \\ 4 & -2 & -14 & -6 \end{array} \right) \xrightarrow{R_1 \leftarrow -\frac{1}{2}R_1} \left(\begin{array}{ccc|c} 1 & -1 & -5 & -1 \\ -3 & 1 & 9 & 5 \\ 4 & -2 & -14 & -6 \end{array} \right)$$

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$$\begin{cases} x_1 - x_2 - 5x_3 = -1 \\ -2x_2 - 6x_3 = 2 \end{cases} \xrightarrow{R_3 \leftarrow -\frac{1}{2}R_3} \begin{cases} x_1 - x_2 - 5x_3 = -1 \\ x_2 + 3x_3 = -1 \end{cases}$$

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$$\Rightarrow \begin{cases} x_1 = 2x_3 - 2 \\ x_2 = -3x_3 - 1 \end{cases}$$

$$\Rightarrow \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$$

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(Parametric form)