

1. Find the echelon of system equation

$$\begin{aligned}x_1 - 2x_4 &= -3 \\2x_2 + 2x_3 &= 0 \\x_3 + 3x_4 &= 0 \\x_3 + 4x_4 &= 1 \\-2x_1 + 3x_2 + 2x_3 + x_4 &= 5\end{aligned}$$

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & -2 & -3 \\ 0 & 2 & 3 & 0 & 0 \\ 0 & 0 & 1 & 3 & 0 \\ -2 & 3 & 2 & 1 & 5 \end{array} \right]$$

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & -2 & -3 \\ 0 & 2 & 3 & 0 & 0 \\ 0 & 0 & 1 & 3 & 0 \\ 0 & 0 & 0 & \frac{9}{2} & -1 \end{array} \right]$$

$$\left\{ \begin{aligned}x_1 - x_4 &= -3 \\2x_2 + 3x_3 &= 0 \\x_3 + 3x_4 &= 0 \\ \frac{9}{2}x_4 &= 1\end{aligned} \right. \Rightarrow$$

$$\begin{aligned}x_1 &= \frac{-29}{9} \\x_2 &= -\frac{1}{2} \\x_3 &= \frac{3}{9} \\x_4 &= -\frac{2}{9}\end{aligned}$$

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$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & -2 & -3 \\ 0 & 2 & 2 & 0 & 0 \\ 0 & 0 & 1 & 3 & 1 \\ -2 & 3 & 2 & 1 & 5 \end{array} \right]$$

$$\begin{array}{l} R_4 + 2R_1 \\ \frac{R_2}{2} \end{array} \rightarrow \left[\begin{array}{cccc|c} 1 & 0 & 0 & -2 & -3 \\ 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 3 & 1 \\ 0 & 3 & 2 & -1 & -1 \end{array} \right]$$

$$\xrightarrow{R_4 - 3R_2} \left[\begin{array}{cccc|c} 1 & 0 & 0 & -2 & -3 \\ 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 3 & 1 \end{array} \right]$$

1.

$$A = \begin{pmatrix} 1 & -2 & -1 \\ -1 & 5 & 6 \\ 5 & -4 & 3 \end{pmatrix} \quad \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

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