

1. EXAMPLE

Gauss elimination: From a given matrix find a row equivalent matrix on reduced echelon form by using elementary row operations.

Example 1.1.

$$\begin{bmatrix} 1 & -2 & 1 & 6 \\ 0 & 1 & -5 & -13 \\ 0 & 0 & 1 & 3 \end{bmatrix}$$

Example 1.2.

$$\begin{bmatrix} 1 & -2 & 1 & 6 \\ 0 & 1 & -5 & -13 \\ -4 & 7 & 4 & -2 \end{bmatrix}$$

Example 1.3.

$$\begin{bmatrix} 2 & -4 & 2 & 12 \\ 3 & -5 & -2 & 5 \\ -4 & 7 & 4 & -2 \end{bmatrix}$$

Example 1.4. Solve the following system of linear equations.

$$\begin{cases} 2x_1 & -4x_2 & +2x_3 & = 12 \\ 3x_1 & -5x_2 & -2x_3 & = 5 \\ -4x_1 & +7x_2 & 4x_3 & = -2 \end{cases}$$

2. EXAMPLE

Example 2.1.

$$\begin{bmatrix} 3 & 2 & -5 & -1 \\ 0 & 2 & -5 & 29 \\ 0 & 0 & 5 & -35 \end{bmatrix}$$

Example 2.2.

$$\begin{bmatrix} 3 & 2 & -5 & -1 \\ 12 & 10 & -25 & 25 \\ 0 & -4 & 15 & -93 \end{bmatrix}$$

Example 2.3.

$$\begin{bmatrix} 30 & 20 & -50 & -10 \\ 12 & 10 & -25 & 25 \\ 15 & 8 & -15 & -69 \end{bmatrix}$$

Example 2.4. Solve the following system of linear equations.

$$\begin{cases} 30x_1 + 20x_2 - 50x_3 = -10 \\ 12x_1 + 10x_2 - 25x_3 = 25 \\ 15x_1 + 8x_2 - 15x_3 = -69 \end{cases}$$