

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.

$$\begin{bmatrix} 1 & 2 & -4 & 5 & -4 \\ 0 & 1 & -3 & -2 & 16 \\ 0 & 0 & 0 & -4 & 20 \end{bmatrix}$$

Example 1.2.

$$\begin{bmatrix} 1 & 4 & -10 & 0 & 33 \\ 0 & 2 & -6 & 6 & -18 \\ 0 & 0 & 0 & 11 & -55 \end{bmatrix}$$

Example 1.3.

$$\begin{bmatrix} 1 & 2 & -4 & 5 & -4 \\ 3 & 7 & -15 & 13 & 4 \\ -1 & -1 & 1 & -11 & 40 \end{bmatrix}$$

Example 1.4. Solve the following system of linear equations.

$$\begin{cases} x_1 + 2x_2 - 4x_3 + 5x_4 = -4 \\ 3x_1 + 7x_2 - 15x_3 + 13x_4 = 4 \\ -x_1 - x_2 + x_3 - 11x_4 = 40 \end{cases}$$

2. EXAMPLE

Example 2.1.

$$\begin{bmatrix} -3 & 4 & 0 & -5 & 13 \\ 0 & 2 & 4 & -5 & 66 \\ 0 & 0 & 4 & -3 & 52 \end{bmatrix}$$

Example 2.2.

$$\begin{bmatrix} -3 & 4 & 0 & -5 & 13 \\ 3 & -2 & 4 & 0 & 53 \\ -3 & 2 & 0 & -3 & -1 \end{bmatrix}$$

Example 2.3.

$$\begin{bmatrix} -3 & 4 & 0 & -5 & 13 \\ 3 & -2 & 4 & 0 & 53 \\ 6 & -4 & 4 & 3 & 54 \end{bmatrix}$$

Example 2.4. Solve the following system of linear equations.

$$\begin{cases} -3x_1 + 4x_2 - 5x_4 = 13 \\ 3x_1 - 2x_2 + 4x_3 = 53 \\ 6x_1 - 4x_2 + 4x_3 + 3x_4 = 54 \end{cases}$$