One Two

August 21, 2024

Contents

1 Example

$$\left(\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \end{array}\right)$$

Now apply the row operation from example 3, section 1.1 (we will come back to this)

2 Gausian Elimination

2.1 Reduced Row Echelon Form

1. If a row does not consist entirely of zeros, then the first nonzero number in the row is a 1, this is called a leading 1

2. If there are any rows that consist entirely of zeros, then they are grouped together at the bottom of the matrix

3. In any 2 seuccessive rows that do not consist entirely of zeros, the leading 1 in the lower rows occurs farther to the right than the leading 1 in the higher row.

4. Each column that contains a leading 1 has zeros everywhere else in the column

A matrix that has props 1-3 is in **row echelon form**, thus a matrix in reduced row echelon form is of necessity in row echelon form.

2.1.1 Example 1

Which of these are in reduced echelon form

$$\text{yes} \left(\begin{array}{ccc|c} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 7 \\ 0 & 0 & 1 & -1 \end{array}\right)$$

$$\text{yes} \left(\begin{array}{cc|c} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{array}\right)$$

$$\text{yes} \left(\begin{array}{cccc|c} 0 & 1 & -2 & 0 & 1 \\ 0 & 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right)$$

$$\text{yes} \left(\begin{array}{c|c} 0 & 0 \\ 0 & 0 \end{array}\right)$$

$$\text{no} \left(\begin{array}{ccc|c} 1 & 4 & -3 & 70 \\ 1 & 6 & 2 & \\ 0 & 0 & 1 & 5 \end{array}\right)$$

$$\text{no} \left(\begin{array}{cc|c} 1 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 &) \end{array}\right)$$

$$\left(\begin{array}{cccc|c} 0 & 1 & 2 & 6 & 0 \\ 0 & 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{array}\right)$$