METHOD : GAUSS ELIMINATION

Let's assume we have the given problem :

$$Ax = B$$

which on expansion appears as :

$$\begin{bmatrix} a_{11} & a_{12} & \cdots & \\ a_{21} & \ddots & & \\ \vdots & & \ddots & \\ \vdots & & & a_{nn} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ \vdots \\ b_n \end{bmatrix}$$

To proceed to solve using backsubstitution method, we need to convert matrix A into it Row Echelon Form (REF) i.e.

(i) The non zero rows of A precede the zero rows.

(ii) If A has r non zero rows, and the pivot in row 1 appears in col K_1, in row 2 appears in col K_2, and so on, then $K_1 < K_2 < \cdots K_r$.

$$\Rightarrow \begin{bmatrix} a_{11} & a_{12} & \cdots & \cdots \\ 0 & a_{22}' & \cdots & \cdots \\ 0 & 0 & \ddots & \\ \vdots & \vdots & 0 & \ddots \\ \vdots & \vdots & 0 & \\ 0 & 0 & & a_{nn}' \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix} = \begin{bmatrix} b_1' \\ b_2' \\ \vdots \\ b_n' \end{bmatrix}$$