

Example 1

$$A = \begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix} \text{ transform to vector } \begin{bmatrix} 3 \\ 4 \end{bmatrix}$$

$$= \begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 3 \\ 4 \end{bmatrix} \Rightarrow 3 \begin{bmatrix} 0 \\ 0 \end{bmatrix} + 4 \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0 \\ 0 \end{bmatrix} + \begin{bmatrix} 4 \\ 4 \end{bmatrix}$$

$$= \begin{bmatrix} 4 \\ 4 \end{bmatrix}$$

equal number of rows and columns form it.

Example 1

$$A_2 = \begin{bmatrix} 1 & 0 & 2 \\ 5 & 6 & 1 \\ 1 & 2 & 3 \end{bmatrix}$$

$$= 1 \begin{vmatrix} 6 & 1 \\ 2 & 3 \end{vmatrix} - 0 \begin{vmatrix} 5 & 1 \\ 1 & 3 \end{vmatrix} + 2 \begin{vmatrix} 5 & 6 \\ 1 & 2 \end{vmatrix}$$

$$= 1(18-2) + 2(10-6)$$

$$= 16 + 8$$

$$= 24$$

It is not equal to zero, Hence the rank the rank is 3.

$$B = \begin{bmatrix} 1 & 0 \\ 5 & 6 \end{bmatrix}$$

$$(6) - (0) = 6$$

∴ It is not equal to zero, Hence the rank of B is 3.

Example 2

$$C = \begin{bmatrix} 5 & 6 \\ 7 & 1 \end{bmatrix} \text{ transform to vector } \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 5 & 6 \\ 7 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \end{bmatrix} \Rightarrow 1 \begin{bmatrix} 5 \\ 7 \end{bmatrix} + 1 \begin{bmatrix} 6 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 5 \\ 7 \end{bmatrix} + \begin{bmatrix} 6 \\ 1 \end{bmatrix} = \begin{bmatrix} 11 \\ 8 \end{bmatrix}$$

$$② A = \begin{bmatrix} 1 & -2 & 0 \\ 9 & 6 & -1 \\ 3 & 7 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ 4 \\ -8 \end{bmatrix}$$

$$= 1 \begin{bmatrix} 1 \\ 9 \\ 3 \end{bmatrix} + 4 \begin{bmatrix} -2 \\ 6 \\ 7 \end{bmatrix} - 8 \begin{bmatrix} 0 \\ -1 \\ 3 \end{bmatrix}$$

$$= \begin{bmatrix} 1 \\ 9 \\ 3 \end{bmatrix} + \begin{bmatrix} -8 \\ 24 \\ 28 \end{bmatrix} + \begin{bmatrix} 0 \\ 8 \\ -24 \end{bmatrix}$$

$$= \begin{bmatrix} -7 \\ 41 \\ 7 \end{bmatrix}$$

③ Rank of a matrix

This is the order of the non-zero determinant of highest order that may be formed from the element of a matrix by selecting arbitrarily an