

## Properties of determinant

- If all the elements of a row or column are zero, then the value of determinant is zero.

Example:

$$\Delta = \begin{vmatrix} 0 & 0 & 0 \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$$

$$\Rightarrow \Delta = a_{11}(a_{22}a_{33} - a_{23}a_{32}) - a_{12}(a_{21}a_{33} - a_{31}a_{23}) + a_{13}(a_{21}a_{32} - a_{31}a_{22})$$

$$\Rightarrow \Delta = 0 \cdot M_{11} - 0 \cdot M_{12} + 0 \cdot M_{13}$$

$$\Rightarrow \Delta = 0$$