Matrices

(xix) Non-singular and singular matrices : Let $A = (a_{ij})_n$, n be a square matrix. Then the determinant $\begin{vmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ \cdots & \cdots & \cdots & \cdots \\ a_{n1} & a_{n2} & & a_{nn} \end{vmatrix}$ is called the determinant of the matrix A and is denoted by det A or $|A|$.

If $|A| = 0$, the matrix A is called singular otherwise it is called non-singular.

(xx) Adjoint of matrix : Let A be a square matrix. Let B be the matrix whose elements are Co-factor of the corresponding elements in $|A|$. Then the transpose of B is called the adjoint (or conjugate) of A and is written adj A.

(xxi) Inverse of matrix : If A and B are matrices such that $AB = BA = I$, then B is called the inverse of A and is denoted by A^{-1}.

(xxii) Addition of matrices : Let $A = (a_{ij})_{m,n}$ and $B = (b_{ij})_{m,n}$ be matrices of the same type. Then their sum $A+B$, is defined to be the matrix $(a_{ij}+b_{ij})_{m,n}$

(xiii) **Product of matrices**: Two matrices A and B are said to be conformed for the matrix product AB if the number of columns in A = the number of rows in B. Thus if $A = (a_{ij})_{m,n}$ and $B = (b_{jk})_{n,p}$ then they are conformal for the product AB and in this case the product AB is defined to be an $m \times p$ matrix

$$\left(\sum_{j=1}^{n} a_{ij}\, b_{jk}\right)_{m,p}$$ thus

$$AB = \left(\sum_{j=1}^{n} a_{ij}\, b_{jk}\right)_{m,p}$$

$$= (c_{ik})_{m,p} \text{ where } c_{ik} = \sum_{j=1}^{n} a_{ij}\, b_{jk}.$$