- A square matrix A is said to be orthogonal if

$$A A^T = I$$

- Properties of Rank of Matrices

rank of matrices A $\Rightarrow \rho(A)$

(i) if $A = [a_{ij}]_{m \times n}$ and $B = [b_{ij}]_{m \times n}$.

Then $\rho(A+B) \leq \rho(A) + \rho(B)$

(ii) if $A = [a_{ij}]_{m \times n}$ and $B = [b_{ij}]_{m \times p}$.

$\rho(AB) \leq \rho(A)$ and $\rho(AB) \leq \rho(B)$

(iii) if $A = [a_{ij}]_{m \times n}$ then $\rho(A) = \rho(A')$