Urma unei matrice

Definitie: Pentru orice matrice A = (a_{ij}), $1 \leq i \leq m$ de ordinul n, numarul Tr A = $\sum_{i=1}^{n} a_{ii}$ (suma elementelor de pe diagonala principala) se numeste urma matricei A.

Cazuri particulare:

1) Daca A = $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ atunci Tr A = a + d.
2) Daca A = $\begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix}$ atunci Tr A = $a_{11} + a_{22} + a_{33}$

Proprietati

Orice ar fi A, B ∈ M_n (C) si a ∈ C avem:

1) Tr (A + B) = Tr A + Tr B
2) Tr (aA) = aTr A
3) Tr (AB) = Tr (BA)
4) Tr (ABA^{-1}) = Tr B, daca este inversabila
5) Tr A = Tr (A^{t})
6) Tr $(AB)^k$ = Tr $(BA)^k$, (∀) k ∈ N^*
7) Tr $(A \pm B)^n = \sum_{k=0}^{n} (\pm 1)^k \quad C_n^k \quad (A^{n-k} \quad B)$