trace

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The *trace* $\mathrm{Tr}(A)$ of a square matrix A is defined to be the sum of the diagonal entries of A. It satisfies the following formulas:

- $\mathrm{Tr}(A+B) = \mathrm{Tr}(A) + \mathrm{Tr}(B)$
- $\mathrm{Tr}(AB) = \mathrm{Tr}(BA) \qquad ()$

where A and B are square matrices of the same size.

The *trace* $\mathrm{Tr}(T)$ of a linear transformation $T\colon V \longrightarrow V$ from any finite dimensional vector space V to itself is defined to be the trace of any matrix representation of T with respect to a basis of V. This scalar is independent of the choice of basis of V, and in fact is equal to the sum of the eigenvalues of T (over a splitting field of the characteristic polynomial), including multiplicities.

The following link presents some examples for calculating the trace of a matrix.

A *trace* on a C^*-algebra A is a positive linear functional $\phi\colon A \to \mathbb{C}$ that has the .