

$A^T$ ), unitary ( $A^{-1} = A^*$ ), and normal ( $A^* A = A A^*$ ). The determinant of any orthogonal matrix is either +1 or -1. A special orthogonal matrix is an orthogonal matrix with determinant +1. As a linear transformation, every orthogonal matrix with determinant +1 is a pure rotation, while every orthogonal matrix with determinant -1 is either a pure reflection, or a composition of reflection and rotation. The complex analogue of an orthogonal matrix is a unitary matrix.

Main operations

Trace

The trace,  $\text{tr}(A)$  of a square matrix  $A$  is the sum of its diagonal entries. While matrix multiplication is not commutative as mentioned above, the trace of the product of two matrices is independent of the order of the factors: