

MATRIX SQUARES

Why

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Definition

The square of a square matrix is the product of the matrix with itself. A square root (or matrix square root) of a given matrix is a matrix whose square is the given matrix. A matrix is idempotent if it is equal to its square.

Notation

Let $A \in \mathbb{R}^{n \times n}$. Then the square of A is AA. We denote the square of A by A^2 . A is idempotent if $A^2 = A$. $B \in \mathbb{R}^{n \times n}$ is a square root of A if $A = B^2$.

Existence and uniqueness

Clearly a matrix can have a square root. Take for example the matrix in $\mathbf{R}^{1\times 1}$ [1]. A square root of this matrix is (1), but also (-1). So matrix square roots do exist, but are not unique.

¹Future editions will include an account.

