

## MATRIX SQUARES

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

