

REAL MATRIX-MATRIX PRODUCTS

Definition

Let $A \in \mathbf{R}^{l \times m}$ and $B \in \mathbf{R}^{m \times n}$. In this case we call A and B conformable. The matrix-matrix product of A and B is the matrix $C \in \mathbf{R}^{l \times n}$ whose ith row c_i (for i = 1, ..., n) is defind $c_i = Ab_i$ where b_i is the ith row of B.

Notation

We denote the matrix product of A and B by AB.

Properties

Future editions will contain accounts of the following basic properties.

Proposition 1. Matrix multiplication is associative.

Proposition 2. Matrix multiplication is not commutative.

Indeed, the matrix-matrix product of B and A may not even be defined, if B and A are not conformable.

