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 $i = 1, \ldots, n$) 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.*

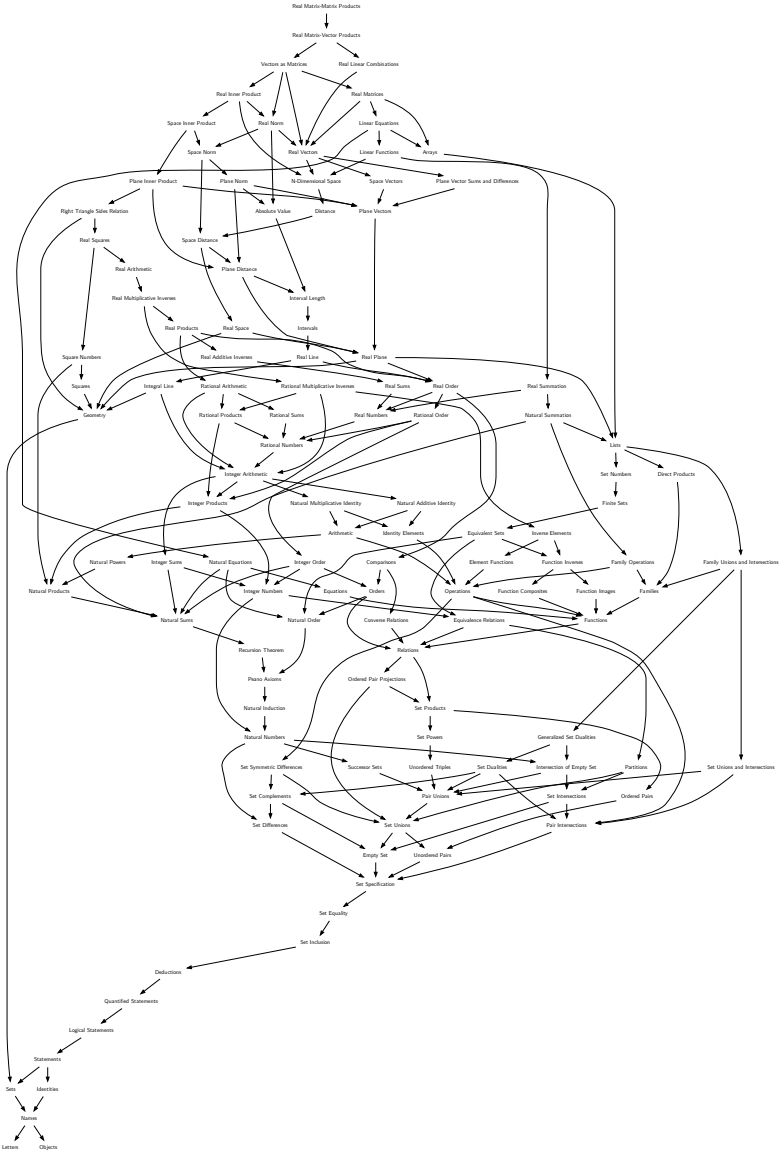
Proposition 2. *Matrix multiplication is not commutative.*

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

Identity matrix

The matrix which is the identity under the operation of multiplication is the one which has ones on its diagonals and zero elswhere.[1] We denote the $d \times d$ identity matrix by I_d, or, when no confusion is possible by I.

[1] Future editions will improve and expand.


Real Matrix-Matrix Products
Real Matrix-Vector Products
Vectors as Matrices
Real Linear Combinations
Real Inner Product
Real Matrices
Space Inner Product
Real Norm
Linear Equations
Space Norm
Real Vectors
Linear Functions
Arrays
Plane Inner Product
Plane Norm
N-Dimensional Space
Sparse Vectors
Plane Vector Sums and Differences
Right Triangle Sides Relation
Absolute Value
Distance
Plane Vectors
Real Squares
Space Distance
Real Arithmetic
Plane Distance
Real Multiplicative Inverses
Interval Length
Real Products
Real Space
Intervals
Square Numbers
Real Additive Inverses
Real Line
Real Plane
Squares
Integral Line
Rational Arithmetic
Rational Multiplicative Inverses
Real Sums
Real Order
Real Summation
Geometry
Rational Products
Rational Sums
Real Numbers
Rational Order
Natural Summation
Rational Numbers
Lists
Integer Arithmetic
Set Numbers
Direct Products
Integer Products
Natural Multiplicative Identity
Natural Additive Identity
Finite Sets
Arithmetic
Identity Elements
Equivalent Sets
Inverse Elements
Natural Powers
Integer Sums
Natural Equations
Integer Order
Comparisons
Element Functions
Function Inverses
Family Operations
Family Unions and Intersections
Natural Products
Integer Numbers
Equations
Orders
Operations
Function Composites
Function Images
Families
Natural Sums
Natural Order
Convene Relations
Equivalence Relations
Functions
Recursion Theorem
Relations
Peano Axioms
Ordered Pair Projections
Natural Induction
Set Products
Natural Numbers
Set Powers
Generalized Set Dualities
Set Symmetric Differences
Successor Sets
Unordered Triples
Set Dualities
Intersection of Empty Set
Partitions
Set Unions and Intersections
Set Complements
Pair Unions
Set Intersections
Ordered Pairs
Set Differences
Set Unions
Pair Intersections
Empty Set
Unordered Pairs
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects