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.*

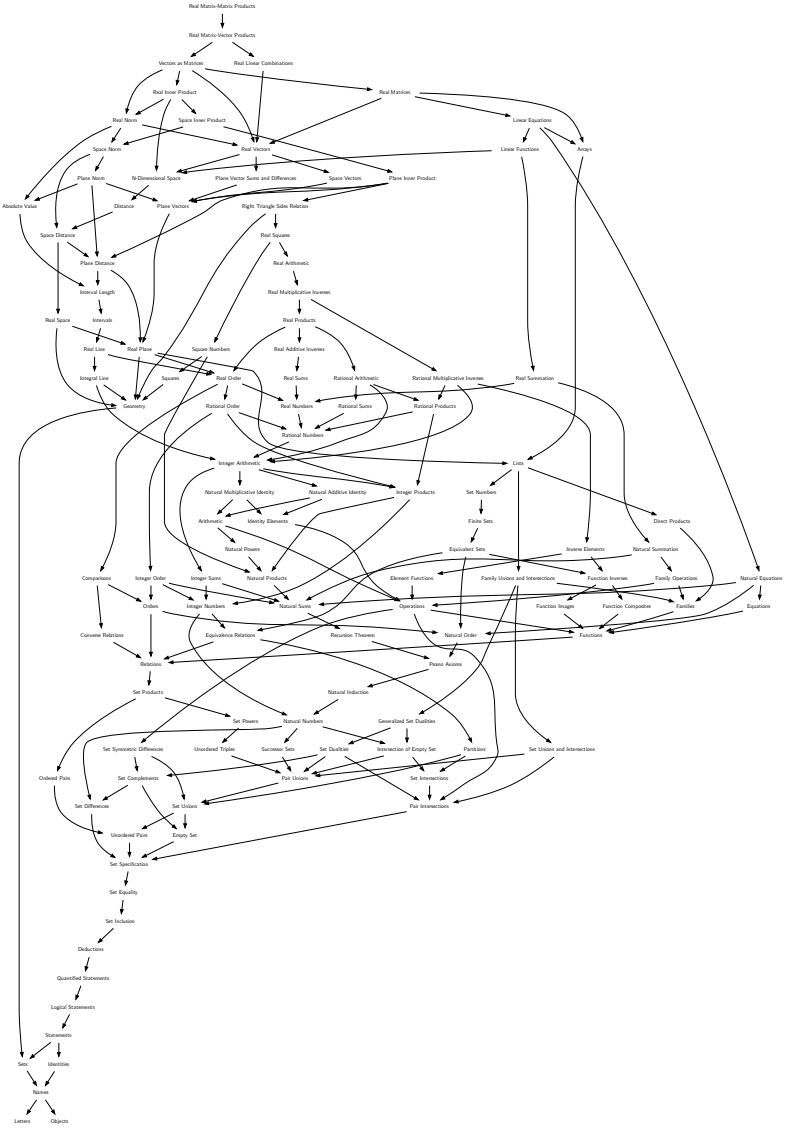
Proposition 2. *Matrix multiplication is not commutative.*

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