Why

We generalize the notion of real matrices, to matrices with elements in any set.

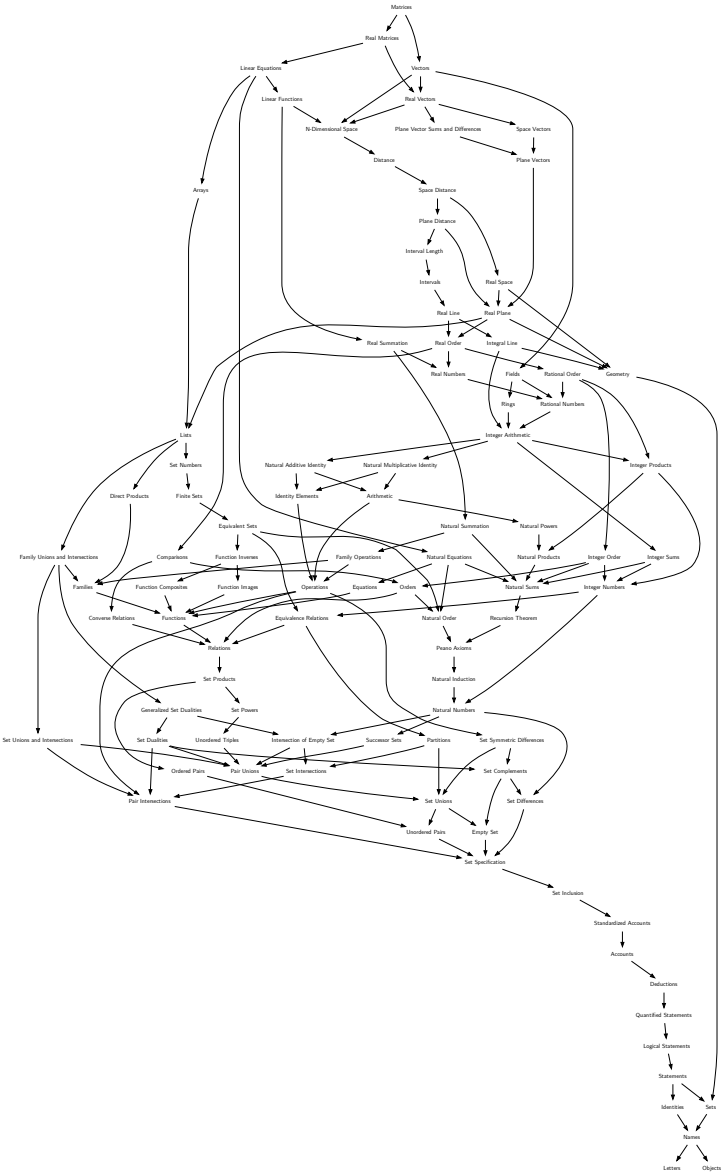
Definition

Let S be a set. A *matrix in* S (or *of* elements in S) is a two-dimensional array in S. In other words, a matrix is a correspondence (function). We call the function's values the *entries* of the matrix.

As with real matrices, we think of the objects in the codo set as arrayed in a grid or arrayed in a table. We call n and m the *dimensions* of the matrix. We call n the *height* and m the *width*. If the height of the matrix is the same as the width of the matrix then we call the matrix *square*. If the height is larger than the width, we call the matrix *tall*. If the width is larger than the height, we call the matrix *wide*.

Notation

Let S be nonempty set. We denote the set of $n \times m$ S-valued matrices by $S^{n \times m}$. Let $a \in S^{n \times m}$. This means the same as $a : \{1, 2, \ldots, n\} \times \{1, 2, \ldots, m\} \to S$. We denote $a(i, j)$ by a_{ij}.


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