Why

[1]

Definition

A *basis for* a vector space is a set of linearly independent vectors whose span is the set of vectors of the space. For any vector in the space, there exists a linear combination of the basis vectors whose result is that vector. In this case, it is common to say that any vector in the space "can be written as a linear combination of the basis vectors."

Since the basis is a linearly independent set, the linear combination of basis vectors is unique. W consider the

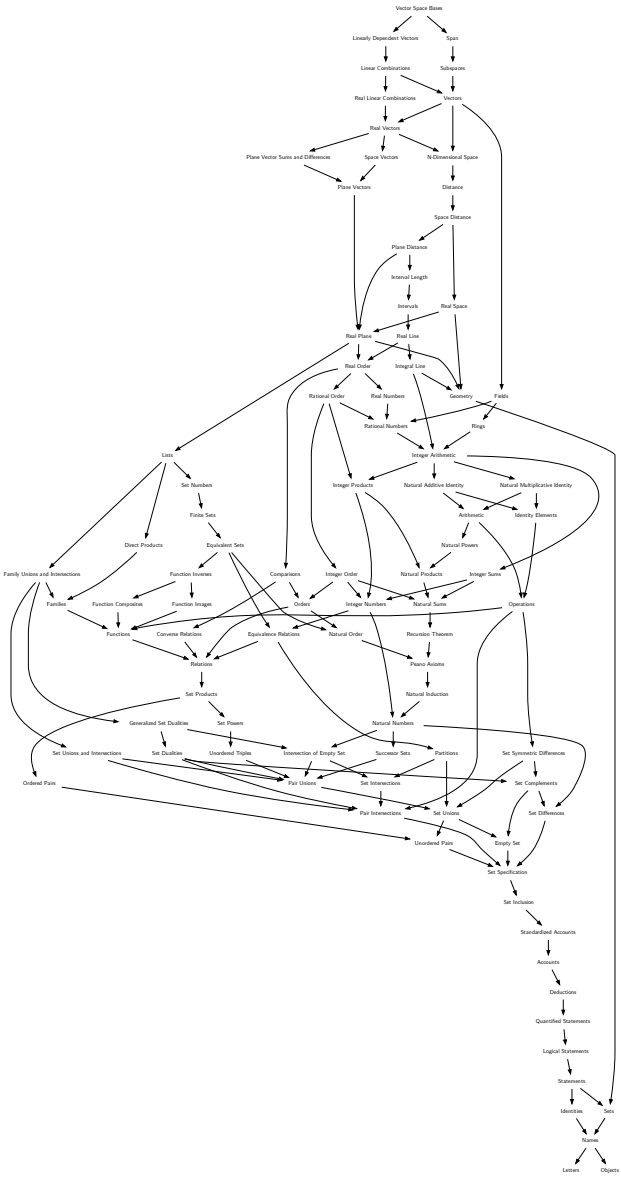
If we have a basis of n vectors for (V, F) then each vector $v \in V$ can be written uniquely as a linear combination of the vectors in the basis. If we take the vector in the field which is these coefficients, then this is an isomorphism with the vector space $(\mathsf{F}^n, \mathsf{F})$ We call this the *coordinate vector*.

Characterizations

Prop. 1. *A set of vectors is a basis if and only if no proper superset of it is linearly independent.*

Prop. 2. *A set of vectors that spans the space is a basis if and only if no proper subset of it spans the space.*

[1] Future editions will include.


Vector Space Bases
Linearly Dependent Vectors
Span
Linear Combinations
Subspaces
Real Linear Combinations
Vectors
Real Vectors
Plane Vector Sums and Differences
Space Vectors
N-Dimensional Space
Plane Vectors
Distance
Space Distance
Plane Distance
Interval Length
Intervals
Real Space
Real Plane
Real Line
Real Order
Integral Line
Rational Order
Real Numbers
Geometry
Fields
Rational Numbers
Rings
Integer Arithmetic
Lists
Set Numbers
Integer Products
Natural Additive Identity
Natural Multiplicative Identity
Finite Sets
Arithmetic
Identity Elements
Direct Products
Equivalent Sets
Natural Powers
Family Unions and Intersections
Function Inverses
Comparisons
Integer Order
Natural Products
Integer Sums
Families
Function Composites
Function Images
Orders
Integer Numbers
Natural Sums
Operations
Functions
Converse Relations
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 Triple
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