Vector Space Bases

Why

TODO

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."

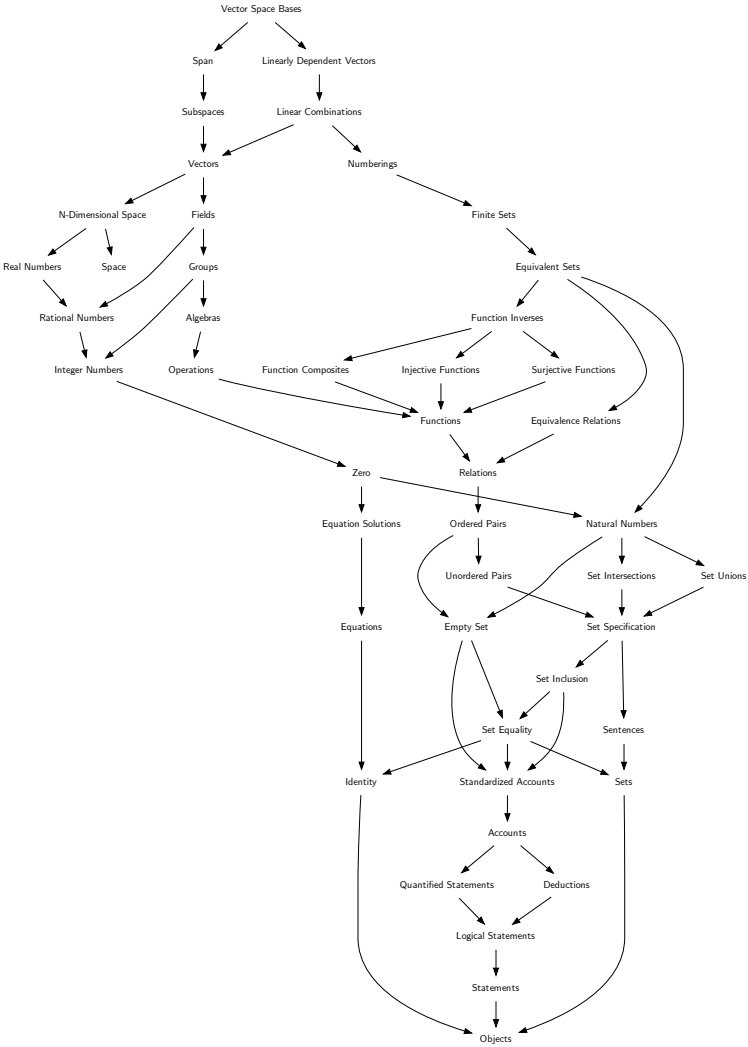
Since the basis is a linearly independent set, the linear combination of basis vectors is unique. W consider the

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

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

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


Vector Space Bases
Span
Linearly Dependent Vectors
Subspaces
Linear Combinations
Vectors
Numberings
N-Dimensional Space
Fields
Finite Sets
Real Numbers
Space
Groups
Equivalent Sets
Rational Numbers
Algebras
Function Inverses
Integer Numbers
Operations
Function Composites
Injective Functions
Surjective Functions
Functions
Equivalence Relations
Zero
Relations
Equation Solutions
Ordered Pairs
Natural Numbers
Unordered Pairs
Set Intersections
Set Unions
Equations
Empty Set
Set Specification
Set Inclusion
Set Equality
Sentences
Identity
Standardized Accounts
Sets
Accounts
Quantified Statements
Deductions
Logical Statements
Statements
Objects