Why

We generalize the notion of linear dependence.

Definition

A *matroid* is a finite subset algebra satisfying

1. Any subset of a distinguished set is distinguished.

2. For two distinguished subsets of nonequal cardinality, there is an element of the base set in the complement of the smaller set in the bigger set whose singleton union with the smaller set is a distinguished set.

We call the distinguished subsets *independent subsets* and we call the undistinguished subsets the *dependent subsets*.

Notation

We follow the notation of subset algebras, but use M for the base set, a mnemonic for matroid, and $\mathcal{I}$ for the distinguished sets, a menomic for independent.

Let $(M, \mathcal{I})$ a matroid. We denote the properties by

1. $A \in \mathcal{I} \wedge B \subset A \longrightarrow B \in \mathcal{I}$.

2. $A, B \in \mathcal{I} \wedge |A| < |B| \longrightarrow \exists x \in M : (A \cup \{x\}) \in \mathcal{I}$

Matroids

Linearly Dependent Vectors

Linear Combinations

Real Linear Combinations

Vectors

Real Vectors

N-Dimensional Space

Space Vectors

Plane Vector Sums and Differences

Distance

Plane Vectors

Space Distance

Plane Distance

Interval Length

Real Space

Intervals

Real Line

Real Plane

Integral Line

Real Order

Geometry

Rational Order

Real Number

Fields

Rational Numbers

Rings

Integer Arithmetic

Lists

Subset Algebra

Natural Additive Identity

Natural Multiplicative Identity

Set Number

Cardinality

Integer Products

Arithmetic

Identity Elements

Finite Sets

Natural Powers

Operations

Equivalent Sets

Direct Products

Natural Products

Integer Sums

Integer Order

Comparisons

Function Inverse

Family Unions and Intersections

Natural Sums

Integer Number

Orders

Function Image

Function Composite

Families

Recursion Theorem

Natural Order

Equivalence Relations

Converse Relations

Functions

Peano Axioms

Relations

Natural Induction

Set Products

Subset Systems

Natural Numbers

Generalized Set Dualities

Set Power

Ordered Pairs

Set Symmetric Difference

Partitions

Successor Sets

Intersection of Empty Set

Set Dualities

Unordered Triples

Set Unions and Intersections

Set Complements

Set Intersections

Pair Unions

Set Differences

Set Unions

Pair Intersections

Empty Set

Unordered Pairs

Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Sets

Identities

Names

Letters

Objects