Why

We want to define area under a real function. We start with defining functions for which this notion is obvious.

Definition

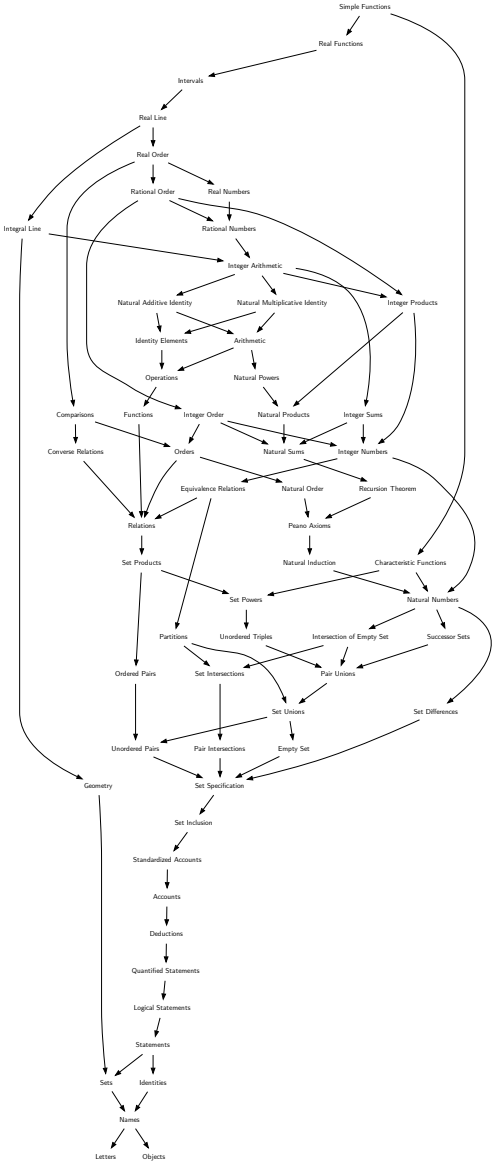
A *simple function* (or *step function*) is a real-valued function whose range is a finite set. We can write simple function as the sum of the characteristic functions fo the inverse image elements.

We can partition the range of the function into a finite family of one-elements sets. Then the family whose members are the inverse images of these sets partitions the domain. We call this the *simple partition* of the function.

Notation

We denote the set of simple functions on A by $\mathrm{SF}(A)$. We denote subset of non-negative simple real functions with domain A by by $SimpleF_+(A)$.

Let $f \in \mathrm{SF}(A)$. Let $\{a_1, \ldots, a_n\} = f(A)$. Define $A_i = f^{-1}(\{a_i\})$. Then $f = \sum_{i=1}^{n} a_i \chi_{A_i}$.


Simple Functions
Real Functions
Intervals
Real Line
Real Order
Rational Order
Real Numbers
Rational Numbers
Integral Line
Integer Arithmetic
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Identity Elements
Arithmetic
Operations
Natural Powers
Comparisons
Functions
Integer Order
Natural Products
Integer Sums
Converse Relations
Orders
Natural Sums
Integer Numbers
Equivalence Relations
Natural Order
Recursion Theorem
Relations
Peano Axioms
Set Products
Natural Induction
Characteristic Functions
Set Powers
Natural Numbers
Partitions
Unordered Triples
Intersection of Empty Set
Successor Sets
Ordered Pairs
Set Intersections
Pair Unions
Set Unions
Set Differences
Unordered Pairs
Pair Intersections
Empty Set
Geometry
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects