Why

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

Definition

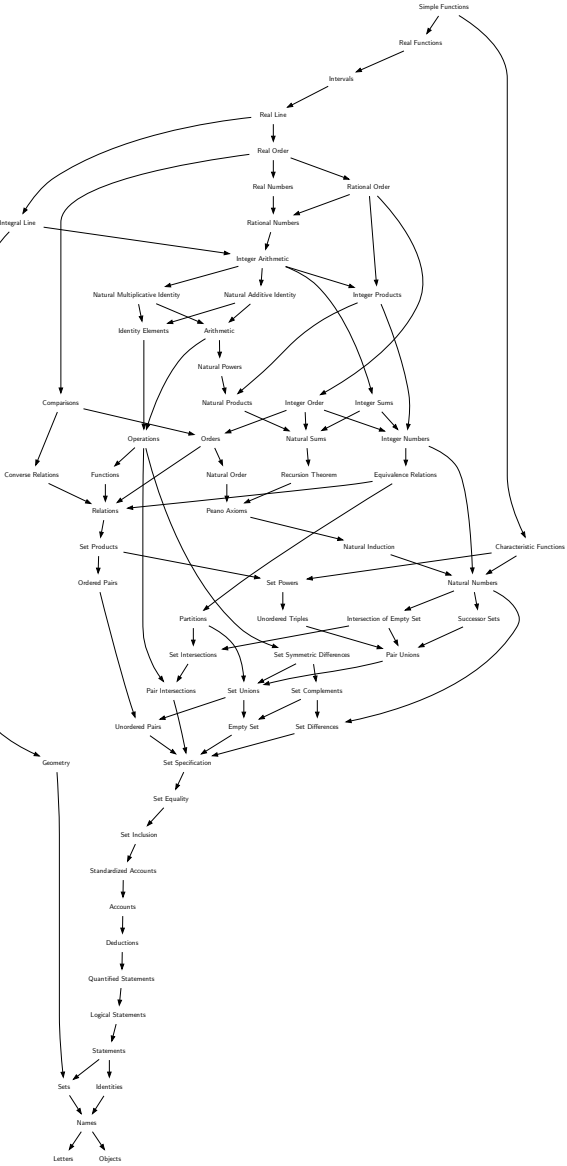
A *simple function* (or *step function*) is a real-valued function whose range is a finite set. We can write simple function as the sum of the characteristic functions fo the inverse image elements.

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 $\mathrm{SF}_+(A)$.

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