Finite Measures

Why

Sometimes we want finite measures. TODO: which times?

Definition

A measurable set is *finite* if its measure is a real number. The measure space itself is *finite* if the base set is finite.

A measurable set is *sigma-finite* if there exists a sequence of finite measurable sets whose union is the set. The measure space itself is *sigma-finite* if the base set is sigma finite.

Notation

We denote that a measure space is finite by saying "Let $(A, \mathcal{A}, \mu)$ and $\mu(A) < +\infty$."

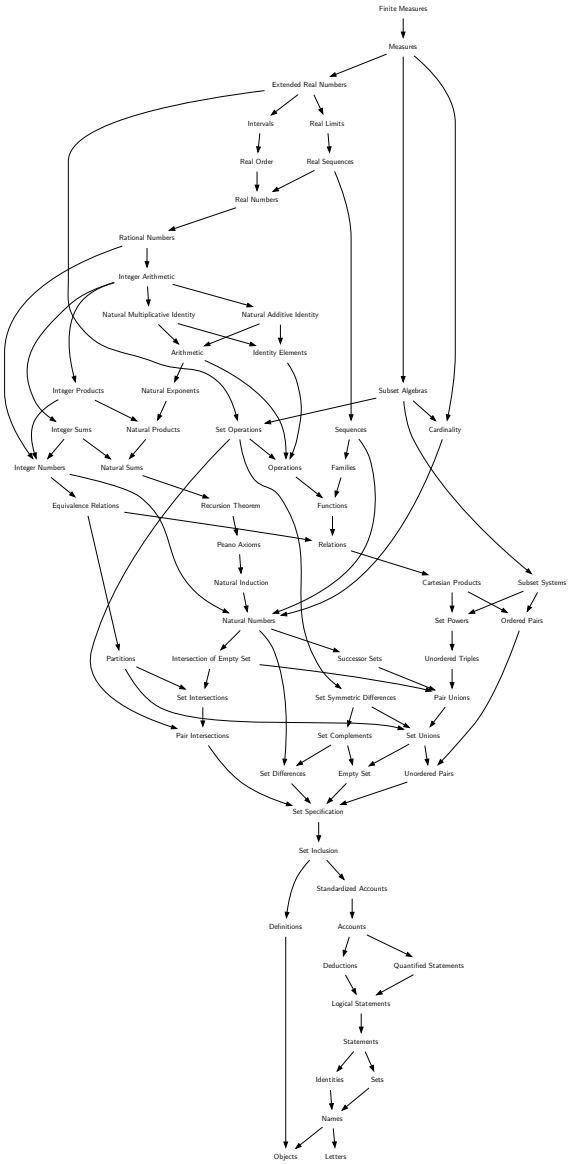
Example 1. *Let $(A, \mathcal{A})$ be a measurable space.*

The counting measure on $(A, \mathcal{A})$ is finite if and only if the base set is finite. It is sigma finite if and only if the base set is a union of a sequence of finite sets.

If $\mathcal{A} = 2^A$, then the counting measure is sigma finite if and only if A is countable.

Example 2. *A point mass measure is finite.*

Example 3. *Let R be the set of real numbers. The Lebesgue measure on $(R, \mathcal{B}(R))$ is sigma finite.*


Finite Measures
Measures
Extended Real Numbers
Intervals
Real Limits
Real Order
Real Sequences
Real Numbers
Rational Numbers
Integer Arithmetic
Natural Multiplicative Identity
Natural Additive Identity
Arithmetic
Identity Elements
Integer Products
Natural Exponents
Subset Algebras
Integer Sums
Natural Products
Set Operations
Sequences
Cardinality
Integer Numbers
Natural Sums
Operations
Families
Equivalence Relations
Recursion Theorem
Functions
Peano Axioms
Relations
Natural Induction
Cartesian Products
Subset Systems
Natural Numbers
Set Powers
Ordered Pairs
Partitions
Intersection of Empty Set
Successor Sets
Unordered Triples
Set Intersections
Set Symmetric Differences
Pair Unions
Pair Intersections
Set Complements
Set Unions
Set Differences
Empty Set
Unordered Pairs
Set Specification
Set Inclusion
Standardized Accounts
Definitions
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Objects
Letters