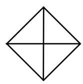


Why

We have seen that the integrable functions form a vector space. How about the square integrable functions? And so on.[1]

Definition

The *integrable function spaces* are a collection of function spaces, one for each real number $p \geq 1$, for which the pth power of the absolute value of the function is integrable.[2]

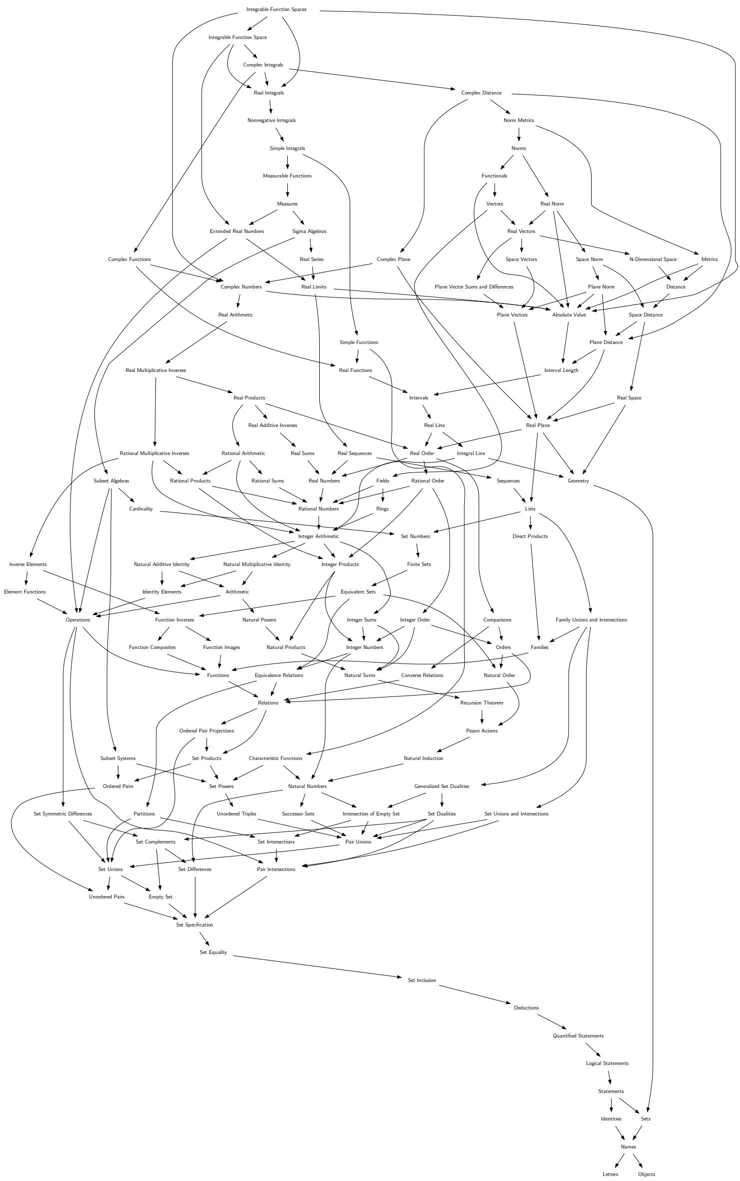
Notation

Let $(X, \mathcal{A}, \mu)$ be a measure space. Let $p \geq 1$. We denote the integrable function space corresponding to p by $\mathcal{L}^p(X, \mathcal{A}, \mu, \mathsf{R})$. We have defined it by

$$\mathcal{L}^p(X, \mathcal{A}, \mu, \mathsf{R}) = \left\{ \text{measurable } f : X \to \mathsf{R} \;\middle|\; \int |f|^p d\mu < \infty \right\}$$

Let $\mathbf{C}$ denote the set of complex numbers. Similarly for complex-valued functions, we denote the pth space by $\mathcal{L}^p(X, \mathcal{A}, \mu, \mathbf{C})$.

[1] Future sheets are likely to begin with L^2.
[2] Future editions will include the case where $p = \infty$.


Integrable Function Spaces
Integrable Function Space
Complex Integrals
Real Integrals
Complex Distance
Nonnegative Integrals
Norm Metrics
Simple Integrals
Norms
Measurable Functions
Functionals
Measures
Vectors
Real Norm
Extended Real Numbers
Sigma Algebras
Real Vectors
Complex Functions
Real Series
Complex Plane
Space Vectors
Space Norm
N-Dimensional Space
Metrics
Complex Numbers
Real Limits
Plane Vector Sums and Differences
Plane Norm
Distance
Real Arithmetic
Plane Vectors
Absolute Value
Space Distance
Simple Functions
Plane Distance
Real Multiplicative Inverses
Real Functions
Interval Length
Real Products
Intervals
Real Space
Real Additive Inverses
Real Line
Real Plane
Rational Multiplicative Inverses
Rational Arithmetic
Real Sums
Real Sequences
Real Order
Integral Line
Subset Algebras
Rational Products
Rational Sums
Real Numbers
Fields
Rational Order
Sequences
Geometry
Cardinality
Rational Numbers
Rings
Lists
Integer Arithmetic
Set Numbers
Direct Products
Inverse Elements
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Finite Sets
Element Functions
Identity Elements
Arithmetic
Equivalent Sets
Operations
Function Inverses
Natural Powers
Integer Sums
Integer Order
Comparisons
Family Unions and Intersections
Function Composites
Function Images
Natural Products
Integer Numbers
Orders
Families
Functions
Equivalence Relations
Natural Sums
Converse Relations
Natural Order
Relations
Recursion Theorem
Ordered Pair Projections
Peano Axioms
Subset Systems
Set Products
Characteristic Functions
Natural Induction
Ordered Pairs
Set Powers
Natural Numbers
Generalized Set Dualities
Set Symmetric Differences
Partitions
Unordered Triples
Successor Sets
Intersection of Empty Set
Set Dualities
Set Unions and Intersections
Set Complements
Set Intersections
Pair Unions
Set Unions
Set Differences
Pair Intersections
Unordered Pairs
Empty Set
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects