Why

What if the set of outcomes is the real line, **R**?

Definition

The principal difficulty is assigning nonzero numbers to infinitely many elements of a set. The solution is instead to assign probabilities to the *events* of outcomes, not to the individual outcomes (elementary events, real numbers), themselves.

A *probability density* (or *probability density function* (*pdf*)) is a function $f : \mathbf{R} \to \mathbf{R}$ satisfying $f \geq 0$ and $\int f = 1$.

Probability Densities

Real Integrals

Nonnegative Integrals

Simple Integrals

Measurable Functions

Measure

Sigma Algebras

Real Series   Extended Real Numbers

Real Limits

Simple Functions   Absolute Value

Probability Distributions   Real Functions   Interval Length

Intervals

Real Line

Real Summation   Real Order   Real Sequences

Rational Order   Real Numbers   Sequences   Subset Algebras

Integral Line   Rational Numbers   Cardinality   Lists

Integer Arithmetic   Set Numbers   Direct Products

Natural Summation   Integer Products   Natural Multiplicative Identity   Natural Additive Identity   Finite Sets

Arithmetic   Identity Elements   Equivalent Sets   Family Operations

Natural Power   Integer Sums   Integer Order   Comparisons   Operations   Function Inverses   Families   Family Unions and Intersections

Natural Products   Integer Numbers   Order   Converse Relations   Equivalence Relations   Function Image   Function Composite

Natural Sums   Natural Order   Relations   Functions

Recursion Theorem   Peano Axioms   Ordered Pair Projections   Subset Systems

Uncertain Outcomes   Natural Induction   Characteristic Functions   Set Products   Ordered Pairs

Natural Numbers   Set Powers   Generalized Set Dualities

Set Symmetric Differences   Successor Sets   Unordered Triples   Set Dualities   Intersection of Empty Set   Partitions   Set Unions and Intersections

Set Complements   Pair Unions   Set Intersections

Set Differences   Set Unions   Pair Intersections

Empty Set   Unordered Pairs

Geometry   Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Sets   Identities

Names

Letters   Objects

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