### Why

We want to guess random variables.

### Definition

Let $(\Omega, \mathcal{A}, \mathbf{P})$ be a probability space. Let $x : \Omega \to V$ be a random variable. An *estimate* or *prediction* or *guess* for $x$ is a value $v \in V$. Some authors call the selection of an estimate *estimation* or an *estimation problem*.

### Cost functions

A *cost function* for an estimate in $V$ is a function $C : V \times V \to \mathbf{R}$. A cost function is also known as a *risk function*. The *cost* of an estimate is a random variable $c : \Omega \to \mathbf{R}$ which is $c(\omega) = C(x(\omega), \xi)$.


Estimates
Random Variables
Probability Measures
Measurable Functions
Topological Sigma Algebra
Event Probabilities
Topological Spaces
Measures
Metrics
Sigma Algebras
Distance
Real Series
Extended Real Numbers
Space Distance
Real Limits
Plane Distance
Absolute Value
Interval Length
Probability Distributions
Real Space
Intervals
Real Line
Real Plane
Integral Line
Real Order
Real Summation
Real Sequences
Geometry
Rational Order
Real Numbers
Rational Numbers
Sequences
Integer Arithmetic
Lists
Subset Algebras
Natural Multiplicative Identity
Natural Additive Identity
Set Numbers
Cardinality
Integer Products
Arithmetic
Identity Elements
Finite Sets
Natural Powers
Natural Summation
Direct Products
Equivalent Sets
Integer Sums
Integer Order
Natural Products
Comparisons
Family Operations
Function Inverses
Family Unions and Intersections
Integer Numbers
Natural Sums
Orders
Operations
Families
Function Composites
Function Images
Recursion Theorem
Natural Order
Converse Relations
Functions
Equivalence Relations
Peano Axioms
Relations
Uncertain Outcomes
Natural Induction
Set Products
Subset Systems
Natural Numbers
Set Powers
Generalized Set Dualities
Ordered Pairs
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
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects