## Why

We have studied guessing random variables (see Estimates). What if we can use another random variable in making our estimate?

## Definition

Let $(\Omega, \mathcal{A}, \mathbf{P})$ be a probability space. Let $U, V$ be sets. Let $x : \Omega \to V$ and let $y : \Omega \to U$. An *estimator* or *predictor* for $x$ given $y$ is a function from $U$ to $V$. An estimate, then, corresponds to a constant estimator, and vice versa. Some authors call the selection of an estimator *estimation* or an *estimation problem*.

## Error function

An error function is a function $e : U \times V \to \mathbf{R}$ which quantifies the cost of an error.


Estimators
Estimates
Random Variables
Topological Sigma Algebra
Probability Measures
Measurable Functions
Topologies
Measures
Metrics
Sigma Algebras
Distance
Real Series
Extended Real Numbers
Space Distance
Event Probabilities
Real Limits
Plane Distance
Outcome Probabilities
Absolute Value
Interval Length
Real Functions
Intervals
Real Space
Real Plane
Real Line
Integral Line
Real Order
Real Summation
Real Sequences
Size of Direct Product
Number of Set Products
Subset Algebras
Geometry
Rational Order
Real Numbers
Natural Summation
Sequences
Lists
Finite Set Examples
Cardinality
Number of Disjoint Unions
Rational Numbers
Direct Products
Set Numbers
Integer Arithmetic
Integer Products
Natural Additive Identity
Natural Multiplicative Identity
Natural Fractions
Finite Sets
Uncertain Events
Identity Elements
Natural Arithmetic
Family Operations
Equivalent Sets
Comparisons
Integer Order
Natural Powers
Integer Sums
Operations
Function Inverses
Family Unions and Intersections
Orders
Integer Numbers
Natural Products
Families
Function Composites
Function Images
Converse Relations
Equivalence Relations
Natural Order
Natural Sums
Functions
Relations
Recursion Theorem
Uncertain Outcomes
Ordered Pair Projections
Peano Axioms
Set Products
Natural Induction
Subset Systems
Natural Numbers
Ordered Pairs
Set Powers
Generalized Set Dualities
Successor Sets
Set Symmetric Differences
Unordered Triples
Intersection of Empty Set
Set Dualities
Partitions
Set Unions and Intersections
Pair Unions
Set Complements
Set Intersections
Set Differences
Set Unions
Pair Intersections
Unordered Pairs
Empty Set
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects