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

Measurable Functions · Probability Measures · Topological Sigma Algebra

Measures · Event Probabilities · Topologies

Sigma Algebras · Metrics

Extended Real Numbers · Real Series · Distance

Real Limits · Space Distance

Absolute Value · Plane Distance

Interval Length · Probability Distributions

Intervals · Real Space

Real Line · Real Plane

Real Summation · Real Sequences · Real Order · Integral Line

Subset Algebras · Real Numbers · Sequences · Geometry

Rational Numbers · Lists · Cardinality · Rational Order

Integer Arithmetic · Direct Products · Set Numbers

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

Natural Summation · Identity Elements · Arithmetic · Equivalent Sets

Family Operations · Family Unions and Intersections · Natural Powers · Function Inverses · Integer Sums · Integer Order · Comparisons

Operations · Families · Natural Products · Function Images · Function Composites · Integer Numbers · Orders

Functions · Natural Sums · Equivalence Relations · Converse Relations · Natural Order

Recursion Theorem · Relations

Subset Systems · Set Products · Peano Axioms

Ordered Pairs · Set Powers · Natural Induction · Uncertain Outcomes

Generalized Set Dualities · Unordered Triples · Natural Numbers

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

Set Complements · Pair Unions · Set Intersections

Pair Intersections · Set Unions · Set Differences

Empty Set · Unordered Pairs

Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Identities · Sets

Names

Letters · Objects

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