Definition

The *variance* of a square-integrable real-valued random variable is the expectation of its square less its expectation squared.

Notation

Let $(X, \mathcal{A}, \mu)$ be a probability space and f be a random variable. We denote the variance of f by $\operatorname{var} f$. We defined it by

$$\operatorname{var} f = \mathbf{E}(f^2) - (\mathbf{E}(f))^2.$$

Results

Proposition 1. *If a random variable on a probability space is square integrable then it is integrable.*

Proof. The L^p spaces are nested for finite measures. □

Proposition 2. *The variance of a square-integrable real-valued random variable is the expectation of the square of the difference between the random variable and its expectation.*

Variance
Expectation
Random Variables
Topological Sigma Algebra
Measurable Functions
Probability Measures
Outcome Variable Covariance
Measures
Topological Spaces
Sigma Algebras
Metrics
Outcome Variable Expectation
Extended Real Numbers
Real Series
Distance
Induced Probability Distributions
Real Square Roots
Real Limits
Outcome Variable Events
Space Distance
Real Squares
Event Probabilities
Place Distance
Absolute Value
Real Arithmetic
Probability Distributions
Interval Length
Real Multiplicative Inverses
Intervals
Real Products
Real Space
Natural Square Roots
Real Plus
Real Line
Real Additive Inverses
Square Numbers
Real Sequences
Real Summation
Rational Multiplicative Inverses
Real Order
Real Sums
Rational Arithmetic
Integral Line
Squares
Sequences
Real Numbers
Rational Order
Rational Products
Rational Sums
Subset Algebras
Rational Numbers
Cardinality
Lists
Set Numbers
Direct Products
Uncertain Outcomes
Integer Arithmetic
Finite Sets
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Equivalent Sets
Inverse Elements
Natural Summation
Identity Elements
Multiplication
Family Unions and Intersections
Function Inverses
Family Operations
Element Functions
Comparisons
Integer Order
Integer Sums
Natural Powers
Natural Equations
Functions
Function Composition
Function Images
Operations
Orders
Integer Numbers
Natural Products
Equations
Functions
Converse Relations
Equivalence Relations
Natural Order
Natural Sums
Relations
Recursion Theorem
Subset Systems
Set Products
Power Axioms
Ordered Pairs
Set Powers
Natural Induction
Generalized Set Qualifiers
Unordered Tuples
Natural Numbers
Set Unions and Intersections
Partitions
Intersection of Empty Set
Set Qualifiers
Successor Sets
Set Symmetric Differences
Set Intersections
Pair Unions
Set Complements
Set Unions
Set Differences
Pair Intersections
Unordered Pairs
Empty Set
Set Specification
Set Equality
Set Inclusion
Unrestricted Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Spaces
Letters
Objects