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 $\mathbf{var}\, f$. We defined it by

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

Results

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

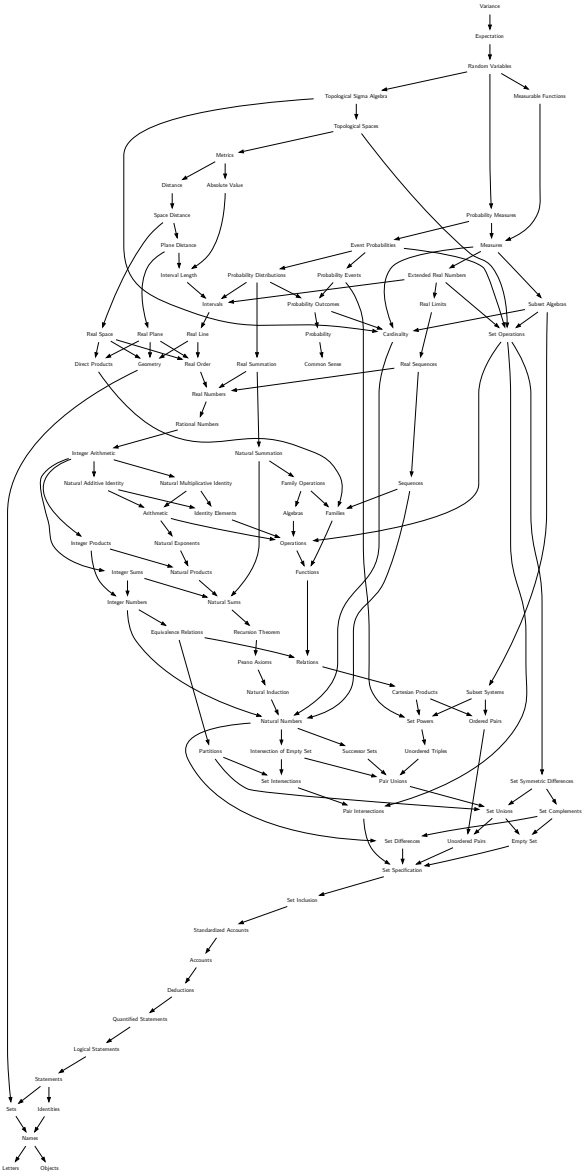
Proof. The L^p spaces are nested for finite measures. □

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.*

Proof.

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

□


Variance
Expectation
Random Variables
Topological Sigma Algebra
Measurable Functions
Topological Spaces
Metrics
Distance
Absolute Value
Space Distance
Probability Measures
Plane Distance
Event Probabilities
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Real Summation
Common Sense
Real Sequences
Real Numbers
Rational Numbers
Integer Arithmetic
Natural Summation
Natural Additive Identity
Natural Multiplicative Identity
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Pair Unions
Set Symmetric Differences
Pair Intersections
Set Unions
Set Complements
Set Differences
Unordered Pairs
Empty Set
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