Why

We name the image measure of a collection of real-valued random variables.

Definition

The *joint law* of an ordered finite family of n real-valued random variables is the image measure of the tuple-valued function whose components are the individual random variables.

Notation

Let $(X, \mathcal{A}, \mu)$ be a probability space and $(Y, \mathcal{B})$ be a measurable space. Let $f_1, \ldots, f_n : X \to Y$ be random variables. Define $f : X \to Y^n$ by $(f(x))_i = f_i(x)$. The joint law is the image measure of f.

We denote the joint law of $\{f_i\}$ by $\mu_{f_1,\ldots,f_n} : \mathcal{A} \to [0, \infty]$. We defined it by

$$\mu_{f_1,\ldots,f_n}(A) = \mu(\{x \in X \mid f(x) \in A\}).$$

for all A in the product sigma algebra on Y^n.

Random Variables Joint Law

Random Variable Laws

Topological Sigma Algebra

Image Measures

Topological Spaces

Measures

Metrics

Extended Real Numbers

Distance

Real Limits

Space Distance

Sigma Algebra

Absolute Value

Plane Distance

Interval Length

Intervals

Real Line

Real Space

Real Plane

Real Sequences

Real Order

Integral Line

Real Numbers

Geometry

Rational Numbers

Subset Algebras

Integer Arithmetic

Direct Products

Set Numbers

Cardinality

Set Operations

Natural Multiplicative Identity

Natural Additive Identity

Finite Sets

Identity Elements

Arithmetic

Operations

Natural Powers

Integer Products

Equivalent Sets

Function Inverses

Natural Products

Integer Sums

Family Unions and Intersections

Function Images

Function Composites

Families

Natural Sums

Integer Numbers

Functions

Recursion Theorem

Equivalence Relations

Natural Order

Relations

Peano Axioms

Subset Systems

Cartesian Products

Natural Induction

Ordered Pairs

Set Powers

Natural Numbers

Generalized Set Dualities

Set Symmetric Differences

Unordered Triples

Successor Sets

Set Dualities

Intersection of Empty Set

Partitions

Set Unions and Intersections

Set Complements

Pair Unions

Set Intersections

Set Differences

Set Unions

Pair Intersections

Unordered Pairs

Empty Set

Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities

Sets

Names

Letters

Objects