Why

We want a notion of entropy for continuous random variables.

Definition

The *relative entropy* of a probability density function is the integral of the density against the negative log of the density.

Notation

Let R denote the set of real numbers. Let $f : R^n \to R$ be a probability density function. The differential entropy of f is

$$- \int f \log f$$

We denote the differential entropy of f by $h(f)$.

Differential Entropy

Multivariate Real Densities

N-Dimensional Space

Probability Densities

Space

Real Integrals

Nonnegative Integrals

Simple Integrals

Measurable Functions

Simple Functions

Measures

Entropy

Characteristic Functions

Extended Real Numbers

Partitions

Logarithm

Real Functions

Probability Distributions

Real Limits

Intervals

Real Sequences

Real Summation

Probability Outcomes

Real Numbers

Sequences

Natural Summation

Probability

Subset Algebras

Rational Numbers

Family Operations

Direct Products

Common Sense

Cardinality

Set Operations

Integer Numbers

Function Composites

Algebras

Natural Families

Injective Functions

Zero

Operations

Families

Subset Systems

Natural Order

Natural Sums

Equation Solutions

Functions

Power Set

Natural Numbers

Set Symmetric Differences

Relations

Set Unions

Set Intersections

Ordered Pairs

Set Complements

Equations

Unordered Pairs

Set Specification

Set Inclusion

Empty Set

Set Equality

Identity

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Sets

Identities

Objects