Why

Definition

Consider two distributions on the same finite set. The *cross entropy* of the first distribution *relative* to the second distribution is the expectation of the negative logarithm of the first distribution under the second distribution.

Notation

Let R denote the set of real numbers. Let A be a finite set. Let $p : A \rightarrow R$ and $q : A \rightarrow R$ be distributions. The cross entropy of p relative to q is

$$-\sum_{a \in A} q(a) \log(p(a)).$$

We denote the cross entropy of p relative to q by $H(q, p)$.

Cross Entropy

Logarithm

Probability Distributions

Intervals

Real Summation

Probability Outcomes

Real Numbers

Natural Summation

Probability

Rational Numbers

Natural Sums

Family Operations

Common Sense

Integer Numbers

Cardinality

Algebras

Natural Numbers

Operations

Families

Set Intersections

Successor Sets

Functions

Pair Intersections

Relations

Cartesian Products

Set Powers

Unordered Triples

Ordered Pairs

Pair Unions

Set Unions

Empty Set

Unordered Pairs

Set Specification

Set Inclusion

Standardized Accounts

Definitions

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities

Sets

Names

Objects

Letters

3