Why

Definition

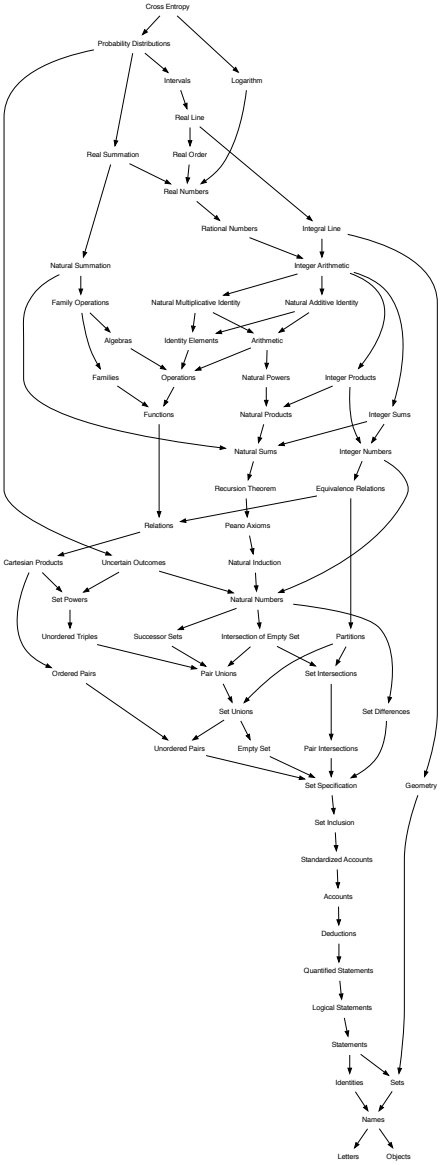
Consider two distributions on the same finite set. The *cross entropy* of the first distribution *relative* to the second distribution is the expectation of the negative logarithm of the first distribution under the second distribution.

Notation

Let R denote the set of real numbers. Let A be a finite set. Let $p : A \to R$ and $q : A \to R$ 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
Probability Distributions
Intervals
Logarithm
Real Line
Real Summation
Real Order
Real Numbers
Rational Numbers
Integral Line
Natural Summation
Integer Arithmetic
Family Operations
Natural Multiplicative Identity
Natural Additive Identity
Algebras
Identity Elements
Arithmetic
Families
Operations
Natural Powers
Integer Products
Functions
Natural Products
Integer Sums
Natural Sums
Integer Numbers
Recursion Theorem
Equivalence Relations
Relations
Peano Axioms
Cartesian Products
Uncertain Outcomes
Natural Induction
Set Powers
Natural Numbers
Unordered Triples
Successor Sets
Intersection of Empty Set
Partitions
Ordered Pairs
Pair Unions
Set Intersections
Set Unions
Set Differences
Unordered Pairs
Empty Set
Pair Intersections
Set Specification
Geometry
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects