Definition

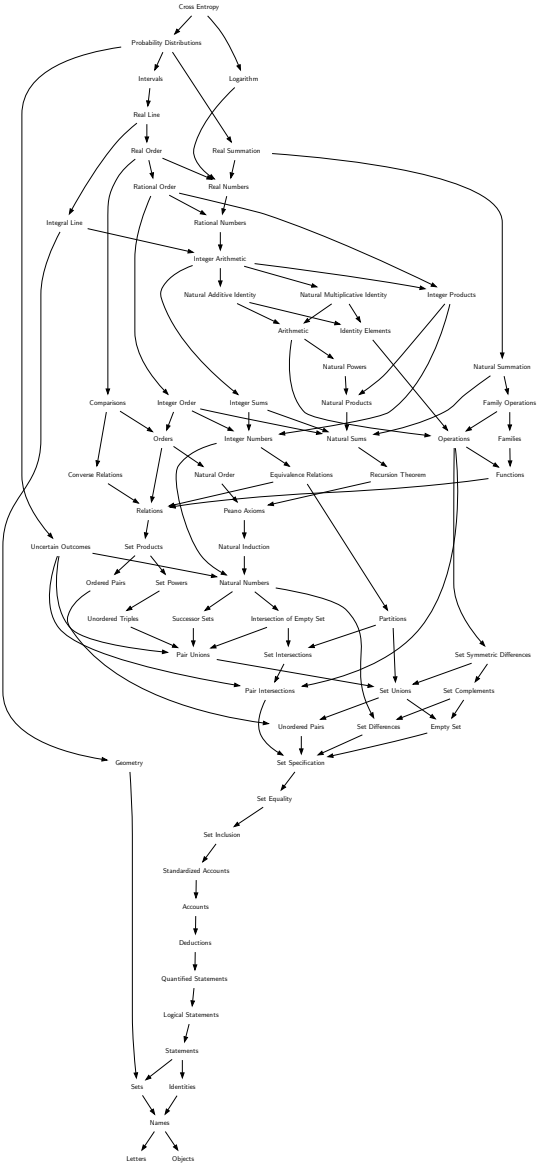
Consider two distributions on the same finite set. The *cross entropy* of the first distribution *relative* to the second distribution is the expectation of the negative logarithm of the first distribution under the second distribution.

Notation

Let A be a finite set. Let $p : A \to \mathbf{R}$ and $q : A \to \mathbf{R}$ 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 Order
Real Summation
Rational Order
Real Numbers
Integral Line
Rational Numbers
Integer Arithmetic
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Arithmetic
Identity Elements
Natural Powers
Natural Summation
Comparisons
Integer Order
Integer Sums
Natural Products
Family Operations
Orders
Integer Numbers
Natural Sums
Operations
Families
Converse Relations
Natural Order
Equivalence Relations
Recursion Theorem
Functions
Relations
Peano Axioms
Uncertain Outcomes
Set Products
Natural Induction
Ordered Pairs
Set Powers
Natural Numbers
Unordered Triples
Successor Sets
Intersection of Empty Set
Partitions
Pair Unions
Set Intersections
Set Symmetric Differences
Pair Intersections
Set Unions
Set Complements
Unordered Pairs
Set Differences
Empty Set
Geometry
Set Specification
Set Equality
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects