Definition

The *entropy* of a distribution is the expectation of the negative logarithm of the distribution under the distribution. It is sometimes called the *discrete entropy* to distinguish it with another related topic.[1]

Notation

Let A be a finite set. Let $p : A \to \mathbf{R}$ be a distribution. The entropy of p is

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

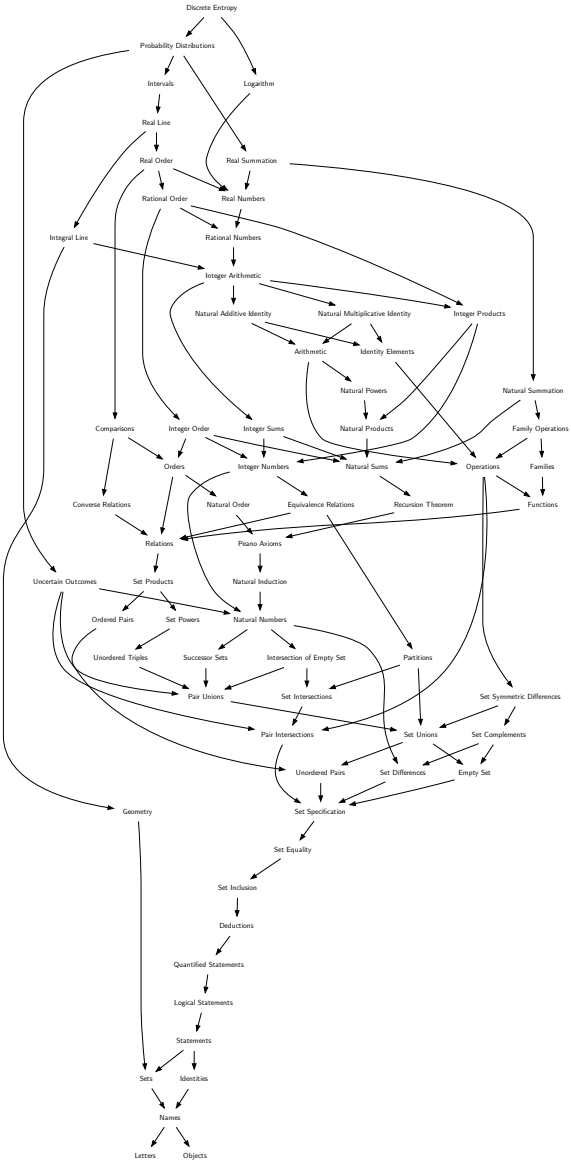
We denote the entropy of p by $H(p)$.

Properties

Let $x : \Omega \to V$ be a discrete random variable.

1. $H(x) \geq 0$
2. $H(f(x)) \leq H(x)$
3. For invertible g, $H(g(x)) \leq H(x)$

[1] Future editions may not forward reference differential entropy.


Discrete Entropy
Probability Distributions
Intervals
Logarithm
Real Line
Real Order
Real Summation
Real Numbers
Rational Order
Rational Numbers
Integral Line
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
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects