Why

Where does entropy come from?[1]

Result

$$H(x) \leq \min_{c:\text{prefix free}} \mathbf{E}[\text{len}(c(x)] \leq H(x) + 1$$

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[1]Futre editions will expand

Optimal Average Codeword Length

Expectation

Prefix-Free Codes

Random Variables

Outcome Variable Expectation

Codes

Measurable Function

Probability Measures

Topological Sigma Algebras

Induced Probability Distributions

Dot-Dash Code

Measure

Topologies

Outcome Variable Events

Flash Code

Sigma Algebras

Event Probabilities

Metrics

Discrete Entropy

Extended Real Numbers

Real Series

Distance

Logarithm

Real Limits

Space Distance

Exponential Function

Absolute Value

Plane Distance

Real Functions

Probability Distributions

Interval Length

Real Space

Intervals

Real Plane

Real Line

Real Order

Real Summation

Real Sequences

Integral Line

Geometry

Rational Order

Real Numbers

Subset Algebras

Sequences

Rational Numbers

Cardinality

Lists

Integer Arithmetic

Set Numbers

Direct Products

Uncertain Outcomes

Integer Products

Natural Multiplication Identity

Natural Additive Identity

Arithmetic

Identity Elements

Natural Summation

Finite Sets

Natural Power

Integer Sums

Integer Order

Comparisons

Equivalent Sets

Family Operations

Function Inverses

Family Unions and Intersections

Natural Products

Integer Numbers

Orders

Operations

Function Images

Function Composites

Families

Natural Sums

Natural Order

Converse Relations

Equivalence Relations

Functions

Recursion Theorem

Peano Axioms

Relations

Ordered Pair Projections

Natural Induction

Set Products

Subset System

Natural Numbers

Set Powers

Generalized Set Dualities

Ordered Pairs

Set Symmetric Differences

Partitions

Intersection of Empty Set

Successor Sets

Unordered Triples

Set Dualities

Set Unions and Intersections

Set Complements

Set Unions

Set Intersections

Pair Unions

Pair Intersections

Set Differences

Empty Set

Unordered Pairs

Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Identities

Sets

Names

Letters

Objects