Definition

Suppose $\mathcal{X}$ is a finite set. A distribution $p : \mathcal{X} \to [0, 1]$ is a *normalized exponential distribution* (also *Gibbs distribution*, *Boltzmann distribution*) if there exists a function $F : \mathcal{X} \to \mathbf{R}$ so that

$$p(x) = \frac{\exp(-F(x))}{\sum_{\xi \in \mathcal{X}} \exp(-F(\xi))} \quad \text{for all } x \in \mathcal{X}$$

The function F is sometimes called the *energy* (or *energy function*) of p.


Normalized Exponential Probability Distributions
Exponential Function
Outcome Probabilities
Real Functions
Intervals
Real Line
Real Order
Real Summation
Rational Order
Real Numbers
Natural Summation
Integral Line
Rational Numbers
Lists
Integer Arithmetic
Natural Fractions
Set Numbers
Direct Products
Integer Products
Natural Additive Identity
Natural Multiplicative Identity
Finite Sets
Identity Elements
Natural Arithmetic
Equivalent Sets
Integer Order
Integer Sums
Natural Powers
Comparisons
Family Operations
Function Inverses
Family Unions and Intersections
Integer Numbers
Natural Products
Orders
Operations
Families
Function Composites
Function Images
Natural Sums
Equivalence Relations
Natural Order
Converse Relations
Functions
Recursion Theorem
Relations
Peano Axioms
Ordered Pair Projections
Uncertain Outcomes
Natural Induction
Set Products
Natural Numbers
Generalized Set Dualities
Set Powers
Set Symmetric Differences
Set Partitions
Set Dualities
Successor Sets
Intersection of Empty Set
Unordered Triples
Set Unions and Intersections
Set Complements
Set Intersections
Pair Unions
Ordered Pairs
Set Differences
Set Unions
Pair Intersections
Empty Set
Unordered Pairs
Geometry
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects