Why

We provide a principle for density selection based on maximizing the probability of the dataset.

Definition

Let $(x^1, \ldots, x^n)$ be a dataset in $\mathbf{R}^d$.

The *principle of maximum likelihood* says to solve:

$$\textbf{find} \quad f \text{ a density}$$
$$\textbf{to maximize} \quad \prod_{k=1}^{n} f(x^k)$$

We call a solution of the above problem a *maximum likelihood density*. We call the objective of the above problem *density likelihood*.

Density Maximum Likelihood

Density Selection · Multivariate Real Densities

Probability Densities

N-Dimensional Space

Real Integrals

Distance

Nonnegative Integrals

Simple Integrals

Space Distance · Maximum Likelihood

Measurable Functions

Plane Distance · Distribution Selection · Optimizers

Measures

Extended Real Numbers · Probability Distributions · Interval Length · Total Orders

Real Limits · Intervals · Datasets

Real Line · Real Plane · Real Space

Real Summation · Real Sequences · Real Order · Integral Line · Geometry · Sequences

Real Numbers

Rational Numbers

Direct Products · Partial Orders

Integer Arithmetic · Set Numbers

Natural Additive Identity · Natural Multiplicative Identity · Finite Sets

Natural Summation · Identity Elements · Arithmetic

Family Operations · Natural Exponents · Integer Products · Equivalent Sets

Algebra · Natural Products · Integer Sums · Function Inverses

Operations · Natural Sums · Integer Numbers · Families · Function Images · Function Composites

Recursion Theorem · Equivalence Relations · Functions · Natural Order

Simple Functions · Peano Axioms · Relations

Subset Systems · Cartesian Products · Characteristic Functions · Uncertain Outcomes · Natural Induction

Ordered Pairs · Set Powers · Natural Numbers · Partitions · Generalized Set Dualities

Set Symmetric Differences · Unordered Triples · Successor Sets · Set Dualities · Intersection of Empty Set · Set Unions and Intersections

Set Complements · Pair Unions · Set Intersections

Set Differences · Set Unions · Pair Intersections

Unordered Pairs · Empty Set

Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities · Sets

Names

Letters · Objects

Sigma Algebras · Subalgebras · Cardinality · Set Operations · Family Unions and Intersections