Why

[1]

Definition

Let Z and X be non-empty finite sets. We want to model a distribution $p^\theta : Z \times X \to \mathbf{R}$. We parameterize a family of distributions by a parameter θ. We have a dataset $(x^1, \ldots, x^n)$. Given a parameter θ^0, we want to solve

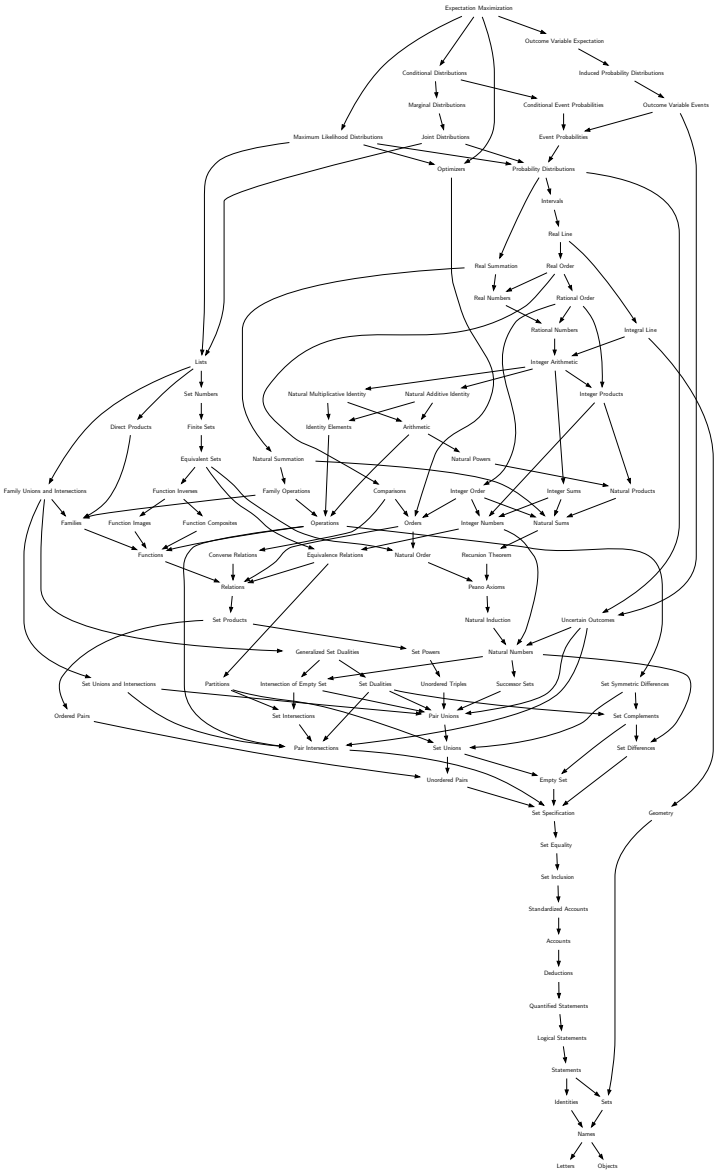
$$\begin{aligned} &\textbf{find} \quad \theta \\ &\textbf{to maximize} \quad \sum_{k=1}^{n} \mathbf{E}_{p^{\theta^0}_{z|x}(z,x^k)} \left[\log p^\theta(z,x)\right] \end{aligned}$$

Binary Gaussian Mixture Example

[2]

[1] Future editions will rework this sheet.

[2] Future editions will expand.


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