Why

Conditioning defines a new distribution on the set of outcomes.

Definition

The conditional probability of any two events defines a new probability mass function over the set of outcomes which is in the second event. The conditional probability of an outcome is the probability of the second event divided into the original probability of the outcome.

Notation

Let p be a probability mass function on the set of outcomes A with the corresponding event probability function $\mathbf{P}$. Then the distribution conditioned on B is $q : A \to \mathsf{R}$, defined by

$$q(a) = \begin{cases} \frac{p(a)}{\mathbf{P}(B)} & \text{if } a \in B \\ 0 & \text{otherwise} \end{cases} .$$

In other words,

$$\mathbf{P}_{A,p}(C \mid B) = \mathbf{P}_{A,q}(C)$$

Definition

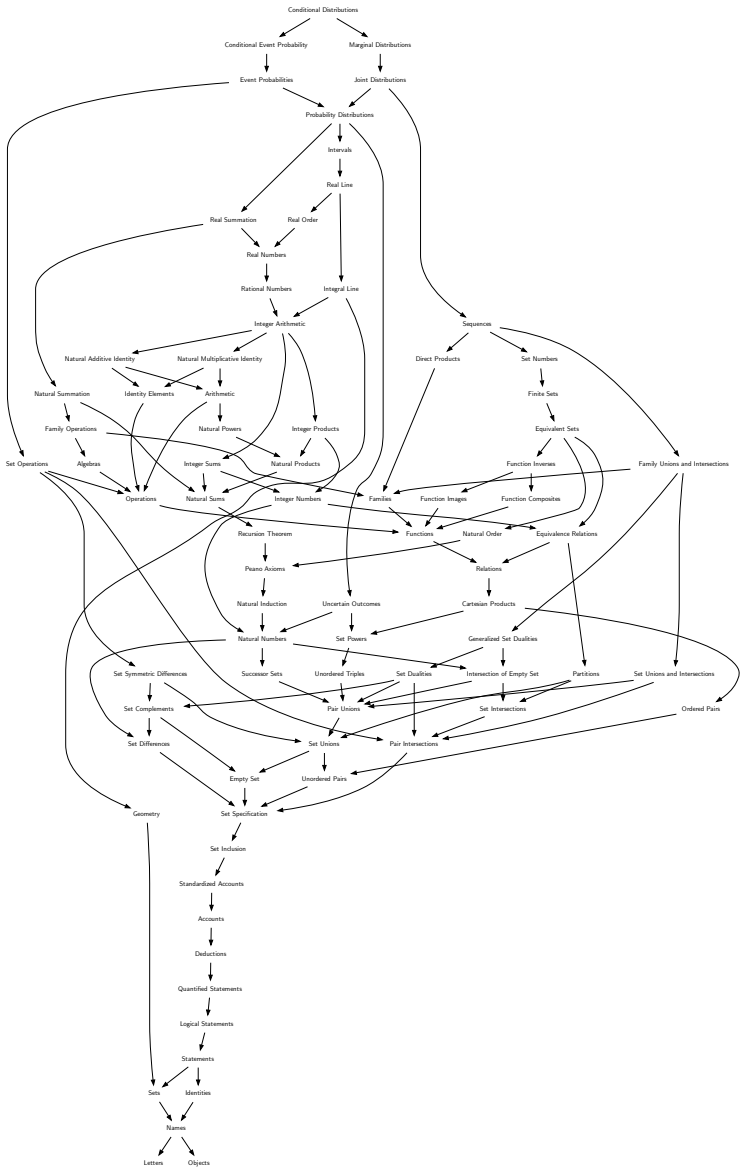
Notation

Let $A_1, \ldots, A_n$ be a sequence of non-empty finite sets. Let $A = \prod_{i=1}^{n} A_i$. Let $p : A \to \mathsf{R}$ be a distribution on A. We denote

the conditional distribution of i on j of p by $p_{i|j} : A_i \times A_j \to R$
For $i, j = 1, \ldots, n$ and $i \neq j$, p_i satisifes

$$p_{i|j}(b, c)p_j(c) = p_{ij}(b, c)$$

for every $b \in A_i$ and $c \in A_j$.


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