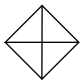


Why

[1]

Definition

Consider a joint distribution with n components. We associate with this joint n *marginal distributions*.

For $i = 1, \dots, n$, the *ith marginal distribution* of the joint is the distribution over the ith set in the product which assigns to each element of that set the sum of probabilities of outcomes whose ith component matches that element.

For $i, j = 1, \dots, n$ and $i \neq j$, the *i,jth marginal distribution* of the joint is the distribution over the product of the ith and jth sets in the original product which assigns to each element in the product the sum of probabilities of outcomes whose i component matches the first component of the product and whose jth component matches the jth component of the product.

Notation

Let $A_1, \dots, A_n$ be non-empty finite sets. Define $A = \prod_{i=1}^{n} A_i$ and let $p : A \to \mathsf{R}$ be a joint distribution.

For $i = 1, \dots, n$, define $p_i : A_i \to \mathsf{R}$ by

$$p_i(b) = \sum_{a_i = b} p(a).$$

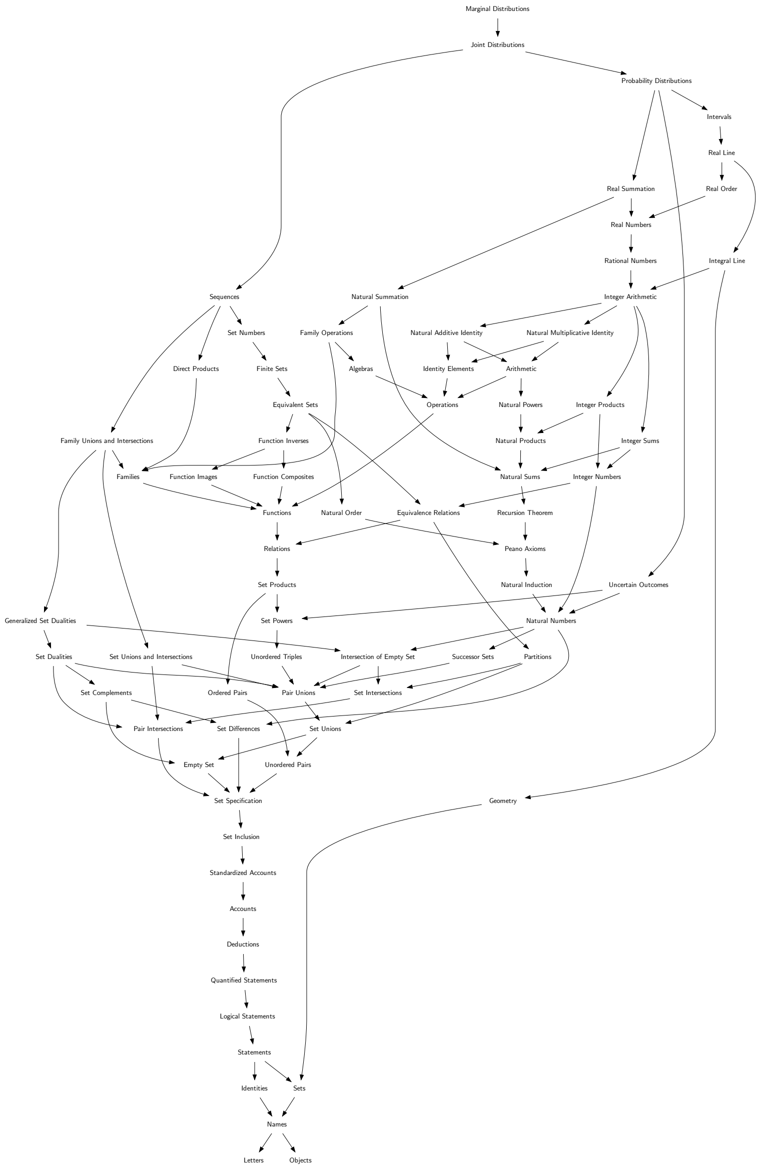
[1] Future editions will include.

for each $b \in A_i$. p_i is the ith marginal of p.

Similarly, for $i, j = 1, \ldots, n$ and $i \neq j$ define $p_{ij} : A_i \times A_j \to \mathsf{R}$ by

$$p_{ij}(b, c) = \sum_{a_i = b, a_j = c} p(a)$$

for every $b \in A_i$ and $c \in A_j$. Then p_{ij} is the i, jth marginal of p.


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