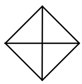


Why

[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 $p : A \to \mathbf{R}$ be a joint distribution.

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

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

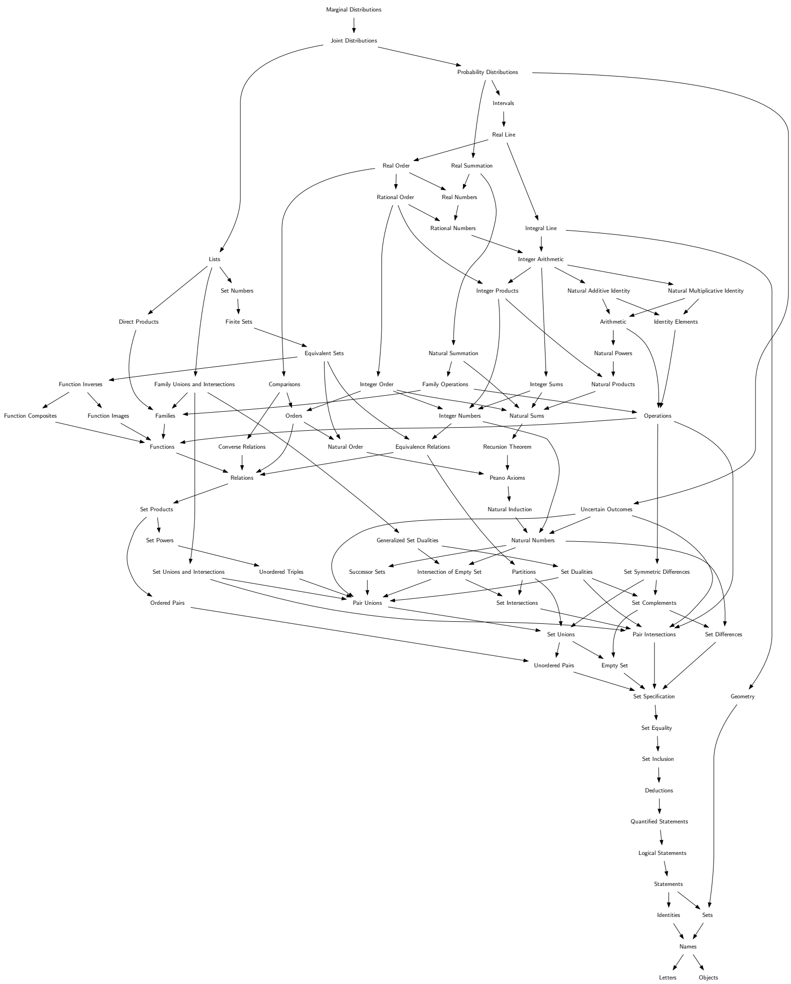
for each $b \in A_i$. p_i is the ith marginal of p.

Similarly, for $i, j = 1, \dots, n$ and $i \neq j$ define $p_{ij} : A_i \times A_j \to \mathbf{R}$ 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.

[1] Future editions will include.


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