### Why

It happens that if a distribution factors according to a tree rooted at a particular vertex, it factors according to a tree rooted at any vertex. So the property of factoring according to a rooted tree is really property of factoring according to a tree.

### Definition

#### 0.1 Defining Result

Proposition **1.** *Let $A_1, \ldots, A_n$ be finite non-empty sets and define $A = \prod_{i=1}^{n} A_n$. Let $p : A \to [0, 1]$ be a distribution and let $T$ be a tree on $\{1, \ldots, n\}$.*

Proposition **2.** *If a distribution factors according to a tree rooted at a vertex it factors according to that tree rooted at any vertex.*

#### Undirected Definition

A distribution *$p$ factors according to the tree $T$* if it factors according to the $T$ rooted at any vertex.

### Existence and Uniqueness

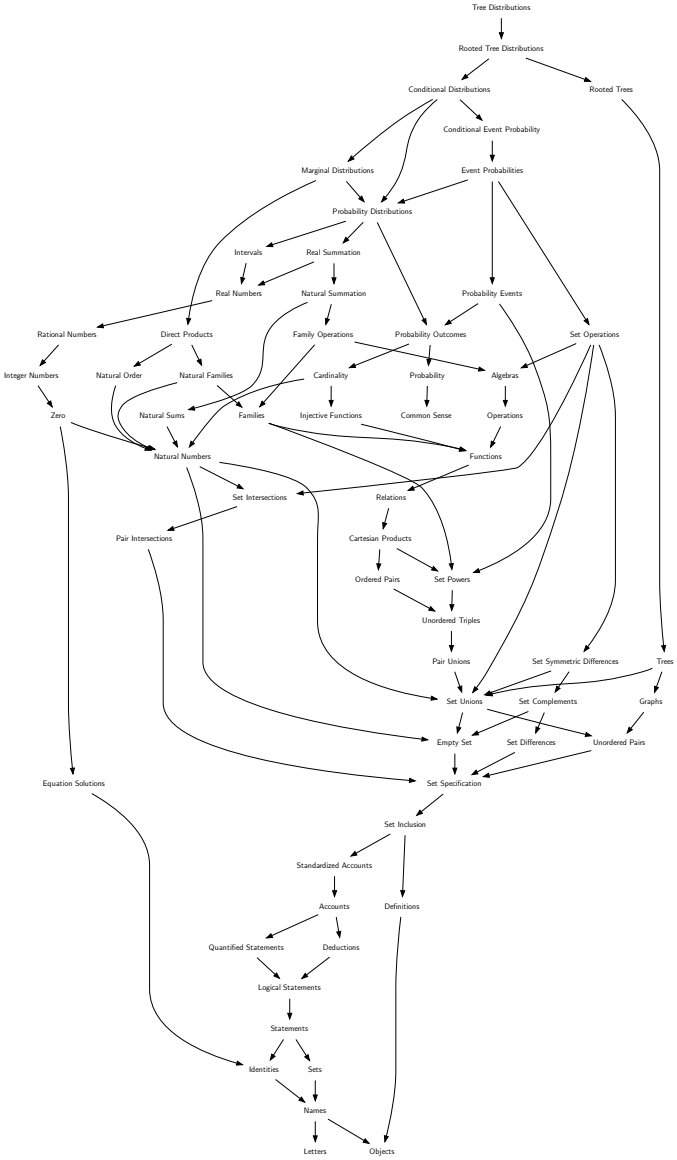
Trees are not a property of distributions, since there is no one-to-one correspondence, as demonstrated by the following propositions.

#### Existence

A distribution $p$ need not factor according to a tree.

#### Uniqueness

A distribution $p$ may factor according to multiple trees.


Tree Distributions
Rooted Tree Distributions
Conditional Distributions
Rooted Trees
Conditional Event Probability
Marginal Distributions
Event Probabilities
Probability Distributions
Intervals
Real Summation
Real Numbers
Natural Summation
Probability Events
Rational Numbers
Direct Products
Family Operations
Probability Outcomes
Set Operations
Integer Numbers
Natural Order
Natural Families
Cardinality
Probability
Algebras
Zero
Natural Sums
Families
Injective Functions
Common Sense
Operations
Functions
Natural Numbers
Set Intersections
Relations
Pair Intersections
Cartesian Products
Ordered Pairs
Set Powers
Unordered Triples
Pair Unions
Set Symmetric Differences
Trees
Set Unions
Set Complements
Graphs
Empty Set
Set Differences
Unordered Pairs
Equation Solutions
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Definitions
Quantified Statements
Deductions
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects