Why

We discuss inductors that produce relations consistent with their given datasets.

Definition

Let $(x_1, y_1), \ldots, (x_n, y_n)$ be a dataset in $X \times Y$. Let $\mathcal{R}$ be the set of all relations on $X \times Y$.

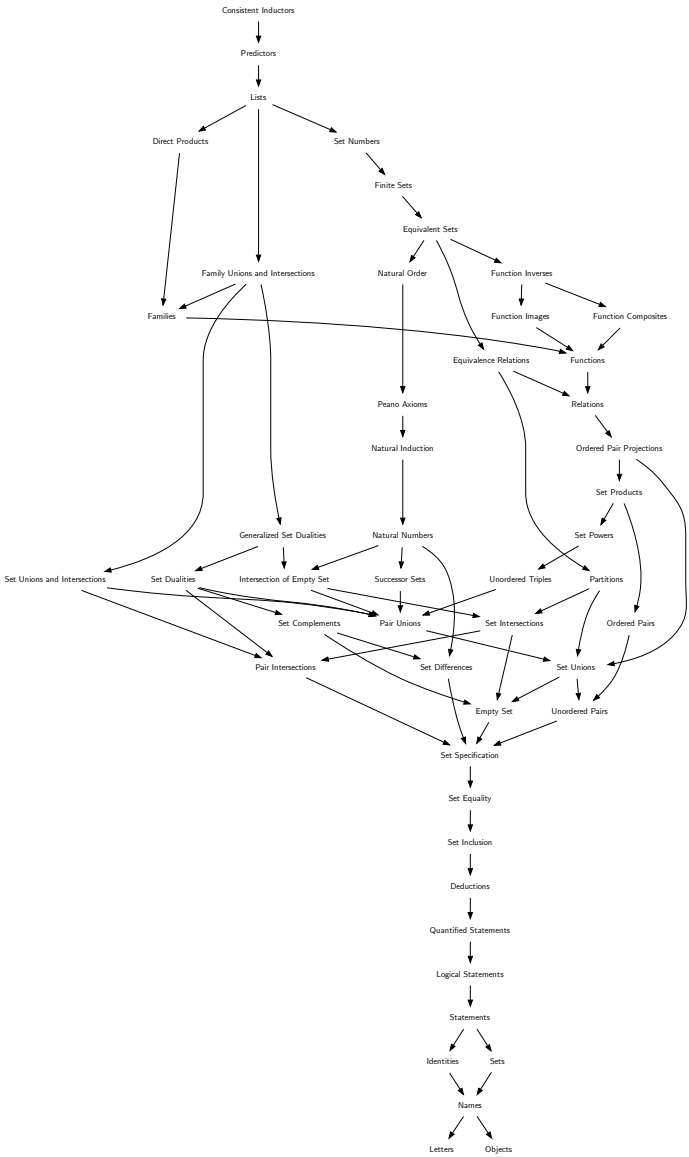
A *consistent inductor* $\{G_n : (X \times Y)^n \to \mathcal{R}\}_n$ is one for which, for all $n \in \mathbf{N}$, for all $D_n \in (X \times Y)^n$, D is consistent with $G_n(D_n)$. In other words, a consistent inductor always produces a relation with which the dataset is consistent.

The interpretation follows. Fix a relation $R^\star$. And let every dataset "shown" to the algorithm G_n be constructed by selecting elements from $R^\star$. In other words, every dataset is a sequence in $R^\star$. In this case, a dataset $D_n \in (X \times Y)^n$ is always consistent with $R^\star$ and so a consistent inductor will never "eliminate" $R^\star$. In other words, the inductor, in order to be consistent "must eliminate" every inconsistent relation.

We may "hope" to give the algorithm a "large and diverse" datset, so that several of the elements of $R^\star$ are included. In this case, the algorithm can "eliminate" many smaller relations in $\mathcal{R}$ which did not include records in the dataset.

Functionally consistent

The rub is that any dataset is consistent with the complete relation $X \times Y$. So we can often consider a set $\mathcal{H} \subset \mathcal{R}$ of relations. It is common to call this a *hypothesis class*, especially for the case in which it consists of functional relations.


Consistent Inductors
Predictors
Lists
Direct Products
Set Numbers
Finite Sets
Equivalent Sets
Family Unions and Intersections
Natural Order
Function Inverses
Function Images
Function Composites
Families
Equivalence Relations
Functions
Relations
Peano Axioms
Natural Induction
Ordered Pair Projections
Set Products
Set Powers
Generalized Set Dualities
Natural Numbers
Set Unions and Intersections
Set Dualities
Intersection of Empty Set
Successor Sets
Unordered Triples
Partitions
Set Complements
Pair Unions
Set Intersections
Ordered Pairs
Pair Intersections
Set Differences
Set Unions
Empty Set
Unordered Pairs
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects