Why

We compare inductors by comparing the predictors they produce. We compare predictors by judging predictions.

Definition

A *loss* function is a nonnegative real-valued function on pairs which is zero only on repeated pairs. It need not be symmetric. The first argument of the loss function is the predicted postcept and the second is the recorded (observed, true, recorded) postcept.

The *loss of a predictor on a pair* is the result of the loss function on the pair. Similarly, the *loss of a predictor on a sequence* of pairs is the sum of the losses on the pairs. The *average loss of a predictor on a sequence* is the loss divided by the length of the sequence. The average loss is also known as the *empirical risk* of the predictor on the dataset.

Notation

Let $(a, b) \in A \times B$; $A, B \neq \varnothing$. For a lost function $\ell : B \times B \to \mathbf{R}$ and predictor $f : A \to B$, the loss of f on (a, b) is

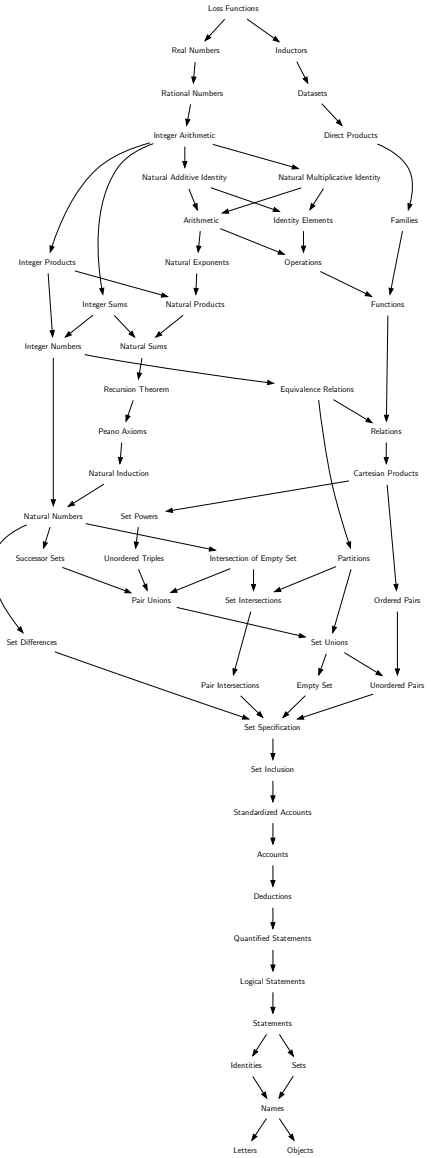
$$\ell(f(a), b).$$

Let $s = ((a^1, b^1), \ldots, (a^n, b^n))$ be a record sequence. The loss of f on s is

$$\sum_{k=1}^{n} \ell(f(a^k), b^k).$$

The average loss of f on s is

$$\frac{1}{n}\sum_{k=1}^{n}\ell(f(a^k),b^k).$$


Loss Functions
Real Numbers
Inductors
Rational Numbers
Datasets
Integer Arithmetic
Direct Products
Natural Additive Identity
Natural Multiplicative Identity
Arithmetic
Identity Elements
Families
Integer Products
Natural Exponents
Operations
Integer Sums
Natural Products
Functions
Integer Numbers
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Recursion Theorem
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Successor Sets
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Intersection of Empty Set
Partitions
Pair Unions
Set Intersections
Ordered Pairs
Set Differences
Set Unions
Pair Intersections
Empty Set
Unordered Pairs
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects