

Empirical Distribution

1 Why

A natural distribution to associate with a dataset is to assign probabilities which are the proporitions.

2 Definition

The *empirical distribution* of a dataset is to assign probabilities to outcomes in accordance to their proportions of appearance in the dataset. The proporitions are nonnegative and sum to one, so this definition yields in a probability distribution.

2.1 Notation

Let (a^1, \ldots, a^n) be a data set in A. Let $q: A \to \mathbb{R}$ be defined by

$$q(a) = \frac{1}{n} |\{k \in \{1, \dots, n\} | a^k = a\}|$$

Then q is the empirical distribution of (a^1, \ldots, a^n) .