Probability Distributions

1 Why

We want to talk about probability over finite sets.

2 Definition

A *probability distribution* or *probability mass function* is a real-valued function from a set of outcomes which is non-negative and normalized. A real-valued function on a finite set is *normalized* if the sum over the its results is 1.

The *probability of an outcome* is the result of the outcome under the probability mass function. When the context is clear, we refer to such a function as a *distribution*. We say that the distribution is *over* outcomes.

2.1 Notation

Let A be a set of outcomes and Let $p : \Omega \to \mathbf{R}$ satisfy

- $p(a) > 0$ for each $a \in A$ and
- $\sum_{a \in A} p(a) = 1$