Assignment 1

Insert author

Insert date

Abstract

Instructions: Please set the following. Experiment with

`\subseteq, \cdots, \cup, \cap, \bigcup, \bigcap, \left( ... \right)`

1 Properties of probability

We review some properties of the probability measure.

1.1 Continuity of P

The following very pleasing property of P is of considerable practical importance. If $\{A_n\}$ is an *increasing* sequence of events, that is, $A_1 \subseteq A_2 \subseteq \cdots$, then $\lim_{n\to\infty} A_n$, given by $\lim_{n\to\infty} A_n = \cup_{i=1}^{\infty} A_i$, satisfies

$$P\left(\lim_{n\to\infty} A_n\right) = \lim_{n\to\infty} P(A_n).$$

Similarly, if $\{A_n\}$ is a *decreasing* sequence of events, that is, $A_1 \supseteq A_2 \supseteq \cdots$, then $\lim_{n\to\infty} A_n$, given by $\lim_{n\to\infty} A_n = \cap_{i=1}^{\infty} A_i$, satisfies

$$P\left(\lim_{n\to\infty} A_n\right) = \lim_{n\to\infty} P(A_n).$$

This property is often used in calculating probabilities. It is used, for example, in proving that the limits of a distribution function near plus and minus infinity are, respectively, 1 and 0.