Probability in Statistics

Your Name

1 Introduction

This document covers the application of probability in statistics.

2 Discrete Random Variables

2.1 Expected Value

2.2 Example Problem

A fair die is rolled. Find the expected value of the outcome.

Solution

The expected value $E(X)$ of a discrete random variable X is given by:

$$E(X) = \sum_{i=1}^{n} x_i P(x_i).$$

For a fair die, the outcomes are $1, 2, 3, 4, 5, 6$, each with probability $\frac{1}{6}$. Thus,

$$E(X) = 1 \cdot \frac{1}{6} + 2 \cdot \frac{1}{6} + 3 \cdot \frac{1}{6} + 4 \cdot \frac{1}{6} + 5 \cdot \frac{1}{6} + 6 \cdot \frac{1}{6} = \frac{21}{6} = 3.5.$$