Week 5

John Daye

Stat 225, Fall 2005

13 Lecture 13

13.1 Random Variable (5.1)

- Definition: A random variable is a real-valued function whose domain is the sample space of a random experiment, that is, $X : \Omega \to \Re$

- Examples:

  1. Toss a coin 2 times. Let $X_1 = \{\#$ of heads$\}$.

  2. Let $X_2 = \{$speed of a randomly selected car in West Lafayette at a given time$\}$.

13.2 Discrete and Continous Random Variables (5.1)

- Discrete Random Variable: A random variable X is called a discrete random variable if it takes on either a finite or countable number of values.

- Continuous Random Variable: A random variable Y is called a continuous random variable if it takes on a continuum of possible values.

- Examples:

1. Toss a coin an infinite number of times. Let $X_3 = \{$ # of heads$\}$.

2. let $X_4 = \{$ Waiting time till you see the first bus $\}$.

13.3 Probability Mass Function (5.2)

- Definition: Let X be a discrete random variable. Then the probability mass function (PMF) of X, denoted p_X, is the real-valued function defined on $\Re$ by

- Fundamental Probability Formula: For a discrete random variable X, the probability that X takes its value in a subset A of real numbers is described by

- Example: Consider the experiment of tossing 4 coins. Let $X = \{$# of heads$\}$.

  1. Obtain the PMF table:

  2. Sketch the PMF histogram:

  3. Find the probability of getting 2 or more heads: