Random Variables
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(modified)

Numerical Quantities whose values are determine by the outcome of a random experiment

Random variables are either

- ***Discrete***
  - Integer valued
  - The set of possible values for *X* are integers
- ***Continuous***
  - The set of possible values for *X* are all real numbers
  - Range over a continuum.

Examples

- ***Discrete***
  - A die is rolled and *X* = number of spots showing on the upper face.
  - Two dice are rolled and *X* = Total number of spots showing on the two upper faces.
  - A coin is tossed *n* = 100 times and *X* = number of times the coin toss resulted in a *head*.
  - We observe *X*, the number of hurricanes in the Carribean from April 1 to September 30 for a given year

Discrete Random Variables

Discrete Random Variable: A random variable usually assuming an integer value.

- a discrete random variable assumes values that are isolated points along the real line. That is neighbouring values are not "possible values" for a discrete random variable

Note: Usually associated with counting

- The number of times a head occurs in 10 tosses of a coin
- The number of auto accidents occurring on a weekend
- The size of a family

Examples

- ***Continuous***
  - A person is selected at random from a population and *X* = weight of that individual.
  - A patient who has received who has revieved a kidney transplant is measured for his **serum creatinine level, *X*,** 7 days after transplant.
  - A sample of n = 100 individuals are selected at random from a population (i.e. all samples of n = 100 have the same probability of being selected) . *X* = the average weight of the 100 individuals.

Continuous Random Variables

Continuous Random Variable: A quantitative random variable that can vary over a continuum

- A continuous random variable can assume any value along a line interval, including every possible value between any two points on the line

Note: Usually associated with a measurement

- **Blood Pressure**
- **Weight gain**
- **Height**