Wed Sept 4th 2019

Lecture 1
Probability

Definitions

- Random experiment: An experiment whose outcome is determined by chance and cannot be predicted with 100% accuracy.

- Sample space: The collection of all possible outcomes of a random experiment.

- Event: A collection of some possible outcomes (a subset of sample space).

- The Probability of an event is a number between 0 and 1, which represents the chance that the event will occur. An event with probability 1 occurs almost surely, while an event with probability 0 has no chance to occur.

How to determine a proper probability?

→ There are three ways to assign a probability to an event.

1) • Personal Method: The probability represents a person's degree of belief that the event will take place.
   - A casual and subjective method.
   - Commonly used in real life, but not in science.

2) • Relative frequency method: Suppose a random experiment is repeated for n times, with event A observed in k times. Then

$$P(A) = k/n$$

   - Need n to be large for accurate estimate
   - Useful in practice when lack prior knowledge.