Lecture Notes: Section 2.4

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1 Overview

Key Points

- Key point 3

2 Detailed Notes

2.1 Subtopic 1

When an experiament is performed there are a number of possible outcomes which may occur, we call those events.
For example say you toss a coin twice, these are some of the possible events

- A - Get the same on both flips
- B - Different on the 2 flips
- C - First flip is H
- D - First flip is T
- F - Second flip is H
- G - Second flip is T
- H - Don't get TH

There is a difference between those events and these, we denote them with the letter E for special cases

- E_1- HH
- E_2- HT
- E_3- TH
- E_4 - TT

The sample space associated with a experiament is associated with all possible sample points

The sample space will be Denoate by $\mathbb{S}$ similar to the universal set

$$S = \{HH, HT, TH, TT\} \tag{1}$$

An event in discrete sample space $\mathbb{S}$ is a collection of sample poitns that is a subset of $\mathbb{S}$

For the events described previously, we have

$$\begin{aligned} A &= \{HH, TT\} \\ B &= \{HT, TH\} \\ C &= \{HH, HT\} \\ D &= \{TH, TT\} \\ F &= \{HH, TH\} \\ G &= \{HT, TT\} \\ H &= \{HH, HT, TT\} \\ E_1 &= \{HH\} \\ E_2 &= \{HT\} \\ E_3 &= \{TH\} \\ E_4 &= \{TT\} \end{aligned} \tag{2}$$

Now we will talk about probablity associated with events

2.2 Subtopic 2

Your notes for subtopic 2

3 Important Formulas/Theorems/Definitions

Key Formula/Theorem

- The discrete case is a probalistic model for an experiament
- Definition: An experiament is the proccess by which an observation is made
  - Tossing a coin or dye a number of times
  - Measuring the height of a group of people
  - Counting the number of bacteria in a certain sample
- Definition: A simple event is a event which cannot be decomposed. Each simple event corresponds to one and only one sample point. The letter E wwith a subscript is used to denote a single simple event/sample point.
- Definition: A discrete sample space is ore that contains either a finite or a countable number of distinct sample points
- Suppose $\mathbb{S}$ is a sample space associated with a expierament. To every event, A in $\mathbb{S}$ (for every $A \subsetneqq S$) We assign a number, P(A) the probablity of A, so the following Axioms hold
  - Axiom 1: $P(A) \geq 0$ for all $A \subsetneqq S$
  - Axiom 2: $P(S) = 1$
  - Axiom 3: If $A_1, A_2$are pairwise mutually exclusive

4 Questions/Topics for Further Study

- Question or topic for further study