STAT 230

July 25 Tutorial

Preview

In this tutorial, we will look at an example where covariance and correlation are calculated. We will interpret the result and comment on independence.

We will also do an example with indicator variables, where expectation and variance are calculated.

We will conclude the tutorial with two questions involving the Central Limit Theorem.

Problem 1

You are given the following joint probability function, f(x, y), for the random variables X and Y in the table below:

y

x

f(x,y)	0	1	2
1	0.2	0.1	0.1
2	0.1	0	0.1
3	0.1	0.2	0.1

a. Determine the correlation coefficient, ρ.

b. Are X and Y dependent or independent?

Problem 2

Suppose that 6 players are seated at a round table. They are identified as Player 1, Player 2, …., Player 6. Each player will flip a fair coin. A player will score a point when their flip matches the flip of both the player on their left AND on their right. Let X represent the number of points scored during one round.

a. Calculate E(X).

b. Calculate Var(X)

Problem 3

Suppose that the weights of bananas (in kg) in your favourite grocery store follow a Uniform(0.1, 0.15) distribution.

a. What is the approximate probability that a bin of 100 bananas at this grocery store weighs between 12.35 and 12.65 kg?

b. Suppose that this grocery store is selling bananas in 20 kg boxes (for those real banana lovers!). What is the minimum number of bananas needed in each box so that the probability that the box has less than 20 kg of bananas is no more than 5%?

Problem 4

Suppose that a fair coin is to be flipped 50 times.

a. What is the probability that exactly 25 heads will be flipped?
b. Approximate the probability in part a. using a Normal approximation.