Stat 134: Section 20

Hank Ibser

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Problem 1

Let X have uniform distribution on $\{-1, 0, 1\}$ and let $Y = X^2$. Are X and Y uncorrelated? Are X and Y independent? Explain carefully.

Ex 6.4.5 in Pitman's Probability

Problem 2

Let T_1 and T_3 be the times of the first and third arrivals in a Poisson process with rate λ. Find $\text{Corr}(T_1, T_3)$.

Ex 6.4.11 in Pitman's Probability

Problem 3

Let A and B be two possible results of a trial, not necessarily mutually exclusive. Let N_A be the number of times A occurs in n independent trials, N_B the number of times B occurs in the same n trials. True or false and explain: If N_A and N_B are uncorrelated, then they are independent.
Ex 6.4.13 in Pitman's Probability

Problem 4

A box contains 5 nickels, 10 dimes, and 25 quarters. Suppose 20 draws are made at random without replacement from this box. Let X be the total sum obtained in these 20 draws. Find

1. $\mathbb{E}[X]$

2. $Var(X)$

3. $P(X \leq \$3)$ using the normal approximation

Ex 6.4.19 in Pitman's Probability

Prepared by Malayandi Palaniappan (Andy) and Dibya Ghosh