Stat 134: Section 9

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Problem 1

Suppose two teams play a series of games, each producing a winner and a loser, until one team has won two more games than the other. Let G be the total number of games played. Assuming your favorite team wins each game with probability p, independently of the results of all previous games, find:

a. $P(G = n)$ for $n = 2, 3, \dots$

b. $\mathbb{E}G$.

c. $Var(G)$

Ex 3.4.18 in Pitman's Probability

Problem 2

Suppose that X and Y are independent Poisson random variables with parameters 1 and 2, respectively. Find

a. $P(X = 1 \ \& \ Y = 2)$

b. $P(\frac{X+Y}{2} \geq 1)$

c. $P(X = 1 | \frac{X+Y}{2} = 2)$

Ex 3.5.8 in Pitman's Probability

Problem 3

Suppose that X has Poisson(μ) distribution and Y has geometric(p) distribution independently of X. Find a formula for $P(Y \geq X)$ in terms of p and μ.
Ex 3.rev.19 in Pitman's Probability

Problem 4

The horn on an automobile operates on demand 99% of the time. Assume that each time you hit the horn, it works or fails independently of all other times

a. How many times would you expect to be able to honk the horn with a 50% probability of not having any failures?

b. What is the expected number of times you hit the horn before the fourth failure?

Ex 3.rev.26 in Pitman's Probability

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