Stat 134: Section 11

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Conceptual Review

Please discuss these short questions with those around you in section. These problems are intended to highlight concepts from lecture that will be relevant for today's problems.

a. If $X \sim Geom(p)$ on $\{1, 2, \ldots\}$, what is $P(X = x)$? What about if $X \sim Geom(p)$ on $\{0, 1, \ldots\}$?

b. What is the way to specify a distribution?

Problem 1

Bill, Mary, and Tom have coins with respective probabilities p_1, p_2, p_3 of turning up heads. They toss their coins independently at the same times.

a. What is the probability that the first person to get a head has to toss more than n times? (What distribution does this follow?)

b. What is the probability that neither Bill nor Tom gets a head before Mary?

Ex 3.4.5 in Pitman's Probability

Problem 2

Suppose X, Y, and Z are independent Poisson random variables, with parameters μ_X, μ_Y, μ_Z respectively. Find:

a. $P(X + Y = 4)$

b. $E((X + Y + Z)^2)$

Problem 3

In Bernoulli (p) trials let V_n be the number of trials required to produce either n successes or n failures, whichever comes first.

a. Write down the range of possible values of V_n.

b. Find the distribution of V_n.

Ex 3.4.14 in Pitman's Probability