Stat 134: Section 5

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Conceptual Review

a. For random variables X, Y, what does $X = Y$ mean? How is this different from saying that X and Y have the same distribution?

b. Let X follow the Hypergeometric (N, G, n) distribution. What does X represent? What are the possible values of X?

c. In a standard deck, how many different ways are there to get two pairs in 4 cards?

Problem 1

A lot of 50 items (10 bad) is inspected by the following two stage plan: (i) A first sample of 5 items is drawn. If all are good the lot is passed; if two or more are bad the lot is rejected. (ii) If the sample contains exactly one bad item, a second sample of 10 more items is drawn from the remaining 45; the lot is rejected if two or more are bad. Otherwise the lot is accepted.

a. What is the probability the sample is drawn and contains more than one bad item?

b. Find the chance the lot is accepted.

Ex 2.5.9 in Pitman's Probability

Problem 2

Eight cards are drawn from a well-shuffled deck of 52 cards. What is the probability the 8 cards contain:

a. two sets of four of a kind (e.g., 4 jacks and 4 kings);

b. exactly 1 set of four of a kind.

Adapted from 2.rev.16 in Pitman's Probability

Problem 3

A fair coin is tossed 3 times. Let X be the number of heads in the first two tosses, and Y be the number of heads in the last two tosses.

a. Make a table showing the joint distribution of X and Y.

b. Are X and Y independent?

c. Find the distribution of $Z = \max\{X, Y\}$.

from Ex 3.1.6 in Pitman's Probability