Stat 134: Section 23

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Problem 1

Let Y have exponential distribution with mean 0.5. Let X be such that, conditional on $Y = y$, X has exponential distribution with mean y. Find:

a. the joint density of (X, Y);

b. $\mathbb{E}(X)$;

c. $Corr(X, Y)$.

Ex 6.rev.8 in Pitman's Probability

Problem 2

Let X have an Exponential (λ) distribution. Suppose that given $X = x$, random variable N follows a Poisson (x) distribution.

1. Find $\mathbb{E}(X^k)$;

2. Identify the distribution of N and provide its parameter(s).

Problem 3

Let X and Y be the minimum and maximum of 8 independent uniform $(0, 1)$ random variables respectively. Find $Corr(X, Y)$.

Problem 4

Divide a standard deck of cards into 4 piles. Let X denote the number of hearts in the first pile, and Y the number of hearts in the second pile. Find $Corr(X, Y)$.