Stat 461 HW #10

Note Title

Problem 1: Defects occur along the length of a filament at a rate of $\lambda = 2$ per foot.

(a) Calculate the probability that there are no defects in the first foot of the filament.

(b) Calculate the conditional probability that there are no defects in the second foot of the filament, given that the first foot contains a single defect.

Problem 2 Let X and Y be independent random variables, Poisson distributed with parameters α and β, respectively. Show that the generating function of their sum $N = X + Y$ is given by

$$g_N(s) = e^{-(\alpha+\beta)(1-s)}$$

Problem 3 Let $\{X(t);\ t \geq 0\}$ be a Poisson process of rate λ. For $s, t \geq 0$, determine the conditional distribution of $X(t)$, given that $X(t+s) = n$.

Problem 4 Find the probability $\mathbb{P}\{X = 1, 3, 5, \cdots\}$ that a Poisson random variable having rate λ, is odd.