

E3106. Prof. Kou, Fall 2005.

Solutions to In-Class Homework Problems 10, 11.

10. Suppose that $E[N(t)] = t/3$. What is $P(N(4) = 0)$?

Solution: Since $E[N(t)] = t/3$, $N(t)$ must be a Poisson process with rate $\lambda = 1/3$. Thus,

$$P(N(4) = 0) = e^{-\lambda 4} \frac{(\lambda 4)^0}{0!} = e^{-\lambda 4} = e^{-4/3}.$$

11. Let X_1, X_2, \dots be independent uniform $(0, 1)$ random variables, and define Y by

$$Y = \min\{n : X_1 + X_2 + \dots + X_n > 1\}.$$

What is $E[Y]$?

Solution:

$$E[Y] = E[N(1) + 1] = (e^1 - 1) + 1 = e.$$