TH Quiz 5 (Pint Processes)

Due May 03, 2020 (11:59 pm)

1. Let N(t) be a Poisson point process with intensity λ=2, and let X1, X2, ⋯ be the corresponding inter-arrival times.
   a. Given that the third arrival occurred at time t=2, find the probability that the fourth arrival occurs after t=4.
   b. Consider the process at time t=10. Let T be the first arrival after t=10. Find E(T) and Var(T).
   c. If N(t) has rate λ, what is the distribution of arrival times T1, T2, ⋯. In particular, for n=1, 2, 3, ⋯, find $E[T_n]$ and $var(T_n)$.
   d. How do you generate the samples of arrival times by using i.i.d exponentially distributed random variables.

2. Assume we have two independent temporal point processes, with histories $H_1(t)$ and $H_2(t)$, using intensities $\lambda_1(t)$ and $\lambda_2(t)$, respectively. Let characterize the joint history $H(t) = H_1(t) \cup H_2(t)$, then find the corresponding intensity function λ(t) by setting up the proper differential equation.