MATH 611

Homework 9

1. Consider a Poisson process with rate . Conditional on there being n arrivals in the interval [0,t], derive the distribution of the number of arrivals in the interval [0,s] where .
2. Buses owned by two different companies, A and B arrive at the same top. Buses A arrive as a Poisson process of rate 2 per hour. Buses B arrive as a Poisson process of rate 1 per hour. Assuming that the two processes are independent, what is the distribution of the waiting time to the arrival of the first bus (of either type)?
3. Referring to the median sampling problem from HW 8, modify your Metropolis-Hastings algorithm to RWMH using a Normal proposal density. In particular, the candidate value is generated from a normal density with mean equal to the current value and standard deviation S.
4. Using the algorithm (function) from question 3, generate two MCMC samples (10000 iterations) for the median, one with S=1 and the other with S=0.1. For both cases use the appropriate numeric values and/or graphical displays to comment on the convergence and the acceptance rate.
5. Answer question 6.14 (b), (Robert and Casella, pg.197).