

Homework 4  
*Ma 623 Stochastic Processes*  
due Tuesday Feb 28 2006

From Ross "Stochastic Processes" 2nd ed. do the following:  
page 153 exercises 3.1, 3.3, 3.7, 3.9.

Now let us try and use simulation to solve problem 3.9. Assume that  $\lambda = 2$  customers per minute, and that  $G = Uniform[0, 1]$ . Use software to generate the Poisson process of the arrivals and the times of the service (the blackout periods). Now calculate the new arrival process.

- (a) Using the elementary renewal theorem you were able to calculate in part (a) of 3.9 the average rate of the new process when  $t$  is large. Now use simulation to do the same thing. Use  $t = 10,000$  minutes and as many repetitions as you think necessary.
- (b) Again using the simulation answer parts (b) and (c) of the problem 3.9. Use the same value for  $t$  as above.
- (c) Calculate using the results in problem 3.9 the theoretical values in (a), (b) above for your specific values of  $\lambda$  and  $G$ . Then record and give the order of difference between the theoretical values and the simulation.