ECEn 370

Homework Problem Set 10

Due on Friday, March 16, 2011.

From Bertsekas and Tsitsiklis, *Introduction to Probability, 2nd Ed.*

1. Chapter 4 Problem 29

2. Chapter 4 Problem 30

3. Chapter 4 problem 31

4. Chapter 4 Problem 33

5. Chapter 4 Problem 35

6. Chapter 4 Problem 36

7. Chapter 4 Problem 41

8. Chapter 4 Problem 43

9. Chapter 4 Problem 44

10. MATLAB Problem
    Sum of a Binomial Number of Independent Uniform Random Variables
    Suppose you live in a small town of a hundred people and you own a small store. Every normal day (excluding Sundays of course) each person in the town has the probability $p = 0.25$ of visiting your store. A person that visits your store will spend money distributed uniformly from 0 to 50 dollars. The amount of money spent in your store on any normal day is Y.

    a) Analytically compute the following: mean of Y, standard deviation of Y (consider page 242 in the book).
    b) Simulate this problem in the following fashion (turn in your code):
    Do the following loop 10,000 times
    —Generate the number of people, n, that visit your store every day by a Binomial random variable.
    —Sum together n random variables with uniform distributions from 0 to 50.
    —Store the sum of money - this is one outcome of the random variable Y.
    After the loop is complete, then compute the mean and standard deviation of the outcomes for Y.
    c) Plot a histogram representing the pdf of Y.
    d) Do the simulated values you computed in part b) match the values in part a)?