ECEn 370

Homework Problem Set 6

Due on Friday, February 17, 2012.

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

1. (5 pts) Schaum's 2.21.
2. (5 pts) Chapter 3 Problem 5.
3. (5 pts) Chapter 3 Problem 6.
4. (15 pts) Chapter 3 Problem 7.
   An example of this type of problem is in continuous_sim_commented.m. One way to do this is to simulate a uniform distribution over a circle of radius 1 and then compute the distance to the point:

   1: define a circle with radius of 1 centered at (0, 0),
   2: generate uniform random variables square defined by (-1,-1),(-1,1),(1,1), and (-1,1),
   3: only accept points that fall in the circle which is equivalent to making sure that all the darts hit within the target,
   4: compute the distances from the center as the values of your random variable.

   Do this simulation for 10,000 points and see if the distribution matches the PDF, the mean, and the variance you calculated in part a. Turn in your code, plots, and calculations.
5. (10 pts) Chapter 3 Problem 9 - a good example of mixed random variables - the answer is right there.
6. (15 pts) Chapter 3 Problem 10.
   Implement part b in MATLAB (look at the solution) to show how you can use this to generate the exponential random variable. Simulate this for 10,000 points and turn in your histogram plot. It should look like the histogram for an exponential random variable.
7. (5 pts) Chapter 3 Problem 11.
8. (5 pts) Chapter 3 Problem 12.
9. (5 pts) Chapter 3 Problem 13.
10. (15 pts) Chapter 3 Problem 15.
    Simulate this problem in MATLAB. It is almost the same kind of problem as the fourth problem on this problem set. When you have accepted points that fall within the semicircle, now just look at the Y values to generate the PDF of Y and $\mathbf{E}[Y]$. Do this for 10,000 points. Turn in your code, plots, and calculations.