ECEn 370

Homework Problem Set 11

Due on Friday, March 23, 2011.

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

1. Chapter 5 Problem 1.

2. Schaum's 4.81.

3. Schaum's 4.82.

4. Chapter 5 Problem 4.

5. Chapter 5 Problem 5.

6. Chapter 5 Problem 8

7. Chapter 5 Problem 9

8. Chapter 5 Problem 10

9. Chapter 5 Problem 11

10. Schaum's 4.85.

11. MATLAB Exercise
    Viewing the Central Limit Theorem
    Perform the following for $N_{\text{variables}}$=1,2,3,5,10,100.

    Let X_i be a uniform random variable over the interval from 0 to 1.
    Let $Y = X_1 + \cdots + X_{N_{\text{variables}}}$

    For each $N_{\text{variables}}$,
    a) Find the mean and standard deviation of Y.
    b) Simulate Y by generating 10,000 points of Y. Plot the estimate of the pdf by dividing the raw histogram by both the total number of points (estimate of probability per interval) and by the length of each interval (estimate of probability density per interval).
    c) On the same graph as the histogram (use the "hold on" and "hold off" commands), plot a Gaussian (normal) random variable with the mean and standard deviation for Y.
    d) Compare the plots obtained in part b) and part c).
    e) Do the means and standard deviations agree with what you found in part a)?

12. MATLAB Exercise
    Repeat Problem 11 for X_i now an exponential random variable with parameter 1.