ECE 3800 Probabilistic Methods of Signal and System Analysis
Homework Assignments

Homework Notes:
- Your submitted skill/text homework solutions must be in the order assigned.
  Problems that are not in the order assigned (1) may not be graded and (2) you may not get credit for the points.

Homework #1 (due 9/14):
Text Problems: 1.4, 1.5, 1.6, 1.9, 1.15, 1.25, 1.27, 1.28, 1.30, 1.35, 1.47, 1.49, 1.53, 1.58, and 1.65

Computer Assignment/Problems:
There are 5 Matlab scripts on line. Download and execute them. Include the plots in your homework assignment to show that you executed the scripts.
C1 Sec1_Marble1: execute the code demonstrated in class
C2 Sec1_Marble2: execute the code demonstrated in class
C3 Sec1_Marble3: execute the code demonstrated in class
C4 Cooper and McGillem HW 1.10.7:
  1-10.7: A multichannel microwave link is to provide telephone communication to a remote community having 12 subscribers, each of whom uses the link 20% of the time during peak hours. How many channels are needed to make the link available during peak hours to:
a.) Eighty percent of the subscribers 100% of the time?
b.) All of the subscribers 95% of the time?
The Matlab computes (i) the percentage of time 0-12 subscriber lines are needed during peak hours and (ii) the probability that n or fewer links can handle the traffic (for n=0 to 12 link). This is a combinatorial example!

C5 Cooper and McGillem HW 1.10.9:
When playing the roulette wheel at a casino you can play based on selecting even/odd or red/black. There are 38 numbers: 0, 00 and 1-36. Even and odd apply to the numbers 1-36 with 0 and 00 not included. Alternately 1-36 are colored red or black with 0 and 00 green. The casino payout is 18/38 for each successful even/odd or red/black bet. For a betting strategy assume (i) that you double your bet after each loss (up to a maximum amount of 128 units), (ii) that you quit a betting session if you must bet more than 128 units to continue or after playing 100 times in a row, and (iii) you repeat using this strategy for 50 sessions. Do you win or lose? How much?
**Homework #2 (due 9/23)**
Text: 2.1, 2.3, 2.4, 2.5, 2.7, 2.11, 2.17, 2.18, 2.21, 2.23, 2.24, 2.27, 2.28, and 2.38

Computer Assignment/Problems: Read and execute the Matlab scripts described in Matlab Homework Set #2. They include HW_2_2_1.m, HW_2_2_4.m, HW_2_3_2.m, and HW_2_4_4.m

**Homework #3 (due 9/30)**
Text: 3.1, 3.3, 3.5, 3.6, 3.10, and 3.12

Computer Assignment/Problems: Execute and provide results for the following Matlab scripts: GaussianDemo.m, ExponentialGen.m, RayleighGen.m, MaxwellGen.m, TriGen.m, and TriRand.m. There are two methods used for generating random variables (1) computing a uniform 0 to 1 distribution and performing an “inverse” CDF mapping to create the random numbers and (2) using sums of MATLAB built in random number generators (rand and randn).

**Homework #4 (due 10/7)**
Computer Assignment/Problems: 3.23, 3.24

**Exam #1 (10/12)**

**Homework #5 (due 10/19)**
Text: 4.1, 4.4, 4.5, 4.6, 4.9, 4.15, 4.18, 4.27, 4.36, 4.37, 4.38, 4.43, 4.47, 4.50, 4.56, and 4.57
Computer Assignment/Problems: None

**Homework #6 (due 10/26)**
Exam 1: all questions as homework
Text: 6.3 (use Bernoulli), 6.4, 6.6, 6.19, 6.26, 6.29

Computer Assignment/Problems: 6.5, 6.9, 6.15 (Matlab please), 6.21, 6.24
Note: the randn(20,1) function would provide 20 data points from a N(0,1) density function.

**Homework #7 (11/2)**
Text: 7.3, 7.6, 7.7, 7.15, 7.16, 7.29
Computer Assignment/Problems: None

**Exam #2 (11/9)**
**Homework #8 (11/16)**
Text: 8.4, 8.6, 8.8, 8.9, 8.16, 9.1, 9.2, 9.3, and 9.4.

Computer Assignment/Problems: None

**Homework #9 (due 11/23)**

Computer Assignment/Problems: None

**Exam #3 (11/30)**

**Homework #10 (due 12/7)**
Final Homework Assignment on web page.
ABET essay on Contemporary Issues.
Questionaire & Comments: Please print, include your name and provide as much or as little information as you desire.

**Final (12/13) → 10:15 AM-12:15 PM**