Math 302: Problem Set 2

Due: September 17, 2009

Email me your m-files and results as attachments in ONE email with each m-file having the format `firstname_lastname_prob.m`. Be sure to comment your code so I can follow it and know when and who wrote it.

1. (20 points) Create a script file called `random` that produces two random 4×4 matrices A and B. Multiply the two matrices with normal matrix operations and display the results using `disp`. Similarly, multiply the two matrices element-wise and display the results using `disp`.
   Grading: 5 points for random matrices, 5 points for normal operations, 5 points for element-wise operations, 5 points for formatting and commenting.

2. (30 points) Create a script file called `savings` that determines the balance in a savings account at the end of every year for the first 10 years. The account has an initial investment of \$1000 and interest rate of 6.5% that compounds annually. Display the information in a table in the Command Window using `fprintf`.

   Recall, for an initial investment of A and interest rate r, the balance B after n years is given by:

   $$B = A\left(1 + \frac{r}{100}\right)^n$$

   Grading: 5 points for correct formula, 10 points for correct usage of `fprintf`*, 10 points for table, 5 points for formatting and commenting.*

3. (50 points) Create a script file called `car` that determines the velocity and distance for a car with acceleration $a = 1.55m/s^2$ every second for the first 10 seconds. Output the results in a file called `carOutput.txt` in a three-column table in which the first column is time (s), the second column is distance (m), and the third column in velocity (m/s).

   Recall, the formulas for velocity (v) and distance (d) as a function of time of a car that accelerates from rest at constant acceleration a are

   $$v(t) = at \text{ and } d(t) = \frac{1}{2}at^2$$

   Grading: 10 points for correct formula, 15 points for correct usage of `fprintf`*, 15 points for table, 10 points for formatting and commenting.*