Math105LB - Project 2

Due: Febuary 27

February 27, 2007

Write a main function (**function FirstLastname()**), which can do the following things (put all in the same file):

1. Initilize matrix $A = [4, 3, 0; 3, 4, -1; 0, -1, 4]$ and a column vector b with ones(3,1).
   (a) (25 points) Call Gauss-Siedel method to solve $Ax = b$ iteratively, display and check the solution.
   (b) (25 points) Call SOR method to solve $Ax = b$ (with $w = 1.25$), display and check the solution.

2. (25 points) Use Newton's method with $x^{(0)} = (-1, -2, 1)^t$ to solve the following nonlinear system with tolerance 10^{-6},

$$\begin{aligned} &x_1^3 + x_1^2 x_2 - x_1 x_3 + 6 = 0, \\ &e^{x_1} + e^{x_2} - x_3 = 0, \\ &x_2^2 - 2x_1 x_3 = 4. \end{aligned} \tag{1}$$

3. (25 points) Find the least square polynomials of degree 3 for the data in the following table.

x_i	0	0.15	0.31	0.5	0.6	0.75
y_i	1.0	1.004	1.031	1.117	1.223	1.422