ENEE 241/MATH 242 Dr. Wolfe ASSIGNMENT #9 Due April 27/28, 2004

Readings: *Linz & Wang* , Section 7.5

1. Problem 3, p.194 *Linz & Wang*
2. Use the MATLAB command FSOLVE to solve the system in problem 1.
3. Solve the system
$$x^2 + xy^3 = 9 \qquad 3x^2y - y^3 = 4$$
using Newton's method for nonlinear systems. Use each of the initial guesses $(x_0, y_0) = (1.2, 2.5), (-2, 2.5), (-1.2, -2.5), (2, -2.5)$. Observe to which root the method converges, the number of iterates required, and the speed of convergence. Write a MATLAB function with the initial guess as input. Include an appropriate stopping criterion and limit the number of iterations. Be sure to take advantage of the fact that MATLAB works with vectors.
4. Consider the system $A\mathbf{x} = \mathbf{b}$ where
$$A = \begin{pmatrix} 4 & -1 & 0 & -1 & 0 \\ -1 & 4 & -1 & 0 & -1 \\ 0 & -1 & 4 & -1 & 0 \\ -1 & 0 & -1 & 4 & -1 \\ 0 & -1 & 0 & -1 & 4 \end{pmatrix}$$
and $\mathbf{b} = (-2, -1, 6, 7, 14)'$. Solve the system using

(a) Jacobi iteration.
(b) Gauss-Seidel iteration. (The MATLAB command TRIL might be useful.)