1. Problem 6.2 from the text.

2. Problem 7.2 from the text.

3. Problem 7.14 from the text. Note: if you write a MATLAB function \([y, J]=g(x)\) that evaluates both \(y = g(x)\) and the Jacobian \(J(x)\), you can optionally choose to set the Jacobian option in \texttt{fsolve} to 'on'.

4. Problem 7.15 from the text. In parts (iii), (vii), and (ix), also report the number of function evaluations.

5. Problem 8.1 from the text.

6. Problem 8.3 from the text, parts (i), (ii), (viii), (ix), (x), (xi), and (xii) only.

7. Problem 8.4 from the text.

8. Problem 8.5 from the text.

In several of these problems, you’ll be using the function \texttt{fsolve} in the Optimization Toolbox of MATLAB. The Optimization Toolbox is available in all of IIT’s computer labs. (See also information at the course web site about remote access to the computer labs.) Type \texttt{help fsolve} at the command line for the syntax and use, or look it up in the Help facility (looking under functions in the Optimization Toolbox section). Your basic syntax would be

\[
[x, fval, exitflag, output] = \texttt{fsolve(@gfun, 0)}
\]

where \texttt{gfun} is a MATLAB function file that you have created that takes (possibly) vector-valued inputs and produces vector-valued outputs. Type \texttt{help function} at the command line of MATLAB if you have not written your own MATLAB functions before.

In the evaluation of \texttt{fsolve}, the output variable \(x\) is the solution, \(fval\) is the value of the function at \(x\), \texttt{exitflag} gives you information about the termination condition of the equation solver, and \texttt{output} has a number of values in it, two of which are requested in the problems.