

## ASE 211 Homework 2

Due: 12:00 noon, Friday, September 15. Put assignments in the drawer on the third floor of WRW marked 'ASE 211.'

1. Consider problem A2.2 in the book. Here you want to find the angle  $\theta$  that satisfies

$$f(\theta) = 1.732 \sin(\theta) - \cos(\theta) + .25 = 0$$

Starting with an initial interval of  $[0,60]$ . Apply 5 iterations (by hand) of the bisection method for determining  $\theta$ .

2. Take 5 iterations of Newton's method (by hand) for problem 1, starting with an initial guess of  $\theta = 30$  degrees.

3. Write a Matlab *m*-file which will implement Newton's method. The outline of the *m*-file is as follows:

```
function newton(x0,xtol,maxiter)
%
% Matlab function which uses Newton's method to find the
% roots of a given function funcf.
%
% m-files funcf.m and funcfp.m which specify the function and its derivative
% must be provided.
%
% xtol is the tolerance used for stopping
% x0 is the starting guess for the method
% maxiter is the maximum number of iterations allowed
%
%
k=0;
x1=x0-funcf(x0)/funcfp(x0);
%
% do until convergence
%
while (abs(x1-x0)>xtol & k <= maxiter)
.....
.....
.....
end
```

```
k
x1
funcf(x1)
```

Use your *m*-file to solve problem 1 with the initial guess given in problem 2. Set  $xtol = .0001$  and  $maxiter = 50$ . Since matlab assumes angles are given in radians, you will need to input your initial guess in radians. 1 degree =  $\pi/180$  radians.

Keep a diary of your matlab session. Hand in all *m*-files and your diary.