Homework 7

CS 323E

Due: 12/06/2001

By going to the class webpages, under assignment 7, you will find a number of .m files related to finding the root of a function. We used these in class. Your final assignment is to organize the various methods into one robust routine, call it

\[
\text{function } x = \text{find\_root}( \text{fncline}, a, b, \text{tol} )
\]

Let \( f(x) \) be the function implemented by the routine passed in parameter \( \text{fncline} \).
Your routine should have the following characteristics:

- It should check whether \( a \) and \( b \) are such that \( \text{sign}(f(a)) \neq \text{sign}(f(b)) \).
- It should make sure that the tolerance \( \text{tol} \) is positive.
- It should find the root \( x^* \) of \( f(x) \) to the indicated tolerance.
- It should somehow combine the bisection method with the secant method so that you get the benefit of guaranteeing that the routine will home in on the root, while getting the benefit of the faster convergence to the root of the bisection method.

- Bonus credit: rig the routine so that it will show the steps being taken on a graph, much like mine do. However, use a different color depending on whether a bisection method step is used or a secant method step. Try to come up with other ways of making the graph illustrate how your routine functions.

- Be creative!