

ASSIGNMENT 8

Due May 4, 2005 (before start of makeup class)

Problem 9

Consider the following iteration scheme

$$x^{(k+1)} = x^{(k)} - \frac{[f(x^{(k)})]^2}{f(x^{(k)} + f(x^{(k)})) - f(x^{(k)})}, \quad k = 0, 1, \dots$$

for finding a root of a scalar function, $f(x)$, of a scalar argument, x , starting with an initial guess $x^{(0)}$.

1. Write a Matlab program to test this method using the function $x^2 - 4 \sin(x)$ with a starting guess $x^{(0)} = 3$. What is the rate of convergence?
2. Also test your program for finding roots of other functions. Is it always possible to obtain solutions to machine accuracy? Explain what you find.
3. Does the method converge at a double root? Test to see what you find.