

COMPUTER HOMEWORK 1 (DUE : February 12, 2009)

1 Write MATLAB functions in the following formats to implement the methods: Bisection, Fixed-Point Iteration, Newton, and Secant and Muller.

- function [xval, funval, iter, error] = bisection(fnc, a, b, tol, maxitr)
- function [xval, funval, iter, error] = newton(fnc, deriv, x0, tol, maxitr)
- function [xval, funval, iter, error] = fixed-point(fnc, x0, tol, maxitr)
- function [xval, funval, iter, error] = secant(fnc, x0, x1, tol, maxitr)
- function [xval, funval, iter, error] = muller(fnc, x0, x1, x2, tol, maxitr)

xval = Value of the root at the present iteration

iter = Iteration number

funval = Value of the function at the present iteration

error = Error message in case of nonconvergence

fnc = The function input as a string

deriv = Derivative of function also given as a string

x0, x1, x2 = Initial approximations

tol = Error tolerance

maxitr = Maximum number of iterations to be performed

Presentation of Results : Present your results both in tabular and graphic forms. The table and graph should display the values of the function and approximate root at each iteration. Results from all the methods need to be presented in the same table and same graph.

Data : Implement the methods using the functions given in Exercises 1, 2(b), and 6 of the Lecture Notes. Data for Muller's method will be given later.

2 . Apply now the built-in MATLAB function **fzero** to the same data and present your results along with those of other methods in the same table and same graph.

3 Write a MATLAB program, using the built-in MATLAB functions, **polyval**, and **polyder** to find a zero of a polynomial, based on Newton's Method with Horner's scheme. Implement the program using the polynomials of Exercises 1 and 7. Present results of each iteration both in tabular and graphic forms.