ESO 208A; ESO 218

Computational methods in engineering

Assignment #2

Due date: August 29, 2013

1. Determine the real roots of $f(x) = -2.0+6x-4x^2+0.5x^3$:

   (a) Graphically and

   (b) Using the Newton-Raphson method to within $\varepsilon_s = 0.01\%$

2. Employ the Newton-Raphson method to determine a real root for $f(x) = -2.0+6x-4x^2+0.5x^3$

   using initial guesses of

   (a) 4.2

   (b) 4.43

   Discuss and use graphical and analytical methods to explain any peculiarities in your results.

3. Determine the roots of the following simultaneous nonlinear equations using

   (a) Fixed-point iteration

   (b) Newton-Raphson method

   $$x = y+x^2-0.5$$
   $$y = x^2-5xy$$

   Employ initial guesses of $x = y = 1.0$ and discuss the results.

4. Use Muller's method to determine real and complex roots of:

   $$f(x) = x^3-x^2+2x-2$$

5. Use Bairstow's method to determine the roots of:

   $$f(x) = -2+6.2x-4x^2+0.7x^3$$