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**Assignment # 2**

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**1353**

**BSCS-6TH Morning**

**Numerical analysis**

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# **Algorithms for False Position**

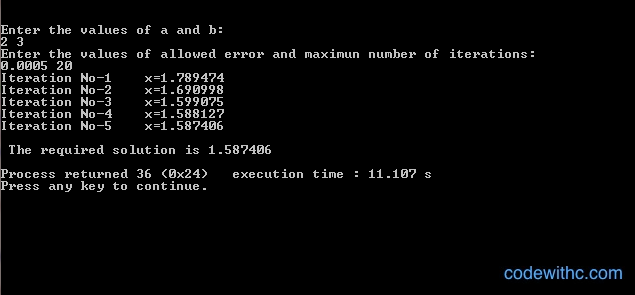
|  |
| --- |
| **y-y_1=(f(x_(n-1))-f(x_1))/(x_(n-1)-x_1)(x_n-x_1)** |

**with y=0, using y_1=f(x_1), and solving for x_n therefore gives the iteration**

|  |
| --- |
| **x_n=x_1-(x_(n-1)-x_1)/(f(x_(n-1))-f(x_1))f(x_1).** |

Secant Method Algorithm:

1. Start
2. Get values of x0, x1 and e  
   \*Here x0 and x1 are the two initial guesses  
   e is the stopping criteria, absolute error or the desired degree of accuracy\*
3. Compute f(x0) and f(x1)
4. Compute x2 = [x0\*f(x1) – x1\*f(x0)] / [f(x1) – f(x0)]
5. Test for accuracy of x2  
   If [ (x2 – x1)/x2 ] > e, \*Here [ ] is used as modulus sign\*  
   then assign x0 = x1 and x1 = x2  
   goto step 4  
   Else,  
   goto step 6
6. Display the required root as x2.
7. Stop



**Algorithm: Bisection method**

Start

1. Decide initial values for x1 and x2 and stopping criterion, E.
2. Compute **f1 = f(x1)** and **f2 = f(x2)**.
3. If **f1 \* f2>0**, x1 and x2 do not bracket any root and go to step 7;  
   Otherwise continue.
4. Compute **x0 = (x1+x2)/2** and compute **f0 = f(x0)**
5. If **f1\*f0 < 0** then  
   **set x2 = x0**  
   else  
   **set x1 = x0**  
   **set f1 = f0**
6. If absolute value of **(x2 – x1)/x2** is less than error E, then  
   **root = (x1 + x2)/2**  
   write the value of root  
   go to step 7  
   else  
   go to step 4
7. Stop.

Newton Raphson Method Algorithm:

1. Start
2. Read x, e, n, d  
   \*x is the initial guess  
   e is the absolute error i.e the desired degree of accuracy  
   n is for operating loop  
   d is for checking slope\*
3. Do for i =1 to n in step of 2
4. f = f(x)
5. f1 = f'(x)
6. If ( [f1] < d), then display too small slope and goto 11.  
   \*[ ] is used as modulus sign\*
7. x1 = x – f/f1
8. If ( [(x1 – x)/x1] < e ), the display the root as x1 and goto 11.  
   \*[ ] is used as modulus sign\*
9. x = x1 and end loop
10. Display method does not converge due to oscillation.
11. Stop

