Analysis of Newton Raphson Method

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***Abstract*- In this review paper, the basic aim of this method is to develop logical thinking and programming ability of students. i want to summerise the benefit of Newton-Raphson method.**
In this paper is about Newton Raphson Method which is all-inclusive solveing the non-square and non-linear problem. The study also aims to comparing the rate of performance, rate of convergence of Bisection method, root findings of the Newton meted and Secant method. It also represents a new approach of calculation using nonlinear equation and this will be similar to Newton Raphson simple method and inverse Jacobian matrix will be used for the iteration process and this will be further used for distributed power load flow calculationd [6, 7]

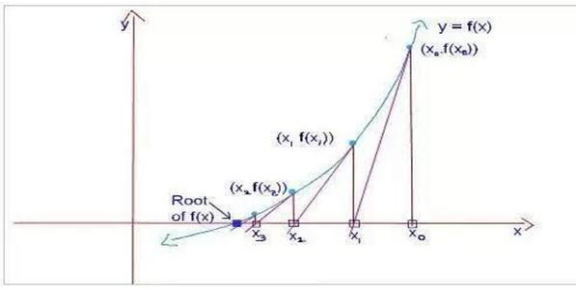
INTRODUCTION

In numerical analysis, Newton-Raphson method is used for finding successively better approximation to the roots of real valued function. This method start with function 'f' defined over the real number 'x' the functions of derivative f' and initial guess x0 for root of the function 'f'. this method is find out by using following formula,

Xn+1 = Xn-f(Xn)/f'(Xn)

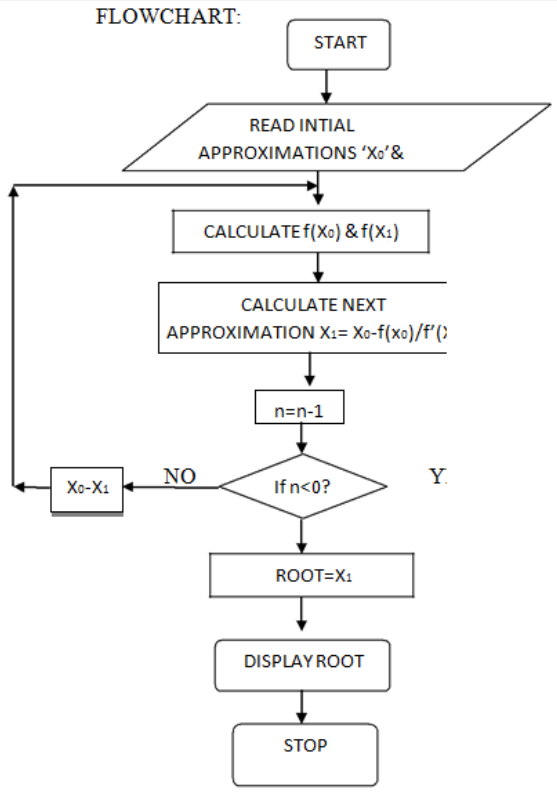
GRAPHICAL INTERPETATION OF NEWTON RAPHSON METHOD

In this representation the initial approximation f(X) =0. And the curve f(X0) is approximated by a straight line which is tangent to the curve at the point P[X0, f(X0)] as shown in following figure below,



Write a equation of this tangent line at a point P
Y-Y0=slope at point P(X-X0)……(1)
We know that,
Y0= f(X)|X=X0=f(X0)
Slope of line at point A = first derivative of f(X) at X=X0
=F'(X0)
Put the value in (1)
Y-f(X0)=f'(X0)[X-X0]
Tangent line crosses X- axis when Y=0 Hence, X=X1
X1=X0-f(X0)/f'(X0)
#some numerical based on NEWTON RAPHSON method [1]
Example 1: using NEWTON RAPHSON method solve the equation f(X)=X-e-X=0, correct up to 5 significant digits after decimal point.
Solution:
f(X)=X-e-x ……(1)
diff (1)
f'(X)=1-e-x …….(2)
put 0.5 in (1)
f(0.5)=0.5-e-0.5
-0.106530659
Put 0.5 in (2)
f'(0.5)=1-e-0.5
0.39346934
X0 should be taken 0.5
Iteration 1:
X1=X0- f(X0)/ f'(X0) =0.5-[-0.106531/1.606531]
=0.566311
Iteration 2:
X2=X1-[f(X1)/f'(X1)]=0.566311-[-0.001305/-1.1567616] =0.56
Iteration 3:
X3=x2-f(x2)/f'(x2)=0.567143-[-0.0000002686/1.567143] =0.567143
Here observe that x2=0.567143 & x3=0.567143
Values repeat up to 6th decimal places Approximate value = 0.567143

FLOWCHART:



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CONCLUSION

In this review paper, we have studied the newton-raphson method.

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