*Iteration Method:*

Iteration Method is a root finding method of an equation.we have so far discussed root-finding methods(Bisection method,false position method)which require an interval in which the root lies.But in Iteration Method it requires one or more approximate values to start the solution and these values need not necessarily bracket the root.The first is the Iteration Method which requires one starting value of x.

To describe this method for finding a root of the equation

*f*(x)=0

we rewrite this equation in the form

x=*p*(x)

then we have to work on this fuction.

*Iteration tasks:*  
1.First we need to find out the first derivative of the function,p’(x).

2.Then find out the value of p’(x) in the given interval such [a,b].

3.If p’(a) and p’(b) both are less than one then “Iteration Method “is applicable.

4.we take an approximate value in the interval,x0.

5.find x1=p(x0).

6.Determine xn+1=p(xn) while the required accuracy is obtained.For this we need to check if

|xn+1-xn|> or = than the given accuracy.

*Newton-Raphson Method:*

This method is generally used to improve the result obtained by one of the previous methods.Let x0 be an approximate root of *f(*x)=0 and let x1=x0+h be the correct root so that *f*(x1)=0.Expanding f(x0+h) by Taylor’s series,we obtain

*f*(x0)+h*f*’(x0)+h2/2!\**f*’’(x0)+…………..=0

Neglecting the second and higer-order derivatives ,we have

*f*(x0)+h*f*’(x0)=0

which gives

h=-*f*(x0)/*f*’(x0)

A better approximation than x0 is ,therefore ,given by x1,where

x1=x0-*f*(x0)/*f* ‘(x0)

Successsive approximation are given by x2,x3,……….xn+1,where

xn+1=xn-*f*(xn)/*f*’(xn)

which is the Newton-Raphson formula.

*Process of using Newton-Raphson method:*

1.Determine first derivative of the given function *f’****(***x).

2.Take an approximate value x0 and determine h=-*f*(x0)/*f’*(x0).

3.Find out x1=x0-*f*(x0)/*f ‘*(x0) and x2,x3,…….and so on until |xn+1-xn|>0r =than the given accuracy