

## SOME DERIVATIVE FREE ITERATIVE METHODS FOR SOLVING NONLINEAR EQUATIONS

**Nusrat Yasmin**

Centre for Advanced Studies in Pure and Applied  
Mathematics, Bahauddin Zakariya University Multan  
PAKISTAN  
nusyasmin@yahoo.com

**Moin-ud-din Junjua**

Centre for Advanced Studies in Pure and Applied  
Mathematics, Bahauddin Zakariya University Multan  
PAKISTAN  
moin\_junjua@yahoo.com

### ABSTRACT

*In this paper we present two new derivative free iterative methods for finding the zeros of the nonlinear equation  $f(x) = 0$ . Finding the zeros of the nonlinear equations is a classical problem in numerical analysis arises frequently in various branches of science and engineering. The aim of this paper is to develop some efficient methods to find the approximation of the root  $\omega$  of the nonlinear equation  $f(x) = 0$ , without the evaluation of the derivatives. The new methods based on the central-difference and forward-difference approximations to derivatives. It is proved that one of the methods has cubic convergence and other method has fourth-order convergence. The benefit of these methods is that these methods do not need to calculate any derivative. Several examples illustrate that the convergence and efficiency of the new methods are better than previous methods.*

*Keywords: nonlinear equations, iterative methods, Newton's method, Central approximation, Derivative free method.*