

Modified Newton's Iterative Method for Solving System of Nonlinear Equations in Two Variables

Authors : Sara Mahesar, Saleem M. Chandio, Hira Soomro

Abstract : Nonlinear system of equations in two variables is a system which contains variables of degree greater or equal to two or that comprises of the transcendental functions. Mathematical modeling of numerous physical problems occurs as a system of nonlinear equations. In applied and pure mathematics it is the main dispute to solve a system of nonlinear equations. Numerical techniques mainly used for finding the solution to problems where analytical methods are failed, which leads to the inexact solutions. To find the exact roots or solutions in case of the system of non-linear equations there does not exist any analytical technique. Various methods have been proposed to solve such systems with an improved rate of convergence and accuracy. In this paper, a new scheme is developed for solving system of non-linear equation in two variables. The iterative scheme proposed here is modified form of the conventional Newton's Method (CN) whose order of convergence is two whereas the order of convergence of the devised technique is three. Furthermore, the detailed error and convergence analysis of the proposed method is also examined. Additionally, various numerical test problems are compared with the results of its counterpart conventional Newton's Method (CN) which confirms the theoretic consequences of the proposed method.

Keywords : conventional Newton's method, modified Newton's method, order of convergence, system of nonlinear equations

Conference Title : ICCM 2018 : International Conference on Computational Mathematics

Conference Location : Dublin, Ireland

Conference Dates : February 15-16, 2018