Application of newton-gs iteration with quadrature scheme to solve nonlinear Fredholm integral equations

ABSTRACT

This paper presents the application of Newton Gauss-Seidel (Newton-GS) iteration with the first-order quadrature scheme to solve nonlinear Fredholm integral equations of second kind (NFIE-2). By using first-order quadrature scheme, a system of nonlinear Fredholm integral equation can be generated. Actually, Newton-GS iteration is based on the combination of Newton's method and GaussSeidel iteration. Based on this combination, this Newton's method is used to linearize the generated system of nonlinear system to a linear system and then solved it iteratively by using Gauss-Seidel iteration. To illustrate the effectiveness of the Newton-GS method, the numerical experiments have been conducted by comparing the results with Newton-Jacobi. Referring to three main criteria of comparison, which is number of iteration, iteration time and maximum absolute error. The comparative results show that Newton-GS is superior to Newton-Jacobi.