

Quartic non-polynomial spline solution for solving two-point boundary value problems by using Conjugate Gradient Iterative Method

Abstract

Solving two-point boundary value problems has become a scope of interest among many researchers due to its significant contributions in the field of science, engineering, and economics which is evidently apparent in many previous literary publications. This present paper aims to discretize the two-point boundary value problems by using a quartic non-polynomial spline before finally solving them iteratively with Conjugate Gradient (CG) method. Then, the performances of the proposed approach in terms of iteration number, execution time and maximum absolute error are compared with Gauss-Seidel (GS) and Successive Over-Relaxation (SOR) iterative methods. Based on the performances analysis, the two-point boundary value problems are found to have the most favorable results when solved using CG compared to GS and SOR methods.