

Application of Refinement Successive OverRelaxation (RSOR) in Solving the Piecewise Polynomial on Fredholm Integral Equation of the Second Type

ABSTRACT

This paper establishes an effective and reliable algorithm for solving the second type of FIE based on the first-order piecewise polynomial and the first-order quadrature method. The algorithm, which is called Composite Trapezium (CT), is generally used to discretize any integral term. This paper also aims to derive a Composite Trapezium (CT) with first-order piecewise polynomial and first-order quadrature linear collocation approximation equation generated from the discretization process of the proposed problem by considering the distribution of node points with vertex-centered. Accordingly, we built a system of CT linear collocation approximation equations using collocation node points over the approximation equation for linear collocation. The coefficient matrix is large and dense. In addition, this research also considered the effective Refinement Successive Over-Relaxation (RSOR) algorithm to obtain the piecewise linear collocation solution of this linear problem. In order to test the proposed iterative methods, three tested examples were solved. The results were subsequently obtained based on three parameters, including the iterations (I), execution period (s), and the maximum absolute error, which was all recorded and further compared with two iterations, SOR and RSOR.