Refinement of SOR iterative method for the linear rational finite difference solution of second-order Fredholm Integro-differential equations

ABSTRACT

The primary objective of this paper is to develop the Refinement of Successive Over-Relaxation (RSOR) method based on a three-point linear rational finite difference-quadrature discretization scheme for the numerical solution of second-order linear Fredholm integro-differential equation (FIDE). Besides, to illuminate the superior performance of the proposed method, some numerical examples are presented and solved by implementing three approaches which are the Gauss-Seidel (GS), the Successive Over-Relaxation (SOR) and the RSOR methods. Lastly, through the comparison of the results, it is verified that the RSOR method is more effective than the other two methods, especially when considering the aspects of the number of iterations and running time.