

## **Redlich-Kister finite difference solution for two-point boundary value problem by using MKsor iteration**

### **ABSTRACT**

In this study, two-point boundary value problems (BVPs) have been considered and discretized by using the second-order Redlich-Kister Finite Difference (RKFD) discretization scheme in order to get a large-scale and sparse linear system. In the process of obtaining the linear system, firstly we propose the second-order RKFD discretization scheme and then discretize all derivative terms of the proposed problems for the derivation of the corresponding second-order RKFD approximation equation. Due to the generation of a large-scale linear system, the iterative methods namely Gauss-Seidel, Kaud Successive Over Relaxation and Modified Kaud Successive Over Relaxation (MKSOR) iterative method had been chosen in this study to get the Redlich-Kister solution. For the sake of comparison, these iterative methods have been tested for solving three examples in which all numerical results obtained have been recorded based on three measurement parameters such as number of iterations (Iter), execution time (Time) and maximum error. The combination of MKSOR iteration method with RKFD discretization scheme was found to be superior compared to other iterations.