

## **Preconditioned successive over relaxation iterative method via semi-approximate approach for Burgers' equation**

### **ABSTRACT**

This paper proposes the combination of a preconditioner applied with successive over relaxation (SOR) iterative method for solving a sparse and huge scale linear system (LS) in which its coefficient matrix is a tridiagonal matrix. The purpose for applying the preconditioner is to enhance the convergence rate of SOR iterative method. Hence, in order to examine the feasibility of the proposed iterative method which is preconditioner SOR (PSOR) iterative method, first we need to derive the approximation equation of one-dimensional (1D) Burgers' equation through the discretization process in which the second-order implicit finite difference (SIFD) scheme together with semi-approximate (SA) approach have been applied to the proposed problem. Then, the generated LS is modified into preconditioned linear system (PLS) to construct the formulation of PSOR iterative method. Furthermore, to analyze the feasibility of PSOR iterative method compared with other point iterative methods, three examples of 1D Burgers' equation are considered. In conclusion, the PSOR iterative method is superior than PGS iterative method. The simulation results showed that our proposed iterative method has low iteration numbers and execution time.