Numerical Solution of the Time-fractional Diffusion Equations via Quarter-sweep Preconditioned Gauss-seidel Method

ABSTRACT

In this research, we propose the approximate solution of the time-fractional diffusion equation based on a quarter-sweep implicit finite difference approximation equation. To derive this approximation equation, Caputo's time-fractional derivative has been used to discretize the proposed problems. By using the Caputo finite difference approximation equation, a linear system will be generated and solved iteratively. In addition to that, formulation and implementation the QSPGS iterative method are also presented. Based on the numerical results of the proposed iterative method, it can be concluded that the proposed iterative method is superior to the FSPGS and HSPGS iterative method.