

SOR method for the implicit finite difference solution of time-fractional diffusion equations

Abstract

In this study, we derive an unconditionally implicit finite difference approximation equation from the discretization of the one-dimensional linear time fractional diffusion equations by using the Caputo's time fractional derivative. Then this approximation equation hence will be used to generate the corresponding system of linear equations. The approximation solution of the linear system is described via the implementation of Successive Over-Relaxation (SOR) iterative method. An example of the problem is presented to illustrate the effectiveness of SOR method. The findings of this study show that the proposed iterative method is superior compared with the Gauss-Seidel iterative method.