# Implicit finite difference solution for time-fractional diffusion equations using AOR method


## ABSTRACT

In this paper, we derive an implicit finite difference approximation equation of the one-dimensional linear time fractional diffusion equations, based on the Caputo's time fractional derivative. Then this approximation equation leads the corresponding system of linear equation, which is large scale and sparse. Due to the characteristics of the coefficient matrix, we use the Accelerated Over-Relaxation (AOR) iterative method for solving the generated linear system. One example of the problem is presented to illustrate the effectiveness of AOR method. The numerical results of this study show that the proposed iterative method is superior compared with the existing one weighted parameter iterative method.