

An efficient spectral approximation for solving several types of parabolic PDEs with nonlocal boundary conditions

Abstract

The problem of solving several types of one-dimensional parabolic partial differential equations (PDEs) subject to the given initial and nonlocal boundary conditions is considered. The main idea is based on direct collocation and transforming the considered PDEs into their associated algebraic equations. After approximating the solution in the Legendre matrix form, we use Legendre operational matrix of differentiation for representing the mentioned algebraic equations clearly. Three numerical illustrations are provided to show the accuracy of the presented scheme. High accurate results with respect to the Bernstein Tau technique and Sinc collocation method confirm this accuracy.

Keyword: Parabolic partial differential equations (PDEs); Nonlocal boundary conditions