

Full-Discretized Numerical Methods for Solving a Class of Integro-Differential Equations of the First Kind

蔣世中

Finance

Management

chiang@chu.edu.tw

Abstract

This study presents full-discretized numerical algorithms for solving a class of integro-differential equations of the first kind. This class of equations consists of an integro-differential term containing an Abel-type kernel. First kind equations with a weakly singular kernel originated from an aeroelasticity problem. The authors propose full-discretized central difference numerical methods, central difference and center point (CC) and central difference and integration (CI), for equations with weakly singular kernels and obtain superior results by revising the numerical algorithms to create central difference, center point, and revision (CCR) and central difference, integration, and revision (CIR) for the corresponding equations with nonsingular kernels. The feasibility of the proposed numerical algorithms is demonstrated by applying them to examples in which the CPU times and maximum errors are compared with exact solutions.

Keyword : full-discretized numerical algorithms , integro-differential equations of the first kind