



Exponential Trapezoidal Product Integration Schemes on Graded Meshes for a Tempered Type Integrodifferential Equation

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Abstract

The importance of evaluating the tempered fractional integral has grown as a result of the increasing popularity of tempered fractional equations in mathematics and applied sciences [1]. In the present study, a numerical investigation of a fully discrete Crank-Nicolson scheme for a tempered-type integrodifferential equation with a diffusion operator is presented [3]. Graded temporal meshes are implemented to eliminate the Runge phenomenon [2].

The experiments confirm that the ETPI (Exponential Trapezoidal Product-Integration) method achieves stable second-order convergence for different problems. Comparisons show that other hybrid schemes yield unstable results in cases of different fractional parameters or periodic exact functions.

Keywords: Tempered fractional integral, exponential trapezoidal product integration, Crank-Nicolson scheme.

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