

A Variable Time-Step Method for a Space Fractional Diffusion Moving Boundary Problem: An Application to Planar Drug Release Devices

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Abstract

In this paper we consider an anomalous diffusion model in a planar polymeric matrix as a space-fractional diffusion problem with moving boundary conditions. An iterative implicit finite difference method with variable time-steps is established to solve the proposed problem. The stability and consistency of the numerical method are proved and the estimation of the numerical error is conducted. The numerical results are compared with the scale-invariant solutions when the diffusion coefficient is a constant and the agreement between the numerical results and the scale-invariant solutions is investigated. Furthermore the numerical results for a test case with time-dependent diffusion coefficient are reported.

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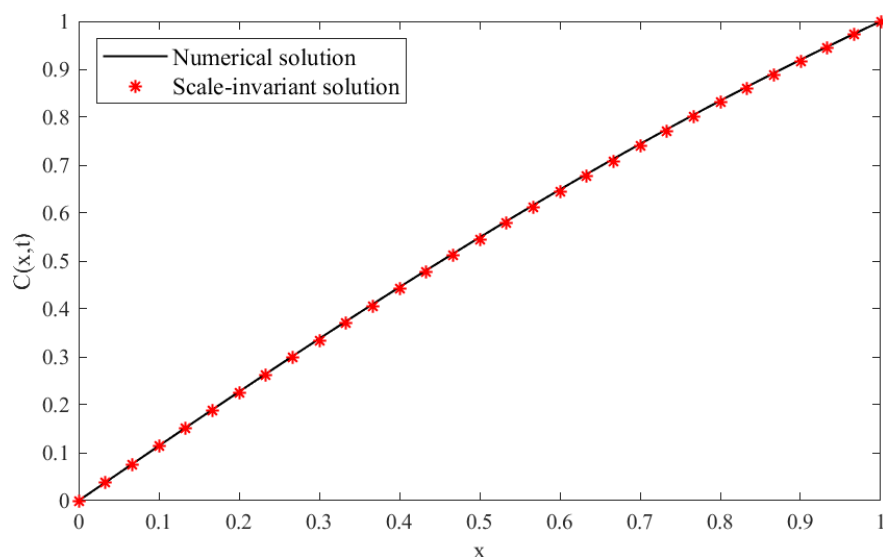


Figure 1: This is a caption