

عنوان مقاله:

Numerical solution of non-linear fractional Riccati differential equations using compact finite difference method

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خلاصه مقاله:

This paper aims to apply and investigate the compact finite difference methods for solving integer-order and fractional-order Riccati differential equations. The fractional derivative in the fractional case is described in the Caputo sense. In solving the Riccati equation, we first approximate first-order derivatives using the approach of compact finite difference. In this way, the system of nonlinear equations is obtained, which solves the Riccati equation. In addition, we examine the convergence analysis of the proposed approach for the fractional and nonfractional cases and prove that the methods are convergent under some suitable conditions. Examples are also given to illustrate the efficiency of our method compared to other methods.

کلمات کلیدی:

Fractional Riccati Equation, Caputo fractional derivative, Compact Finite Difference Methods

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