

Numerical solutions of linear time-fractional Klein-Gordon equation by using power series approach

Abstract: In this paper, we provide approximate solution to linear time fractional Kline-Gordon equations (FKGEs) with initial conditions by using the residual power series (RPS) method. The proposed technique relies on generalized Taylor formula under Caputo sense aiming at extracting a supportive analytical solution in convergent series form. Graphical results show the geometric behaviors to the approximate solutions at different values of fraction order γ . The numerical analysis detects that the RPS technique is an efficient, simple and powerful tool to determine the solutions of the time-fractional KGE.

Keywords: Fractional partial differential equations; Klein–Gordon equations; Caputo fractional derivative.

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