

An Innovative Method to the Fractional Diffusion-Wave Equation

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Abstract: *A fundamental mathematical model with numerous applications in physics, engineering, and biology is the fractional diffusion-wave equation. In this study, we suggest a novel and effective numerical approach for resolving this difficult problem. The fractional diffusion-wave equation has traditionally been computationally challenging and frequently restricted to particular situations or too simplistic scenarios. To overcome this issue, our revolutionary strategy makes use of cutting-edge numerical approaches and creative algorithms. We present a fresh discretization approach that preserves computing effectiveness while capturing the subtleties of fractional derivatives. The solutions to the linear and non-linear fractional diffusion wave equations have been found in this study using a new, creative technique. To show the effectiveness of the method, instances with clear solutions are applied.*

Keywords: New Iterative Method, Fractional Diffusion – wave Equation, Fractional initial value problems, Caputo fractional derivative

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