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TITLE: Controlled Picard's Transform technique for solving a type of time fractional Navier–Stokes equation resulting from Incompressible Fluid Flow

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ABSTRACT:

In this article, a new developed approach to solve multi-dimensional, time-fractional Navier–Stokes equation resulting from the incompressible fluid flow is presented. Controlled Picard's technique is merged with Laplace transform producing an elegant frame characteristic with its ability to solve nonlinear fractional equations, without the calculation of Lagrange multiplier or Adomian polynomial, and the presence of the small parameter, which reinforces the convergence and is convenient for nonlinear differential equations. The characteristic of this approach is its ability to combine two robust methods in the presence of the auxiliary parameter h for determining exact and approximate analytical solutions for nonlinear equations. Three patterns of Navier–Stokes equation in two and three dimensions are presented to show the validity and to clarify the reliability of the proposed new scheme. Figures have been obtained with Mathematica 12 to verify the efficacy and accuracy of the proposed new method.

CONTRIBUTION OF THE APPLICANT:

- Literature review.
- Ideas involved.
- The mathematical model and its solution.
- Analysis of the results.
- Writing up the manuscript.

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