

An Efficient Collocation Method for Solving the Variable-Order Time-Fractional Partial Differential Equations Arising from the Physical Phenomenon

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Abstract : In this work, we present an efficient approach for solving variable-order time-fractional partial differential equations, which are based on Legendre and Laguerre polynomials. First, we introduced the pseudo-operational matrices of integer and variable fractional order of integration by use of some properties of Riemann-Liouville fractional integral. Then, applied together with collocation method and Legendre-Laguerre functions for solving variable-order time-fractional partial differential equations. Also, an estimation of the error is presented. At last, we investigate numerical examples which arise in physics to demonstrate the accuracy of the present method. In comparison results obtained by the present method with the exact solution and the other methods reveals that the method is very effective.

Keywords : collocation method, fractional partial differential equations, legendre-laguerre functions, pseudo-operational matrix of integration

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