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SOLVING FUZZY FRACTIONAL WAVE EQUATION BY THE VARIATIONAL ITERATION METHOD IN FLUID MECHANICS

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Abstract

In this paper, we are extending fractional partial differential equations to fuzzy fractional partial differential equation under Riemann-Liouville and Caputo fractional derivatives, namely Variational iteration methods, and this method have applied to the fuzzy fractional wave equation with initial conditions as in fuzzy. It is explained by one and two-dimensional wave equations with suitable fuzzy initial conditions.

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Content may be subject to copyright.J. Korean Soc. Ind. Appl. Math. Vol.23, No.4, 381–394, 2019 <http://doi.org/10.12941/jksiam.2019.23.381>**SOLVING FUZZY FRACTIONAL WAVE EQUATION BY THE VARIATIONAL
ITERATION METHOD IN FLUID MECHANICS**

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ABSTRACT. In this paper, we are extending fractional partial differential equations to fuzzy fractional partial differential equation under Riemann-Liouville and Caputo fractional derivatives, namely Variational iteration methods, and this method have applied to the fuzzy fractional wave equation with initial conditions as in fuzzy. It is explained by one and two-dimensional wave equations with suitable fuzzy initial conditions.

1. INTRODUCTION

In now a day, there have been many implementations in obtaining exact solutions in the subject of a fuzzy fractional partial differential equation. Amiri defines the fuzzy generalized Pantograph Equation under Hukuhara differentiability [1]. The concept of the fuzzy derivative was initially defined by Chang and Zadeh [2]. The concept of the fuzzy matrix is first introduced by Thomason 1977 [3]. VIM for obtaining the analytical solution of nonlinear fuzzy initial value problem (NLFIVP) relating to the fuzzy Duffing's equation without changing of the first-order system [4]. Applications of VIM, and finding the exact solution of fractional order by using FIVP is compared [5]. Jafari had explained Huan VIM for fractional Riccati differential equation with following NL equations,

$${}^c D_{0+}^\alpha u(t) = A(t) + B(t)u + C(t)u^2, t > 0, m - 1 < \alpha \leq m, \quad (1.1)$$

with fuzzy initial condition,

$$u^j(0) = \tilde{C}_j, j = 1, \dots, m - 1, m \in \mathbf{N}$$

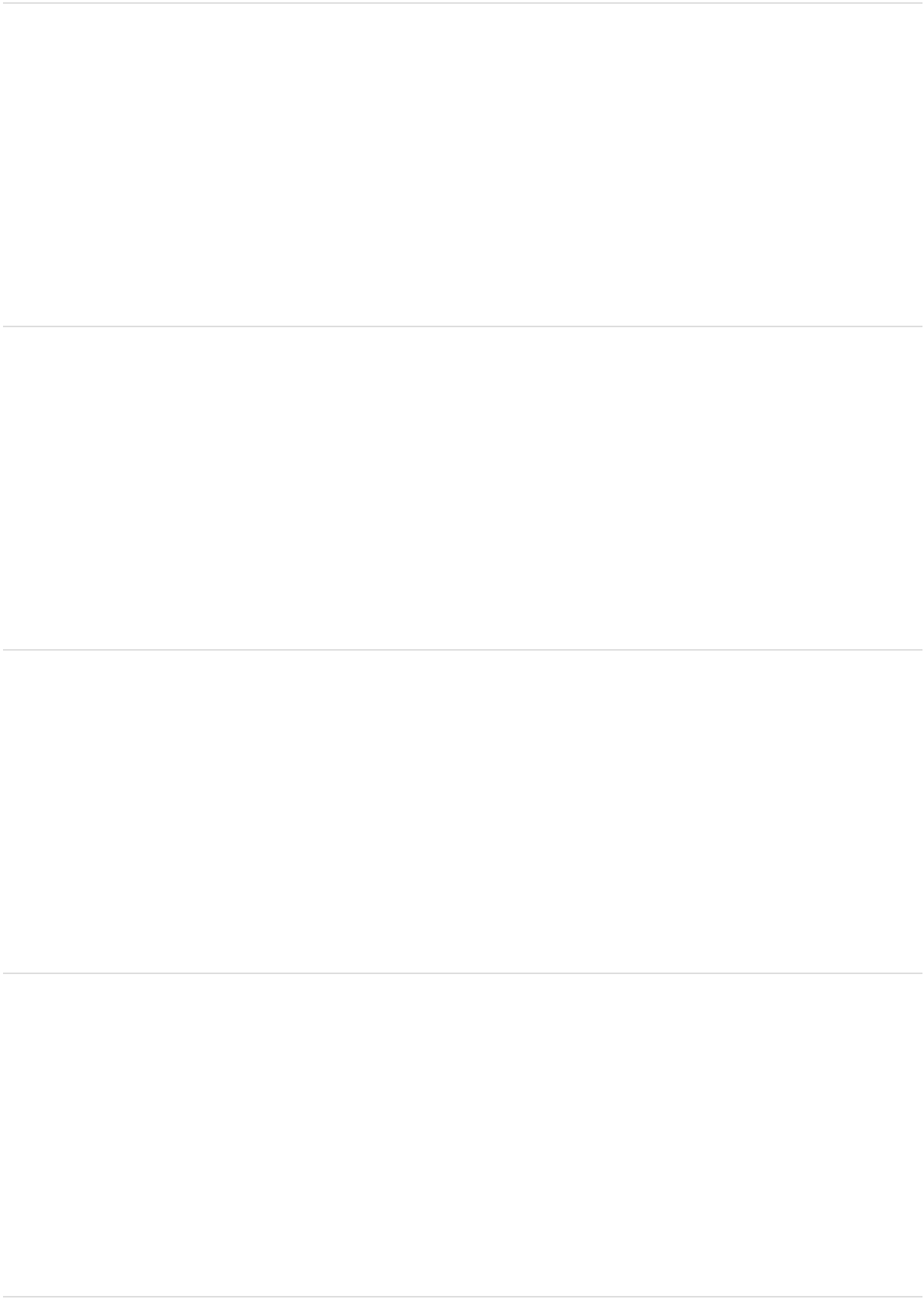
Where A(t), B(t) and C(t) are given functions, $\tilde{C}_j, j = 1, 2, \dots, m - 1, m \in \mathbf{N}$, are arbitrary fuzzy numbers and α is an order of the fractional derivative [6]. N-th order fuzzy differential equation for VIM is done by Abbasbandy et.al [7]. Using Laplace transforms method

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[†] Corresponding author.



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In this article, a systematic solution based on the sequence of expansion method is planned to solve the time-fractional diffusion equation, time-fractional telegraphic equation and time-fractional wave equation in three dimensions using a current and valid approximate method, namely the ADM, VIM, and the NIM subject to the estimate initial condition. By using these three methods it is likely to ... [\[Show full abstract\]](#)

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Solving Fuzzy Fractional Klein-Gordon-Fock Equation by the VIM, ADM and NIM in Fluid Mechanics

January 2020

[●](#) Firdous Khan · [●](#) Kirtiwant P. Ghadle

In this paper we are extending one dimensional fractional partial differential Klein–Gordon–Fock equation to Trapezoidal fuzzy fractional partial differential equation under Riemann–Liouville and caputo fractional derivatives, namely Variational iteration method, Adomain Decomposition method, and New iterative method and this method has applied to fuzzy fractional Klein–Gordon equation with ... [\[Show full abstract\]](#)

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In this paper, we develop and analyze the use of the Variational Iteration Method (VIM) to find the semi-analytical solution for an initial value problem involving the fuzzy heat parabolic equation. VIM allows for the solution of the partial differential equation to be calculated in the form of an infinite series in which the components can be easily computed. The VIM will be studied for fuzzy ... [\[Show full abstract\]](#)

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