

ISSN 0304-9892

Jñānābha ज्ञानाभ

VOLUME 39

2009

Published by :

The Vijñāna Parishad of India

DAYANAND VEDIC POSTGRADUATE COLLEGE

(Bundelkhand University)

ORAI, U.P., INDIA

APPLICATION OF H -FUNCTION FOR OBTAINING AN ANALYTIC SOLUTION OF THE SPACE-AND-TIME FRACTIONAL INITIAL VALUE DIFFUSION PROBLEM

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(Received : September 2, 2009)

ABSTRACT

In the present paper, we make an application of Fox's H -function to derive an analytic solution of the space-and-time fractional initial value diffusion problem defined in a bounded space domain $x \in (a, b)$. In this process, the Adomian decomposition techniques and the given initial conditions are taken into account. We also make some extensions of above solution through Lie group techniques.

2000 Mathematics Subject Classification : 35S5, 35S10, 35G20, 26A33, 33C60, 22E60.

Keywords. Space-and-time fractional initial value diffusion equation, decomposition techniques, Fox's H -function, Lie group techniques.

1. Introduction. Nowadays connection between walk and fractional order dynamics is well known, see for instance, Adler et al. [1], Andries et al. [7] and Metzler and Klafter [24]. A number of constructive random walk models governed by fractional order differential equations in the one dimensional case were studied by Gills et al. [15], Chechkin et al. ([10], [11]), Gorenflo et al. ([16]-[18]). In these studies the governing equation depends on the parameters $\alpha \in (0, 1)$ and $\beta \in (0, 2]$

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