

APPLICATION OF TWO-VARIABLE H-FUNCTION FOR OBTAINING  
ANALYTIC SEQUENCE OF SOLUTIONS OF THREE-VARIABLE  
SPACE-AND-TIME FRACTIONAL DIFFUSION PROBLEM

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**Abstract**

In the present paper, we make an application of two- variable H-function to derive analytic sequence of solutions of the three- variable space-and-time fractional diffusion problem defined in the bounded space-domains  $x \in (a, b)$  and  $y \in (c, d)$ . In this process, the Adomian decomposition techniques are used and for that the given initial condition and the order of time derivative are taken into account to obtain the prescribed solution of the problem.

**Keywords :** Space-and-time fractional initial value diffusion-wave equation, Caputo fractional derivatives, Adomian decomposition techniques, two- variable H-function

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**1. Introduction**

Agrawal ([ 2 ] and [ 3 ]) has presented a general solution for a time fractional diffusion -wave equation defined in the bounded space domain through application of sine transform and together with Laplace transform Al-Khaled and Momani [ 4 ] have used the decomposition techniques to obtain an approximate solution for the generalized time- fractional diffusion- wave equations. Their results showed the transition from a pure diffusion process to a pure wave process.

Momani [ 13 ] has derived the general solution for two variable space- and- time fractional diffusion-wave equation on applying Adomian decomposition techniques [ 1 ] that equation is given by

