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论文

有限分形介质中带有分数阶振子的分数阶反应扩散方程及其解析解

林爱华, 蒋晓芸

山东大学数学学院, 山东 济南 250100

摘要:

建立了有限分形介质中带有分数阶振子的分数阶反应扩散方程,利用Laplace变换和有限Hankel变换及相应的逆变换,给出上述问题浓度分布的解析解并以广义Mittag-Leffler的形式给予表示。将二维,三维空间以及整数阶的有限分形介质中反应扩散的模型作为本文的特例进行讨论。

关键词: 分数阶微积分;分形介质;分数阶振子;Laplace变换;有限Hankel变换;广义Mittag-Leffler函数

The solution of the fractional reaction diffusion equation with a fractional oscillator in a finite fractal medium

LIN Ai-hua, JIANG Xiao-yun

School of Mathematics, Shandong University, Jinan 250100, Shandong, China

Abstract:

he fractional reaction diffusion differential equation with a fractional oscillator in a finite fractal medium was established. By applying Laplace transformation, the finite Hankel transformation and their inverse transform, the exact solution of the model were obtained. The expression in the form of the generalized Mittag-Leffler function was given. Finally, the solutions of two dimensional space, three dimensional space and the integral diffusion equation as some particular cases of this paper were discussed.

Keywords: fractional calculus; fractal medium; fractional oscillator; Laplace transform; the finite Hankel transform; generalized Mittag-Leffler function

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通讯作者:

作者简介:

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