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Latest SCI Journal Papers on FDA

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(Searched on 30th September 2014)

A Collocation Method for Solving Fractional Riccati Differential Equation
By: Gulsu, Mustafa; Ozturk, Yalcin; Anapali, Ayse
ADVANCES IN APPLIED MATHEMATICS AND MECHANICS Volume: 5 Issue: 6 Pages: 872-884 Published: DEC 2014

Approximate controllability of impulsive fractional neutral evolution equations with Riemann-Liouville fractional derivatives
By: Liu, Xianghu; Liu, Zhenhai; Bin, Maojun
JOURNAL OF COMPUTATIONAL ANALYSIS AND APPLICATIONS Volume: 17 Issue: 3 Pages: 468-485 Published: NOV 2014

Analytic study on a state observer synchronizing a class of linear fractional differential systems
By: Zhou, Xian-Feng; Huang, Qun; Jiang, Wei; et al.
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 19 Issue: 10 Pages: 3808-3819 Published: OCT 2014

Design of digital Feller fractional order integrator
By: Tseng, Chien-Cheng; Lee, Su-Ling
SIGNAL PROCESSING Volume: 102 Pages: 16-31 Published: SEP 2014

A class of nonlinear differential equations with fractional integrable impulses
By: Wang, JinRong; Zhang, Yuruo
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 19 Issue: 9 Pages: 3001-3010 Published: SEP 2014

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Books

Advances in Robust Fractional Control

Fabrizio Padula, Antonio Visioli

Book Description

The aim of this book is to present design methodologies for fractional control systems. Here, fractional control system means that the controller, the process or both can be fractional. Different approaches are described but the common framework is that the robustness of the control system is considered explicitly in the design. Accordingly, the first part of the book is more industrial oriented and is focused on the design of fractional controllers for integer processes, aiming at evaluating the difference between fractional and integer control. In particular, fractional-order proportional-integral-derivative controllers are considered, since integer-order proportional-integral-derivative regulators are, undoubtedly, the most employed controllers in industry. The second part of the book deals with a more general approach to fractional control systems. Well-known and effective techniques for integer-order systems, such as optimal control and optimal input–output-inversion-based control are extended to fractional systems.

More information on this book can be found by the following link:
http://link.springer.com/book/10.1007/978-3-319-10930-5

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Advances in Modelling and Control of Non-integer-Order Systems

Krzysztof J. Latawiec, Marian Łukaniszyn, Rafał Stanisławski

Book Description

The fractional calculus has recently attracted an unprecedented research interest both from the academia and various application-related environments. The field has experienced a publication explosion and apparently matured but it is still far from conceptual completeness both in the theory and, in particular, applications and implementations.This volume presents one small step ahead in the development of the theory and applications of the fractional calculus. Divided into six parts, it provides a bunch of new results in, consecutively, mathematical fundamentals, approximation, modeling and simulations, controllability and control, stability analysis and applications of various noninteger-order methodologies.

More information on this book can be found by the following link:
http://link.springer.com/book/10.1007/978-3-319-09900-2

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Journals

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Applied Mathematics and Computation

Volume 245, Pages 1-592 (selected)

New hybrid conjugate gradient method for unconstrained optimization

J.K. Liu, S.J. Li

Global stochastic stability analysis for stochastic neural networks with infinite delay and Markovian switching

Ying Guo, Huan Su, Xiaohua Ding, Ke Wang

Sobolev type fractional abstract evolution equations with nonlocal conditions and optimal multi-controls

Amar Debbouche, Juan J. Nieto

Power law approximations for radioactive decay chains

Frank Massey, Jeffrey Prentis

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Communications in Nonlinear Science and Numerical Simulation

Volume 20, Issue 3(selected)

Xuefei Wu, Chen Xu, Jianwen Feng

Stabilizing the unstable periodic orbits of a hybrid chaotic system using optimal control

Yosra Miladi, Moez Feki, Nabil Derbel

Hopf bifurcation of a generalized Moon–Rand system

Jaume Llibre, Clàudia Valls

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Paper Highlight

Numerical solution of the space fractional Fokker–Planck equation

F. Liu, V. Anh, I. Turner

Publication information: F. Liu, V. Anh, I. Turner, Numerical solution of the space fractional Fokker–Planck equation, Journal of Computational and Applied Mathematics, 166(1), 2004, Pages 209-219.

http://www.sciencedirect.com/science/article/pii/S0377042703008616

Abstract
The traditional second-order Fokker–Planck equation may not adequately describe the movement of solute in an aquifer because of large deviation from the dynamics of Brownian motion. Densities of α-stable type have been used to describe the probability distribution of these motions. The resulting governing equation of these motions is similar to the traditional Fokker–Planck equation except that the order α of the highest derivative is fractional. In this paper, a space fractional Fokker–Planck equation (SFFPE) with instantaneous source is considered. A numerical scheme for solving SFFPE is presented. Using the Riemann–Liouville and Grünwald–Letnikov definitions of fractional derivatives, the SFFPE is transformed into a system of ordinary differential equations (ODE). Then the ODE system is solved by a method of lines. Numerical results for SFFPE with a constant diffusion coefficient are evaluated for comparison with the

known analytical solution. The numerical approximation of SFFPE with a time-dependent diffusion coefficient is also used to simulate Lévy motion with α-stable densities. We will show that the numerical method of SFFPE is able to more accurately model these heavy-tailed motions.

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Box-type scheme for fractional sub-diffusion equation with Neumann boundary conditions

Xuan Zhao, Zhi-zhong Sun

Publication information: Xuan Zhao, Zhi-zhong Sun, box-type scheme for fractional sub-diffusion equation with Neumann boundary conditions, Journal of Computational Physics, 230(15)(2011), pp. 6061-6074.

http://www.sciencedirect.com/science/article/pii/S0021999111002373

Abstract
Combining order reduction approach and L1 discretization, a box-type scheme is presented for solving a class of fractional sub-diffusion equation with Neumann boundary conditions. A new inner product and corresponding norm with a Sobolev embedding inequality are introduced. A novel technique is applied in the proof of both stability and convergence. The global convergence order in maximum norm is $O(\tau^{2-\alpha} + h^2)$. The accuracy and efficiency of the scheme are checked by two numerical tests.

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A semi-discrete finite element method for a class of time-fractional diffusion equations

HongGuang Sun, Wen Chen, K.Y. Sze

Publication information: HongGuang Sun, Wen Chen, K.Y. Sze. A semi-discrete finite element method for a class of time-fractional diffusion equations. Philosophical Transactions of The Royal Society A, 2013, 371, 20120268.

http://rsta.royalsocietypublishing.org/content/371/1990/20120268

Abstract

As fractional diffusion equations can describe the early breakthrough and the heavy-tail decay features observed in anomalous transport of contaminants in groundwater and porous soil, they have been commonly used in the related mathematical descriptions. These models usually involve long-time-range computation, which is a critical obstacle for their application; improvement of computational efficiency is of great significance. In this paper, a semi-discrete method is presented for solving a class of time-fractional diffusion equations that overcome the critical long-time-range computation problem. In the procedure, the spatial domain is discretized by the finite element method, which reduces the fractional diffusion equations to approximate fractional relaxation equations. As analytical solutions exist for the latter equations, the burden arising from long-time-range computation can effectively be minimized. To illustrate its efficiency and simplicity, four examples are presented. In addition, the method is used to solve the time-fractional advection–diffusion equation characterizing the bromide transport process in a fractured granite aquifer. The prediction closely agrees with the experimental data, and the heavy-tail decay of the anomalous transport process is well represented.

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