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International Conference on Fractional Differentiation and Its Applications (ICFDA'14)

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Latest SCI Journal Papers on FDA

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(Searched on 30th June 2014)

EXISTENCE AND DECAY OF SOLUTIONS OF THE 2D QG EQUATION IN THE PRESENCE OF AN OBSTACLE
By: Kosloff, Leonardo; Schonbek, Tomas
DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS-SERIES S Volume: 7 Issue: 5 Pages: 1025-1043 Published: OCT 2014

ON ONE MULTIDIMENSIONAL COMPRESSIBLE NONLOCAL MODEL OF THE DISSIPATIVE QG EQUATIONS
By: Wang, Shu; Wu, Zhonglin; Li, Linrui; et al.
DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS-SERIES S Volume: 7 Issue: 5 Pages: 1111-1132 Published: OCT 2014

Fault detection based on fractional order models: Application to diagnosis of thermal systems
By: Aribi, Asma; Farges, Christophe; Aoun, Mohamed; et al.
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 19 Issue: 10 Pages: 3679-3693 Published: OCT 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

Obtaining prediction intervals for FARIMA processes using the sieve bootstrap
By: Rupasinghe, Maduka; Mukhopadhyay, Purna; Samaranayake, V. A.
JOURNAL OF STATISTICAL COMPUTATION AND SIMULATION Volume: 84 Issue: 9 Pages: 2044-2058 Published: SEP 2 2014

[Back]

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Books

Stochastic Calculus for Fractional Brownian Motion and Applications

Biagini F., Hu Y., Øksendal B., Zhang T.

Book Description

Fractional Brownian motion (fBm) has been widely used to model a number of phenomena in diverse fields from biology to finance. This huge range of potential applications makes fBm an interesting object of study.

fBm represents a natural one-parameter extension of classical Brownian motion therefore it is natural to ask if a stochastic calculus for fBm can be developed. This is not obvious, since fBm is neither a semimartingale (except when $H = ½$), nor a Markov process so the classical mathematical machineries for stochastic calculus are not available in the fBm case.

Several approaches have been used to develop the concept of stochastic calculus for fBm. The purpose of this book is to present a comprehensive account of the different definitions of stochastic integration for fBm, and to give applications of the resulting theory. Particular emphasis is placed on studying the relations between the different approaches.

Readers are assumed to be familiar with probability theory and stochastic analysis, although the mathematical techniques used in the book are thoroughly exposed and some of the necessary prerequisites, such as classical white noise theory and fractional calculus, are recalled in the appendices.

More information on this book can be found by the following link:
http://www.springer.com/mathematics/probability/book/978-1-85233-996-8

[Back]

Stochastic Foundations in Movement Ecology

Méndez Vicenç, Campos Daniel, Bartumeus Frederic

Book Description

This book presents the fundamental theory for non-standard diffusion problems in movement ecology. Lévy processes and anomalous diffusion have shown to be both powerful and useful tools for qualitatively and quantitatively describing a wide variety of spatial population ecological phenomena and dynamics, such as invasion fronts and search strategies.

Adopting a self-contained, textbook-style approach, the authors provide the elements of statistical physics and stochastic processes on which the modeling of movement ecology is based and systematically introduce the physical characterization of ecological processes at the microscopic, mesoscopic and macroscopic levels. The explicit definition of these levels and their interrelations is particularly suitable to coping with the broad spectrum of space and time scales involved in bio-ecological problems.

Including numerous exercises (with solutions), this text is aimed at graduate students and newcomers in this field at the interface of theoretical ecology, mathematical biology and physics.

More information on this book can be found by the following link:
http://www.springer.com/physics/complexity/book/978-3-642-39009-8

[Back]]

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Journals

Special Issue of Optimization on Fractional Systems and Optimization

Volume 63, Issue 8, 2014

http://www.tandfonline.com/toc/gopt20/63/8#.U67CuLKcFGY

(Contributed by Prof. Yong Zhou)

Editorial

Articles

[Back]

Communications in Nonlinear Science and Numerical Simulation

Volume 19, Issue 11

Faranak Rajabi Vishkaie, Fatemeh Bakouie, Shahriar Gharibzadeh

Ghost-vibrational resonance

S. Rajamani, S. Rajasekar, M.A.F. Sanjuán

New approach in dynamics of regenerative chatter research of turning

Xilin Fu, Shasha Zheng

Frequency-locking of coupled oscillators driven by periodic forces and white noise

Xuejuan Zhang, Guolong He, Min Qian

Generalization of the simplest equation method for nonlinear non-autonomous differential equations

Anastasia O. Antonova, Nikolay A. Kudryashov

An epidemic model to evaluate the homogeneous mixing assumption

P.P. Turnes Jr., L.H.A. Monteiro

[Back]

Computers & Mathematics with Applications

Volume 67, Issue 10

A quasi-minimal residual variant of the BiCORSTAB method for nonsymmetric linear systems

Dong-Lin Sun, Yan-Fei Jing, Ting-Zhu Huang, Bruno Carpentieri

Sensitivity analysis of the variance contributions with respect to the distribution parameters by the kernel function

Pan Wang, Zhenzhou Lu, Jixiang Hu, Changcong Zhou

Well-conditioned boundary integral equation formulations for the solution of high-frequency electromagnetic scattering problems

Yassine Boubendir, Catalin Turc

Least squares approach for the time-dependent nonlinear Stokes–Darcy flow

Hyesuk Lee, Kelsey Rife

Overlapping radial basis function interpolants for spectrally accurate approximation of functions of eigenvalues with application to buckling of composite plates

Dimitri Bettebghor, François-Henri Leroy

Generalized Schultz iterative methods for the computation of outer inverses

Marko D. Petković

Multiple positive solutions for a quasilinear elliptic system with critical exponent and sign-changing weight

Qin Li, Zuodong Yang

Computational cost estimates for parallel shared memory isogeometric multi-frontal solvers

M. Woźniak, K. Kuźnik, M. Paszyński, V.M. Calo, D. Pardo

Space–time spectral method for a weakly singular parabolic partial integro-differential equation on irregular domains

Farhad Fakhar-Izadi, Mehdi Dehghan

Cascadic multilevel algorithms for symmetric saddle point systems

Constantin Bacuta

Generating harmonic surfaces for interactive design

A. Arnal, J. Monterde

Benchmark tests based on the Couette viscometer—I: Laminar flow of incompressible fluids with inertia effects and thermomechanical coupling

Thomas Heuzé, Jean-Baptiste Leblond, Jean-Michel Bergheau

[Back]

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Paper Highlight

The Wright functions as solutions of the time-fractional diffusion equation

Francesco Mainardi, Gianni Pagnini

Publication information: Francesco Mainardi, Gianni Pagnini. The Wright functions as solutions of the time-fractional diffusion equation. *Applied Mathematics and Computation* 141 (2003) 51–62.

http://www.sciencedirect.com/science/article/pii/S009630030200320X

Abstract

Numerical evidence of nondiffusive transport in three-dimensional, resistive pressure-gradient-driven plasma turbulence is presented. It is shown that the probability density function (pdf) of tracer particles' radial displacements We revisit the Cauchy problem for the time-fractional diffusion equation, which is obtained from the standard diffusion equation by replacing the first-order time derivative with a fractional derivative of order $\beta \in (0,2]$. By using the Fourier–Laplace transforms the fundamentals solutions (Green functions) are shown to be high transcendental functions of the Wright-type that can be interpreted as spatial probability density functions evolving in time with similarity properties. We provide a general representation of these functions in terms of Mellin–Barnes integrals useful for numerical computation.

[Back]

Analytical approximate solutions for nonlinear fractional differential equations

Nabil T. Shawagfeh

Publication information: Nabil T. Shawagfeh. Analytical approximate solutions for nonlinear fractional differential equations. *Applied Mathematics and Computation*, 131(2–3), 2002, 517–529.

http://www.sciencedirect.com/science/article/pii/S0096300301001679

Abstract

We consider a class of nonlinear fractional differential equations (FDEs) based on the Caputo fractional derivative and by extending the application of the Adomian decomposition method we derive an analytical solution in the form of a series with easily computable terms. For linear equations the method gives exact solution, and for nonlinear equations it provides an approximate solution with good accuracy. Several examples are discussed.

[Back]

Trapezoidal methods for fractional differential equations: Theoretical and computational aspects

R. Garrappa

Publication information:

R. Garrappa, Trapezoidal methods for fractional differential equations: Theoretical and computational aspects. Mathematics and Computers in Simulation, in press, http://dx.doi.org/10.1016/j.matcom.2013.09.012

Description

A new Matlab code for solving fractional differential equations has been posted on File Exchange of the Matlab Central website.

The code flmm2.m solves an initial value problem for a fractional differential equation (FDE) by means of some implicit fractional linear multistep methods (FLMMs) of the second order. The code solves scalar and multidimensional systems of linear and nonlinear type. It is freely available at the web address:

http://www.mathworks.com/matlabcentral/fileexchange/47081-flmm2

FLMMs are a generalization to FDEs of classical linear multistep methods and were introduced by Lubich in 1986. The code flmm2.m implements 3 different implicit FLMMs of the second order: the generalization of the Trapezoidal rule, the generalization of the Newton-Gregory formula and the generalization of the Backward Differentiation Formula (BDF); by default the BDF is selected when no method is specified. These methods are particularly suited for problems presenting stability issues.

[Back]

The End of This Issue