**FDA Express**  Vol. 13, No. 5, Dec. 15, 2014

Editors: [http://em.hhu.edu.cn/fda/Editors.htm](http://em.hhu.edu.cn/fda/Editors.htm)
Institute of Soft Matter Mechanics, Hohai University
For contribution: fdaexpress@163.com, pangguofei2008@126.com
For subscription: [http://em.hhu.edu.cn/fda/subscription.htm](http://em.hhu.edu.cn/fda/subscription.htm)

◆ **Latest SCI Journal Papers on FDA**
(Searched on 15th December 2014)

◆ **Conferences**

54th IEEE Conference on Decision and Control – CDC 2015

The 2015 Symposium on Fractional Derivatives and Their Applications (FDTA’15)

◆ **Books**

Selected Aspects of Fractional Brownian Motion

Topics in Fractional Differential Equations

Fractional differential calculus for nondifferentiable functions: Mechanics, Geometry, Stochastics.

Information Theory

◆ **Journals**

Communications in Nonlinear Science and Numerical Simulation

◆ **Paper Highlight**

Hydraulic conductivity, velocity, and the order of the fractional dispersion derivative in a highly heterogeneous system.
Quantitative analysis of single particle trajectories: mean maximal excursion method

◆ Websites of Interest

Fractional Calculus & Applied Analysis

========================================================================

Latest SCI Journal Papers on FDA

-------------------------------

(A searched on 15th December 2014)

ATTRACTORS AND THEIR PROPERTIES FOR A CLASS OF NONLOCAL EXTENSIBLE BEAMS
By: Jorge da Silva, Marcio Antonio; Narciso, Vando
DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS Volume: 35 Issue: 3 Pages: 985-1008 Published: MAR 2015

A mechanical picture of fractional-order Darcy equation
By: Deseri, Luca; Zingales, Massimiliano
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 20 Issue: 3 Pages: 940-949 Published: MAR 2015

Theoretical Models of Ion Pair Chromatography: A Close Up of Recent Literature Production
By: Cecchi, Teresa
JOURNAL OF LIQUID CHROMATOGRAPHY & RELATED TECHNOLOGIES Volume: 38 Issue: 3 Special Issue: SI Pages: 404-414 Published: FEB 7 2015

Numerical approximation of distributed order reaction-diffusion equations
By: Morgado, M. L.; Rebelo, M.
JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS Volume: 275 Pages: 216-227 Published: FEB 2015

On the numerical solution of the eigenvalue problem in fractional quantum mechanics
By: Guerrero, Alejandro; Moreles, Miguel Angel
A Fractal Conservation Law for Simultaneous Denoising and Enhancement of Seismic Data
By: Meng, Fanlei; Li, Yue; Wu, Ning; et al.
IEEE GEOSCIENCE AND REMOTE SENSING LETTERS Volume: 12 Issue: 2 Pages: 374-378 Published: FEB 2015

Conferences

54th IEEE Conference on Decision and Control – CDC 2015

December 15-18, 2015 in Osaka, Japan

Special session invitation
Fractional order models and signals

Call for Papers
The goal of this special session is to gather colleagues that work in the field of fractional calculus in order to present the latest results in fractional order models and signals domain. Papers describing original research work that reflects the recent theoretical advances and experimental results as well as open new issues for research are invited. This session will cover the following topics (but not limited to):

- Signal analysis and filtering with fractional tools (restoration, reconstruction, analysis of fractal noises);
- Fractional modeling especially of (but not limited to) thermal systems, electrical systems (motors, transformers, skin effect, …), dielectric materials, electrochemical systems (batteries,
ultracapacitors, fuel cells, …), mechanical systems (vibration insulation, viscoelastic materials, …), biological systems (muscles, lungs, …);

- System identification (linear, non-linear, MIMO methods, …);
- Models implementation (fractional controllers and filters implementation, …);
- Systems analysis (stability, observability, controllability, …);
- Observers;
- Control (Fractional PID, CRONE, $H_\infty$, …);
- Diagnosis based on fractional models.

Submission Deadline: Contributed Papers and special issues must be submitted before March 24, 2015 but the session proposal deadline is March 12, 2015

Submission Guidelines: Prepare your papers according to recommendations available at http://www.cdc2015.ctrl.titech.ac.jp/cfp.php

Contact if you intend to participate

Christophe Farges, Jocelyn Sabatier
IMS laboratory – Bordeaux University - UMR 5218 CNRS
Email: christophe.farges@ims-bordeaux.fr
        jocelyn.sabatier@ims-bordeaux.fr

Please indicate [Invited Session - CDC 2015] in the email subjectt

[Back]
Papers with the e-mail addresses of the authors must be submitted online abstract(s) at  http://www.asmeconferences.org/idetc2015/ by January 12, 2015. After the abstract submission, you MUST also submit a full length paper for peer review by Jan. 26, 2015.

Prof. YangQuan Chen

Director, MESA LAB, http://mechatronics.ucmerced.edu/

ME/EECS/SNRI/HSRI, School of Eng'g,

University of California, Merced, CA 95343, USA

T: 1(209)2284672; F:1(209)2284047; E: yqchen@ieee.org; O: SE2-273

[Back]

Books

Selected Aspects of Fractional Brownian Motion

Ivan Nourdin

Book Description

The goal of this book is to develop some aspects of fBm (as well as related topics), without seeking for completeness at all. To be comprehensive would have been an impossible task to fulfill anyway, given the huge amount of works that are nowadays dedicated to fBm1. Instead, my
guiding thread was to develop the topics I found the most aesthetic (with all the subjectivity it implies!) by trying to avoid technicalities as much as possible, in order to show the reader that solving questions involving fBm may lead to beautiful mathematics. In fact, it was often an excuse for the development of a more general theory, for which the fBm then becomes a concrete and significant example.

More information on this book can be found by the following link:

[Back]

Topics in Fractional Differential Equations
Saïd Abbas, Mouffak Benchohra, Gaston M. N'Guérékata

Book Description
The content of this book is new and complements the existing literature in fractional calculus. It is useful for researchers and graduate students for research, seminars, and advanced graduate courses, in pure and applied mathematics, engineering, biology, and all other applied sciences.

More information on this book can be found by the following link:

[Back]

Fractional differential calculus for nondifferentiable functions: Mechanics, Geometry, Stochastics, Information Theory
Guy Jumarie

Book Description
Most books which deal with fractional derivative refer to the Riemann-Liouville definition in terms of integral: one first defines integral and then one defines derivative. On the contrary, this
book provides a systematic self-contained presentation of fractional calculus, via fractional difference, and expands a fractional differential calculus which is quite parallel to the Leibniz calculus (therefore the expression of fractional differential calculus) and which is also quite physically meaningful. Whilst the standard fractional calculus applies to differentiable functions only, the present calculus holds for both differentiable functions and nondifferentiable functions. Summary of content. Theory and application of this fractional differential calculus Proposals for some new approaches to analytical mechanics, differential geometry in fractal space-time, fractional white noise calculus, and information theory. Readership. Any scientist who is interested in fractals and in the applications of fractional calculus to natural science, either for the applications or for the foundations of physics.

[Back]

========================================================================

Journals

------------------------------------------

Communications in Nonlinear Science and Numerical Simulation

Volume 22, Issues 1–3 (selected)

Critical desertification transition in semi-arid ecosystems: The role of local facilitation and colonization rate

Raffaele Corrado, Anna Maria Cherubini, Cecilia Pennetta

Jacobian matrix algorithm for Lyapunov exponents of the discrete fractional maps

Guo-Cheng Wu, Dumitru Baleanu

Non-standard extensions of gradient elasticity: Fractional non-locality, memory and fractality

Vasily E. Tarasov, Elias C. Aifantis
Pseudo Phase Plane and Fractional Calculus modeling of western global economic downturn
J.A. Tenreiro Machado, Maria Eugénia Mata

Nonlinear dynamic analysis and characteristics diagnosis of seasonally perturbed predator–prey systems
Huayong Zhang, Tou Sheng Huang, Liming Dai

Linear stability of a generalized multi-anticipative car following model with time delays
D. Ngoduy

Fractional model for pharmacokinetics of high dose methotrexate in children with acute lymphoblastic leukaemia
Jovan K. Popović, Dragan T. Spasić, Jela Tošić, Jovanka L. Kolarović, Rachid Malti, Igor M. Mitić, Stevan Pilipović, Teodor M. Atanacković

A mathematical model of dengue transmission with memory
Tridip Sardar, Sourav Rana, Joydev Chattopadhyay

A new difference scheme for the time fractional diffusion equation
Anatoly A. Alikhanov

Stability and resonance conditions of the non-commensurate elementary fractional transfer functions of the second kind
A. Ben Hmed, M. Amairi, M. Aoun

[Back]
Hydraulic conductivity, velocity, and the order of the fractional dispersion derivative in a highly heterogeneous system

M.G. Herrick, D.A. Benson, M.M. Meerschaert, K.R. McCall


Abstract
A one-dimensional, fractional order, advection-dispersion equation accurately models the movement of the core of the tritium plume at the highly heterogeneous MADE site. An a priori estimate of the parameters in that equation, including the order of the fractional dispersion derivative, was based on the assumption that the observed power law (heavy) tail of the hydraulic conductivity (K) field would create a similarly distributed velocity field. Monte Carlo simulations were performed to test this hypothesis. Results from the Monte Carlo analysis show that heavy tailed K fields do give rise to heavy tailed velocity fields; however, the exponent of the power law (the tail parameter) describing these two distributions is not necessarily the same. The tail parameter that characterizes a velocity distribution is not solely dependent on the tail parameter that characterizes the K distribution. The K field must also have long-range dependence so that water may flow through relatively continuous high-K channels.

Quantitative analysis of single particle trajectories: mean maximal excursion method

Vincent Tejedor. Olivier Bénichou, Raphael Voituriez, Ralf Jungmann, Friedrich Simmel, Christine Selhuber-Unkel, Lene B. Oddershede, Ralf Metzler
Abstract
An increasing number of experimental studies employ single particle tracking to probe the physical environment in complex systems. We here propose and discuss what we believe are new methods to analyze the time series of the particle traces, in particular, for subdiffusion phenomena. We discuss the statistical properties of mean maximal excursions (MMEs), i.e., the maximal distance covered by a test particle up to time t. Compared to traditional methods focusing on the mean-squared displacement we show that the MME analysis performs better in the determination of the anomalous diffusion exponent. We also demonstrate that combination of regular moments with moments of the MME method provides additional criteria to determine the exact physical nature of the underlying stochastic subdiffusion processes. We put the methods to test using experimental data as well as simulated time series from different models for normal and anomalous dynamics such as diffusion on fractals, continuous time random walks, and fractional Brownian motion.