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Fractional Calculus & Applied Analysis

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

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Latest SCI Journal Papers on FDA

(Searched on 15th February 2014)

A new 4-D non-equilibrium fractional-order chaotic system and its circuit implementation
By: Zhou, Ping; Huang, Kun
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 19 Issue: 6 Pages: 2005-2011 Published: JUN 2014

Abundant bursting patterns of a fractional-order Morris-Lecar neuron model
By: Shi, Min; Wang, Zaihua
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 19 Issue: 6 Pages: 1956-1969 Published: JUN 2014

Periodic solutions of quadratic Weyl fractional integral equations
By: Chen, Qian; Wang, JinRong; Chen, Fulai; et al.
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 19 Issue: 6 Pages: 1945-1955 Published: JUN 2014

Existence results for fractional q-difference equations of order alpha is an element of]2, 3[with three-point boundary conditions

By: Almeida, Ricardo; Martins, Natalia
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 19 Issue: 6 Pages: 1675-1685 Published: JUN 2014

Existence and uniqueness of solutions of initial value problems for nonlinear langevin equation involving two fractional orders

By: Yu, Tao; Deng, Ke; Luo, Maokang
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 19 Issue: 6 Pages: 1661-1668 Published: JUN 2014

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Call for papers

Special Issue on " Fractional Dynamics: Theory and Applications "

--- in the Journal of Statistical Mechanics: Theory and Experiment

http://iopscience.iop.org/1742-5468/focus/extra.special5

(Contributed by Prof. Yong Zhou)

Fractional Calculus is simultaneously a new and old research issue. During the few decades, fractional calculus has been recognized as one of the best tools to describe long-memory processes. Such models are interesting for physicists and dynamicists but also for mathematicians. The most important among such models are those described by complex systems containing fractional derivatives. Their evolutions behave in a much more complex way than in the classical integer-order case. The objective of this special issue is to report and review the latest progresses in the field of fractional dynamics, which covers fractional statistical mechanics, fractional quantum dynamics and related topics. We hope that one can learn the recent developments from the special issue, including theoretical, numerical and experimental results in this area.

Journal of Statistical Mechanics: Theory and Experiment is published by IOP, indexed in SCI with impact factor: 1.866.

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Submission Deadline: June 30th, 2014.

Submission of Manuscripts

When your contribution is ready for submission, please follow the instructions below:

1. Connect to http://jstat.sissa.it , register (if needed) and login;

2. In the “Submit” section of the JSTAT home page click on “submit a paper for a special issue”;

3. Select “Fractional Dynamics: Theory and Applications” from the list;

4. Follow the step-by-step procedure for submission. In case of need, please click on the "HELP" link available at the top of the submission pages
(http://jstat.sissa.it/jstat/help/helpLoader.jsp?pgType=author)

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Special Issue on "New Challenges in Fractional Systems 2014 (NCFS14)"

--- in Mathematical Problems in Engineering

Website: http://www.hindawi.com/journals/mpe/si/262360/cfp/
(contributed by Prof. Guido Maione)

Fractional order differentiation consists in the generalization of classical integer differentiation to real or complex orders. From a mathematical point of view, several interpretations of fractional differentiation were proposed, but there is still a deep debate about it. The fractional differentiation and fractional integration are nonlocal operations based on an integral with a singular kernel. This explains why these operators are still not well defined and that several definitions still coexist. Since the first recorded reference work in 1695 up to the present day, many papers have been published on this subject, but much progress still to be done particularly on the relationship of these different definitions with the physical reality of a system.

A fractional order system is a system described by an integrodifferential equation involving fractional order derivatives of its input(s) and/or output(s). From a physical point of view, linear fractional derivatives and integrals order systems are not classical linear systems and not quite conventional distributed parameter systems. They are in fact halfway between these two classes of systems and are a modelling tool well suited to a wide class of phenomena with nonstandard dynamic behaviour, and the applications of fractional order systems are now well accepted in the following disciplines. Potential topics include, but are not limited to:

- Signal processing (filtering, restoration, reconstruction, analysis of fractal noises, etc.)
- Image processing (fractal environment modelling, pattern recognition, edge detection, etc.)
- Economy (analysis of stock exchange signals, etc.)
- Electrical engineering (modelling of motors, transformers, skin effect, etc.)
- Electronics, telecommunications (phase locking loops, etc.)
- Electromagnetism (modelling of complex dielectric materials, etc.)
- Electrochemistry (modelling of batteries and ultracapacitors, etc.)
- Thermal engineering (modelling and identification of thermal systems, etc.)
- Mechanics, mechatronics (viscoelasticity, vibration insulation, etc.)
- Automatic control (system identification, observation, and control of fractional systems, etc.)
- Biology, biophysics (signal and models of biological systems, viscoelasticity in biology, etc.)
- Physics (analysis and modelling of diffusion phenomenon, etc.)

The goal of the present special issue is to address the latest developments in the area of fractional calculus application in signals and systems. Papers describing original research work that reflects the recent theoretical advances and experimental results as well as open new avenues for research are invited on all aspects of object tracking.

Before submission authors should carefully read over the journal's Author Guidelines, which are located at http://www.hindawi.com/journals/mpe/guidelines/.
Prospective authors should submit an electronic copy of their complete manuscript through the journal Manuscript Tracking System at http://mts.hindawi.com/ according to the following timetable:

Manuscript Due ;**June 13, 2014**
First Round of Reviews **September 5, 2014**
Publication Date **October 31, 2014**

Lead Guest Editor

Guido Maione, Politecnico di Bari, Italy; ggmaione@poliba.it

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Special session: Fractional Signal Processing and Applications

---- in the 22nd European Signal Processing Conference

September 1 -5, 2014, Lisbon, Portugal

http://www.eusipco2014.org/

(Contributed by Prof. Manuel Duarte Ortigueira)

Fractional Calculus is the generalisation of the classic integer order calculus to real or complex orders having as base the definition of fractional derivative. The mutual influence Fractional Calculus/Signal Processing has been increasing in the last fifteen years with insertion of current signal processing tools, nomenclature and system interpretations into Fractional Calculus and bringing from it the fractional concepts.

Fractional calculus is being applied in an increasing number of fields, from Physics to Control Engineering, or modeling long range processes that we find in our daily life as internet traffic, economy and finance. Other systems and devices difficult to study and model fall into the fractional framework as ultra capacitors, batteries, dielectric materials, muscles, etc.

The development of Fractional Signals and Systems theory has led to a new set of tools that began substituting classic procedures and implementations. In fact the success of the fractional methodology is unquestionable with a lot of applications, namely in nonlinear and complex system dynamics and image processing. The advantages of fractional filters led to an increment in the research of new design methods.

Also important as referred above was the enrichment of Fractional Calculus done by the Signal Processing view, interpretation, and procedures.

This special session addresses the interplay between Fractional Calculus and signal processing, which brings new challenges since the involved mathematical tools are more involved and hard to compute than the classic ones, but are also richer allowing better models, behaviours, and performances.

Procedure to submit papers, proposals for special sessions, and tutorials are detailed at http://www.eusipco2014.org/. Submitted papers must be camera-ready, up to five pages long, and conform to the format specified on the EUSIPCO'2014 website.

We look forward to seeing you at the conference.

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Books

The Realization Problem for Positive and Fractional Systems (Studies in Systems, Decision and Control)

Tadeusz Kaczorek, Lukasz Sajewski

Book Description

This book addresses the realization problem of positive and fractional continuous-time and discrete-time linear systems. Roughly speaking the essence of the realization problem can be stated as follows: Find the matrices of the state space equations of linear systems for given their transfer matrices. This first book on this topic shows how many well-known classical approaches have been extended to the new classes of positive and fractional linear systems. The modified Gilbert method for multi-input multi-output linear systems, the method for determination of realizations in the controller canonical forms and in observer canonical forms are presented. The realization problem for linear systems described by differential operators, the realization problem in the Weierstrass canonical forms and of the descriptor linear systems for given Markov parameters are addressed. The book also presents a method for the determination of minimal realizations of descriptor linear systems and an extension for cone linear systems. This monographs summarizes recent original investigations of the authors in the new field of the positive and fractional linear systems.

More information on this book can be found by the following link:
http://www.amazon.com/Realization-Problem-Positive-Fractional-Decision/dp/3319048333/ref=sr_1_4?s=books&ie=UTF8&qid=1392363403&sr=1-4&keywords=fractional+model

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Spectral and High Order Methods for Partial Differential Equations

---- ICOSAHOM 2012: Selected papers from the ICOSAHOM conference, June 25-29, 2012, in Computational Science and Engineering)

Book Description

The book contains a selection of high quality papers, chosen among the best presentations during the International Conference on Spectral and High-Order Methods (2012), and provides an overview of the depth and breath of the activities within this important research area. The carefully reviewed selection of the papers will provide the reader with a snapshot of state-of-the-art and help initiate new research directions through the extensive bibliography.

More information on this book can be found by the following link:
http://www.springer.com/mathematics/computational+science+&+engineering/book/978-3-642-15336-5

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Journals

Journal of Applied Nonlinear Dynamics

Volume 2, Issue 3 & 4

https://lhscientificpublishing.com/journals/JAND-Download.aspx

Vibrational Resonance in a Duffing System with a Generalized Delayed Feedback

J.H. Yang, Miguel A.F. Sanjuán, C.J. Wang, and H. Zhu

Fractional Differential Equations System for Commercial Fishing under Predator-Prey Interaction

G.H. Erjaee, M.H. Ostadzad, K. Okuguchi, and E. Rahimi

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Paper Highlight

Simplified models for turbulent diffusion: Theory, numerical modelling, and physical phenomena

A.J. Majda, P.R. Kramer

Publication information: A.J. Majda, P.R. Kramer. Simplified models for turbulent diffusion: Theory, numerical modelling, and physical phenomena. Physics Reports, 1999, 314:
237-574. http://www.sciencedirect.com/science/article/pii/S0370157398000830

Abstract

Several simple mathematical models for the turbulent diffusion of a passive scalar field are developed here with an emphasis on the symbiotic interaction between rigorous mathematical theory (including exact solutions), physical intuition, and numerical simulations. The homogenization theory for periodic velocity fields and random velocity fields with short-range correlations is presented and utilized to examine subtle ways in which the flow geometry can influence the large-scale effective scalar diffusivity. Various forms of anomalous diffusion are then illustrated in some exactly solvable random velocity field models with long-range correlations similar to those present in fully developed turbulence. Here both random shear layer models with special geometry but general correlation structure as well as isotropic

rapidly decorrelating models are emphasized. Some of the issues studied in detail in these models are superdiffusive and subdiffusive transport, pair dispersion, fractal dimensions of scalar interfaces, spectral scaling regimes, small-scale and large-scale scalar intermittency, and qualitative behavior over finite time intervals. Finally, it is demonstrated how exactly solvable models can be applied to test and design numerical simulation strategies and theoretical closure approximations for turbulent diffusion.

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The End of This Issue

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