FDA Express  Vol. 21, No. 1, Oct 15, 2016

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Fractal derivative and operators and their applications

Fractional Calculus & Applied Analysis

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Latest SCI Journal Papers on FDA
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Lyapunov functions for a class of nonlinear systems using Caputo derivative
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 43 Pages: 91-99 Published: FEB 2017

Persistence of low levels of plasma viremia and of the latent reservoir in patients under ART: A fractional-order approach
By: Pinto, Carla M. A.
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 43 Pages: 251-260 Published: FEB 2017

The role of synaptic transmission in a HIV model with memory
By: Pinto, Carla M. A.; Carvalho, Ana R. M.
APPLIED MATHEMATICS AND COMPUTATION Volume: 292 Pages: 76-95 Published: JAN 1 2017

Bifurcations in a delayed fractional complex-valued neural network
By: Huang, Chengdai; Cao, Jinde; Xiao, Min; et al.
APPLIED MATHEMATICS AND COMPUTATION Volume: 292 Pages: 210-227 Published: JAN 1 2017

Approximate controllability of a multi-valued fractional impulsive stochastic partial integro-differential equation with infinite delay
By: Yan, Zuomao; Lu, Fangxia
APPLIED MATHEMATICS AND COMPUTATION Volume: 292 Pages: 425-447 Published: JAN 1 2017

Describing the firmness, springiness and rubberiness of food gels using fractional calculus. Part I: Theoretical framework
By: Faber, T. J.; Jaishankar, A.; McKinley, G. H.
FOOD HYDROCOLLOIDS Volume: 62 Pages: 311-324 Published: JAN 2017

Describing the firmness, springiness and rubberiness of food gels using fractional calculus. Part II: Measurements on semi-hard cheese
By: Faber, T. J.; Jaishankar, A.; McKinley, G. H.
FOOD HYDROCOLLOIDS Volume: 62 Pages: 325-339 Published: JAN 2017

A new representation formula for the Hilfer fractional derivative and its application
By: Kamocki, Rafal
JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS Volume: 308 Pages: 39-45 Published: DEC 15 2016

A fast numerical algorithm based on the second kind Chebyshev polynomials for fractional integro-differential equations with weakly singular kernels
By: Nemati, S.; Sedaghat, S.; Mohammadi, I.
JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS Volume: 308 Pages: 231-242 Published: DEC 15 2016
Amplitude-frequency relationship obtained using Hamiltonian approach for oscillators with sum of non-integer order nonlinearities
By: Navarro, H. A.; Cveticanin, L.
APPLIED MATHEMATICS AND COMPUTATION Volume: 291 Pages: 162-171
Published: DEC 1 2016

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Call for Papers

Symposium on Mathematical Methods in Engineering

------organized by Cankaya University, Ankara, Turkey, April 27-29, 2017

http://mme2017.cankaya.edu.tr/

Scope

The aim of the symposium is to bring together scientists and engineers to present and discuss some recent developments in the area of Mathematical Methods in Engineering. The symposium is designed to maximize the involvement of all participants and will present the state of the art research and the latest achievements. The language of the symposium will be in English. The topics to be covered include (but are not limited to):

Emergent Mathematics-Supported Data Mining and Prediction Tools
Dynamics of Complex Systems

Fixed Point Theory and Applications

Fractals

Fractional Calculus and Applications

Fuzzy Sets and Systems Image and Signal Analysis Mechatronics

Nonlinear Dynamics Partial Differential Equations and Applications
Planning and Scheduling Modelling Quantum calculus and its applications

Stochastic Hybrid Systems Stochastic

Optimal Control Vibration and Control

**Important Dates**

Deadline for draft papers submission : February 1, 2017

Notification of acceptance : March 1, 2017

Final manuscript and registration : April 10, 2017

Workshop : 27-29 April, 2017

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**Mini-Symposium on MS06 Fractional Derivatives**


**Scope**

The topics of interest cover multiple physical phenomena in real life dynamic processes, numerical simulations and benchmark studies for application of fractional derivatives as natural solutions to diverse problems in modelling, simulation and control.

**Important Dates**

You are kindly invited to submit a two-page Extended Summary of your proposed presentation before **20 December 2016** online. Online submission with the relevant
instructions will be available on **August 2016**. All Extended Summaries (ES) will be reviewed. Interested contributors of the accepted ES will be also entitled to submit a non-mandatory 6-10 page Paper in **April 2017**.

**Contact**

Conference Secretary: Gábor Csernák  ENOC2017@mm.bme.hu

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Hyperchaotic Fractional-Order Systems and Their Applications

---on journal Complexity

https://www.hindawi.com/journals/complexity/si/342898/cfp/

**Scope**

Fractional calculus is a mathematical analysis field which is concerned with the generalization of differentiation and integration to arbitrary real or even complex orders. Although the idea of fractional calculus has been first mentioned at the end of 17th century, recent studies reveal that many physical phenomena in nature and experiments can be accurately modeled by fractional differential equations. More specifically, the fractional derivative considers the history of previous states in its definition, so it provides an excellent instrument for the modeling memory and hereditary properties in some physical and biological phenomena.

On the other hand, chaos is a very interesting nonlinear phenomenon which has been intensively studied during the last four decades due to its useful applications in science and technology. A regular chaotic system has one positive Lyapunov exponent, whereas a system with more than one positive Lyapunov exponent is called “hyperchaotic.” Therefore, hyperchaotic systems are more sensitive to perturbations, external disturbances, and parameter variations than conventional chaotic ones.

Thus, research about fractional-order hyperchaotic systems gains a lot of interest from both theoretical and applied points of view. Some fractional-order hyperchaotic systems have been investigated, such as the fractional-order hyperchaotic Rössler system and the fractional-order hyperchaotic Chen system. Recent publications also include nonlinear circuits, secure communication, laser applications, spread spectrum communication, communication in star coupled network, video encryption communication, color image encryption algorithm, and applications of different types of synchronization.
The main objective of this special issue is to provide an opportunity to study the new developments related to novel chaotic systems, synchronization schemes, bifurcations, and control in hyperchaotic fractional-order systems along with their applications. We invite authors and researchers to contribute their original research articles as well as review articles.

Potential topics include but are not limited to the following:

Development and applications of novel controlling schemes for chaotic behavior and bifurcations in hyperchaotic fractional-order systems

Applications of chaos synchronization and bifurcations in hyperchaotic fractional-order systems

Chaos in epidemic fractional-order models

Hyperchaotic fractional-order circuits

Applications in chaos-based cryptography

Authors can submit their manuscripts through the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/complexity/hfos/.

Important Dates

Manuscript Due Friday, 28 April 2017

First Round of Reviews Friday, 21 July 2017

Publication Date Friday, 15 September 2017

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Special Issues: Fractional Calculus and Fractional Differential Equations with Applications

Issue Editor: Sergei Rogosin

Book Description

It is dedicated to the memory of Professor Anatoly A. Kilbas (1948–2010) and contains original papers by well-known experts in Fractional Calculus and its Applications.

The first part begins with an article presenting results by Anatoly Kilbas on properties of the generalized hypergeometric function, obtained by him jointly with R.K. Saxena, M. Saigo and J.J. Trujillo. Partly these results were reported at some conferences, but in the complete form this article has been never published.

According to the policy of De Gruyter GmbH, the first 4 articles of this volume have open access.


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


Fractals and Fractional Calculus in Continuum Mechanics

A. Carpinteri, F. Mainardi
Book Description

In this book, the basic concepts of scaling laws, including complete and incomplete selfsimilarity, are put forward in Chapter I by A. Carpinteri. In this chapter, the phenomenon of brittle fracture is examined under the unifying light of the theory of critical phenomena. Catastrophe theory, cooperative microcrack coalescence and complex damage evolution permit to explain peculiar features related to brittle fracture, like the peak instabilities, the ductile-brittle transition and the size effects on nominal material properties. Geometrical multifractality and self-affinity are also put forward when disordered materials are considered.

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

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Journals

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Fractional Calculus and Applied Analysis

(Vol. 19, No 5)

FRACTIONAL CALCULUS: D’OÙ VENONS-NOUS? QUE SOMMES-NOUS? OÙ ALLONS-NOUS?

J.A. Tenreiro Machado, F. Mainardi, V. Kiryakova, T. Atanacković

MODELS OF DIELECTRIC RELAXATION BASED ON COMPLETELY MONOTONE FUNCTIONS

R. Garrappa, F. Mainardi, G. Maione
SPACE-TIME FRACTIONAL STOCHASTIC EQUATIONS ON REGULAR BOUNDED OPEN DOMAINS

V.V. Anh, N.N. Leonenko, M.D. Ruiz-Medina

GEOMETRIC INTERPRETATION OF FRACTIONAL-ORDER DERIVATIVE

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FRACTIONAL CALCULUS IN IMAGE PROCESSING: A REVIEW

Qi Yang, Dali Chen, Tiebiao Zhao, YangQuan Chen

STRONG MAXIMUM PRINCIPLE FOR FRACTIONAL DIFFUSION EQUATIONS AND AN APPLICATION TO AN INVERSE SOURCE PROBLEM

W. Chen, Y. Liang, X. Hei

ON THE REGIONAL CONTROLLABILITY OF THE SUB-DIFFUSION PROCESS WITH CAPUTO FRACTIONAL DERIVATIVE

F. Ge, Y.Q. Chen, C. Kou, I. Podlubny

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ON TIME-FRACTIONAL REPRESENTATION OF AN OPEN SYSTEM RESPONSE

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ON THE SUMMATION OF TAYLOR’S SERIES ON THE CONTOUR OF THE DOMAIN OF SUMMABILITY

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Fractional Order Modeling of Human Operator Behavior with Second Order Controlled Plant and Experiment Research

Jiacai Huang, YangQuan Chen, Haibin Li, Xinxin Shi

Fractional Modeling and SOC Estimation of Lithium-ion Battery

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Fractional Modeling and Analysis of Coupled MR Damping System

Bingsan Chen, Chunyu Li, Benjamin Wilson, Yijian Huang

Parameter Estimation and Topology Identification of Uncertain General Fractional-order Complex Dynamical Networks with Time Delay

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Cuibong Wang, Huanhuan Li, YangQuan Chen

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Constrained Swarm Stabilization of Fractional Order Linear Time Invariant Swarm Systems

Mojtaba Naderi Soorki, Mohammad Saleh Tavazoei
Improving the Control Energy in Model Reference Adaptive Controllers Using Fractional Adaptive Laws

Norelys Aguila-Camacho, Manuel A. Duarte-Mermoud

An Approach to Design MIMO FO Controllers for Unstable Nonlinear Plants

Arturo Rojas-Moreno

Controllability of Fractional Order Stochastic Differential Inclusions with Fractional Brownian Motion in Finite Dimensional Space

T. Sathiyaraj, P. Balasubramaniam

A Note on Robust Stability Analysis of Fractional Order Interval Systems by Minimum Argument Vertex and Edge Polynomials

Baris Baykant Alagoz

Criteria for Response Monotonicity Preserving in Approximation of Fractional Order Systems

Mohammad Saleh Tavazoei

Fractional-order Generalized Principle of Self-support (FOGPSS) in Control System Design

Hua Chen, Yang Quan Chen

Study on Four Disturbance Observers for FO-LTI Systems

Songsong Cheng, Shengguo Wang, Yiheng Wei, Qing Liang, Yong Wang

Set-point Filter Design for a Two-degree-of-freedom Fractional Control System

Fabrizio Padula, Antonio Visioli

Identification and PID Control for a Class of Delay Fractional-order Systems

Zhuoyun Nie, Qingguo Wang, Ruijuan Liu, Yonghong Lan

Robust Output Feedback Control for Fractional Order Nonlinear Systems with Time-varying Delays

Changchun Hua, Tong Zhang, Yafeng Li, Xinping Guan

State Feedback Control for a Class of Fractional Order Nonlinear Systems

Yige Zhao, Yuzhen Wang, Haitao Li
Paper Highlight

Fractional derivative anomalous diffusion equation modeling prime number distribution

Chen, Wen; Liang, Yingjie; Hu, Shuai; Sun, Hongguang

Publication information: FRACTIONAL CALCULUS AND APPLIED ANALYSIS Volume: 18 Issue: 3 Pages: 789-798 Published: JUN 2015


Abstract

This study suggests that the power law decay of prime number distribution can be considered a sub-diffusion process, one of typical anomalous diffusions, and could be described by the fractional derivative equation model, whose solution is the statistical density function of Mittag-Leffler distribution. It is observed that the Mittag-Leffler distribution of the fractional derivative diffusion equation agrees well with the prime number distribution and performs far better than the prime number theory. Compared with the Riemann's method, the fractional diffusion model is less accurate but has clear physical significance and appears more stable. We also find that the Shannon entropies of the Riemann's description and the fractional diffusion models are both very close to the original entropy of prime numbers. The proposed model appears an attractive physical description of the power law decay of prime number distribution and opens a new methodology in this field.
Linking the fractional derivative and the Lomnitz creep law to non-Newtonian time-varying viscosity

Pandey, Vikash; Holm, Sverre

Publication information: PHYSICAL REVIEW E Volume: 94 Issue: 3 Article Number: 032606 Published: SEP 23 2016

https://journals.aps.org/pre/abstract/10.1103/PhysRevE.94.032606

Abstract

Many of the most interesting complex media are non-Newtonian and exhibit time-dependent behavior of thixotropy and rheopecty. They may also have temporal responses described by power laws. The material behavior is represented by the relaxation modulus and the creep compliance. On the one hand, it is shown that in the special case of a Maxwell model characterized by a linearly time-varying viscosity, the medium's relaxation modulus is a power law which is similar to that of a fractional derivative element often called a springpot. On the other hand, the creep compliance of the time-varying Maxwell model is identified as Lomnitz's logarithmic creep law, making this possibly its first direct derivation. In this way both fractional derivatives and Lomnitz's creep law are linked to time-varying viscosity. A mechanism which yields fractional viscoelasticity and logarithmic creep behavior has therefore been found. Further, as a result of this linking, the curve-fitting parameters involved in the fractional viscoelastic modeling, and the Lomnitz law gain physical interpretation.

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