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◆ Latest SCI Journal Papers on FDA

(Searched on Nov 15, 2017)

◆ Call for papers

The 3rd IFAC Conference on Advances in Proportional-Integral Derivative Control

◆ Reports

Report on the 8th International Conference TMSF 2017 ("Transform Methods and Special Functions", Sofia, Bulgaria, August 27–30, 2017)

◆ Books

Fractional Processes and Fractional-Order Signal Processing : Techniques and Applications

Selected Problems of Fractional Systems Theory

◆ Journals

Fractional Calculus & Applied Analysis

Nonlinear Analysis: Real World Applications

◆ Paper Highlight

Characterizing the rheological behaviors of non-Newtonian fluid via a viscoelastic component: Fractal dashpot

Comparison between classical Kelvin-Voigt and fractional derivative Kelvin-Voigt models in prediction of linear viscoelastic behaviour of waste activated sludge

◆ Websites of Interest

Fractal derivative and operators and their applications

Fractional Calculus & Applied Analysis

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Latest SCI Journal Papers on FDA

(Searched on Nov 15, 2017)

Analytical solutions for coupling fractional partial differential equations with Dirichlet boundary conditions
By: Ding, Xiao-Li; Nieto, Juan J.
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 52 Pages: 165-176 Published: NOV 2017

Spatiotemporal chaos of fractional order logistic equation in nonlinear coupled lattices
By: Zhang, Ying-Qian; Wang, Xing Yuan; Liu, Li-Yan; et al.
COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL SIMULATION Volume: 52 Pages: 52-61 Published: NOV 2017

A note on fractional order in thermo-elasticity of shape memory alloys' dampers
By: Manzoor, Tareq; Mehmood, Zaffar; Zahid, Manzoor A.; et al.
INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER Volume: 114 Pages: 597-606 Published: NOV 2017

Numerical simulation for solution of space-time fractional telegraphs equations with local fractional derivatives via HAFSTM
By: Pandey, Rishi Kumar; Mishra, Hradyesh Kumar
NEW ASTRONOMY Volume: 57 Pages: 82-93 Published: NOV 2017

A fourth-order extrapolated compact difference method for time-fractional convection-reaction-diffusion equations with spatially variable coefficients
By: Ren, Lei; Wang, Yuan-Ming
APPLIED MATHEMATICS AND COMPUTATION Volume: 312 Pages: 1-22 Published: NOV 1 2017

Infinitely many positive solutions of fractional nonlinear schrodinger equation with non-symmetric potential
By: Ao, Weiwei; Wei, Juncheng; Yang, Wen
DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS Volume: 37 Issue: 11 Pages: 5561-5601 Published: NOV 2017

A Liouville theorem for indefinite fractional diffusion equations and its application to existence of solutions
By: Barrios, Begona; Del Pezzo, Leandro; Garcia-Melian, Jorge; et al.
DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS Volume: 37 Issue: 11 Pages: 5731-5746 Published: NOV 2017

Recognition of a time-dependent source in a time-fractional wave equation
By: Siskova, K.; Slodicka, M.
APPLIED NUMERICAL MATHEMATICS Volume: 121 Pages: 1-17 Published: NOV 2017

Numerical analysis of an operational Jacobi Tau method for fractional weakly singular integro-differential equations
By: Mokhtary, P.
APPLIED NUMERICAL MATHEMATICS Volume: 121 Pages: 52-67 Published: NOV 2017

A new Crank-Nicolson finite element method for the time-fractional subdiffusion equation
By: Zeng, Fanhai; Li, Changpin
APPLIED NUMERICAL MATHEMATICS Volume: 121 Pages: 82-95 Published: NOV 2017

[Back]

Call for Papers

The 3rd IFAC Conference on Advances in Proportional-Integral Derivative Control

http://www.pid18.ugent.be

Description

The 3rd IFAC Conference on Advances in Proportional-IntegralDerivative Control (PID 2018) will be held Wednesday through Friday, May 9-11, at the Het Pand Convent and Meeting Centre in the heart of Ghent, Belgium – unanimously declared as the most pleasant city of Belgium. The conference venue is near cultural heritage places, historical monuments, restaurants, shopping, and entertainment, just a walk to all of Ghent's known sights.

Proportional-Integral-Derivative (PID) controllers are undoubtedly the most employed controllers in industry. The PID 2018 is the sequel of PID 2000 in Terassa, Spain and PID 2012 in Brescia, Italy. These last two meetings proved to be great successes and have given a significant impulse in research direction of PID controllers, as seen in the last decade in literature reports. The PID2018 conference is a timely and necessary event fueled by the challenges and perspectives of Industry 4.0 context and the renewed role of the PID controller in this new environment. In addition to provide the current state-of-art in the field, the meeting aims at providing a perspective of the future requirements for PID controllers within Industry 4.0.

The technical program will comprise several types of presentations in regular and invited sessions, tutorial sessions, and special sessions along with workshops and exhibits. This event will feature a parallel track on Internet Based control Education workshop (more details on conference website).

Topics: emphasis will be put on current challenges and new directions in PID control in the context of Industry 4.0. Below you can find a list of preferred topics, not limited to. Contributions with both theoretical and practical relevance are encouraged. Study cases from industry and challenges thereof are welcome.

PID tuning and automatic tuning methodologies

PID-based control structures

Applications of PID control

Industrial products for PID control design

Adaptive and robust

PID control Multivariable

PID control

Identification methods for PID control design

Stabilizing PID parameters

Event-based PID control

Fractional-order PID controllers

PID control performance assessment

Control education

CACSD tools for PID control design

Fault detection techniques for PID control

Nonlinear PID control

Simple alternatives to PID controllers

Important Dates:
Initial paper: 20 December 2017
Final Paper and Registration: 01 March 2018

[Back]

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Reports

Report on the 8th International Conference TMSF 2017 (“Transform Methods and Special Functions”, Sofia, Bulgaria, August 27–30, 2017)

Website: http://www.math.bas.bg/~tmsf/2017/

The main organizer and host was the Institute of Mathematics and Informatics – Bulgarian Academy of Sciences (IMI–BAS). The aim of this conference was to continue the traditions of the series of TMSF conferences in Bulgaria, http://www.math.bas.bg/~tmsf/, and to mark some jubilee events: – the **70 years of IMI–BAS**; – the **20th volume of “Fractional Calculus and Applied Analysis” journal**; – the **65th anniversary of its Ed.-in-Chief, Virginia Kiryakova**.

Organizing Committee: Emilia Bazhlekova and Jordanka PanevaKonovska (Co-Chairs), etc. Scientific Program Committee: Virginia Kiryakova, Stepan Tersian (Co-Chairs), etc.

Topics and Scientific Program of TMSF 2017 were planned to include: – “Fractional Calculus and Applied Analysis” (FCAA) - the topics of this journal; – “Transform Methods and Special Functions” (TMSF) - topics as: Special Functions, Integral Transforms, Convolutional and Operational Calculus, Fractional and High Order Differential Equations, Numerical Methods, Generalized Functions, Complex Analysis, etc.; – “Geometric Function Theory and Applications” (GFTA); Applications etc. However, it happened that the vast majority of talks and participants were closely related to the FCAA topics !

The Scientific Program (28, 29, 30 August) and **Abstracts Book** are available at the conference website, with participants list and all other details. Post-conference publications of some papers presented at TMSF 2017 are planned in the journals FCAA and IJAM (Int. J. Appl. Math.). The final countdown is that there were 70 participants and visitors, from 17 countries (44 - from abroad, 26 - from Bulgaria), distributed as follows: Serbia / Macedonia - 7; Poland - 6; Italy - 5; Oman - 3; China / Romania / Russia / Slovak R / Spain - 2; Croatia / France / Germany / Portugal / Ukraine / Uzbekistan - 1. Among participants, we had 11 representatives of FCAA Editorial Board: R. Garrappa, M. Kirane, Y. Luchko, J.A. Tenreiro Machado, F. Mainardi, I. Podlubny, and the Bulgarian members: E. Bazhlekova, I. Dimovski, V. Kiryakova, P. Rusev, S. Tersian.

[Back]

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Books

Fractional Processes and Fractional-Order Signal Processing : Techniques and Applications

Hu Sheng, YangQuan Chen, TianShuang Qiu

Book Description

Fractional processes are widely found in science, technology and engineering systems. In Fractional Processes and Fractional-order Signal Processing, some complex random signals, characterized by the presence of a heavy-tailed distribution or non-negligible dependence between distant observations (local and long memory), are introduced and examined from the 'fractional' perspective using simulation, fractional-order modeling and filtering and realization of fractional-order systems. These fractional-order signal processing (FOSP) techniques are based on fractional calculus, the fractional Fourier transform and fractional lower-order moments. Fractional Processes and Fractional-order Signal Processing: • presents fractional processes of fixed, variable and distributed order studied as the output of fractional-order differential systems; • introduces FOSP techniques and the fractional signals and fractional systems point of view; • details real-world-application examples of FOSP techniques to demonstrate their utility; and • provides important background material on Mittag-Leffler functions, the use of numerical inverse Laplace transform algorithms and supporting MATLAB® codes together with a helpful survey of relevant webpages. Readers will be able to use the techniques presented to re-examine their signals and signal-processing methods. This text offers an extended toolbox for complex signals from diverse fields in science and engineering. It will give academic researchers and practitioners a novel insight into the complex random signals characterized by fractional properties, and some powerful tools to analyze those signals.

More information on this book can be found by the following links:
https://link.springer.com/book/10.1007%2F978-1-4471-2233-3

[Back]

Selected Problems of Fractional Systems Theory

Tadeusz Kaczorek

Book Description

This monograph covers some selected problems of positive fractional 1D and 2D linear systems. It is an extended and modified English version of its preceding Polish edition published by Technical University of Bialystok in 2009. This book is based on the lectures delivered by the author to the Ph.D. students of the Faculty of Electrical Engineering of Bialystok University of Technology and of Warsaw University of Technology and on invited lectures in several foreign universities in the last three years.

More information on this book can be found by the following links:
https://link.springer.com/book/10.1007%2F978-3-642-20502-6#about

[Back]

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Journals

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Fractional Calculus & Applied Analysis

(Vol. 20, No 5)

Niels Henrik Abel and the birth of fractional calculus

Podlubny, Igor / Magin, Richard L. / Trymorush, Iryna

An approach to construct higher order time discretisation schemes for time fractional partial differential equations with nonsmooth data

Ford, Neville J. / Yan, Yubin

Mixed norm spaces of analytic functions as spaces of generalized fractional derivatives of functions in Hardy type spaces

Karapetyants, Alexey / Samko, Stefan

On the maximum principle for a time-fractional diffusion equation

Luchko, Yuri / Yamamoto, Masahiro

Infinitely many sign-changing solutions for the Brézis-Nirenberg problem involving the fractional Laplacian

Li, Lin / Sun, Jijiang / Tersian, Stepan

Asymptotic behavior of solutions of linear multi-order fractional differential systems

Diethelm, Kai / Siegmund, Stefan / Tuan, H.T.

On a generalized three-parameter wright function of Le Roy type

Garrappa, Roberto / Rogosin, Sergei / Mainardi, Francesco

A generalization of the Paley–Wiener theorem for Mellin transforms and metric characterization of function spaces

Bardaro, Carlo / Butzer, Paul L. / Mantellini, Ilaria / Schmeisser, Gerhard

Well-posedness and numerical approximation of tempered fractional terminal value problems

Morgado, Maria Luísa / Rebelo, Magda

Accurate relationships between fractals and fractional integrals: New approaches and evaluations

Nigmatullin, Raoul R. / Zhang, Wei / Gubaidullin, Iskander

Fractional Fokker-Planck-Kolmogorov equations associated with SDES on a bounded domain

Umarov, Sabir

Benchmark problems for Caputo fractional-order ordinary differential equations

Xue, Dingyü / Bai, Lu

[Back]

Nonlinear Analysis: Real World Applications

(Selected)

Nontrivial solutions of some fractional problems

Nguyen Van Thin

Conservation laws for certain time fractional nonlinear systems of partial differential equations

Komal Singla, R.K. Gupta

Fractional nonlinear dynamics of DNA breathing

Alain Mvogo, Germain H. Ben-Bolie, Timoléon C. Kofané

(N+1)-dimensional fractional reduced differential transform method for fractional order partial differential equations

Muhammad Arshad, Dianchen Lu, Jun Wang

Analytical solutions for coupling fractional partial differential equations with Dirichlet boundary conditions

Xiao-Li Ding, Juan J. Nieto

Spiking and bursting patterns of fractional-order Izhikevich model

Wondimu W. Teka, Ranjit Kumar Upadhyay, Argha Mondal

Persistence of nonlinear hysteresis in fractional models of Josephson transmission lines

J.E. Macías-Díaz

[Back]

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Paper Highlight

Characterizing the rheological behaviors of non-Newtonian fluid via a viscoelastic component: Fractal dashpot

Xianglong Su, Wen Chen, Wenxiang Xu

Publication information: ADVANCES IN MECHANICAL ENGINEERING Volume: 9 Issue: 10 Article Number: 1687814017699765 Published: OCT 5 2017

http://journals.sagepub.com/doi/full/10.1177/1687814017699765

Abstract

Based on the fractal derivative, a robust viscoelastic element—fractal dashpot—is proposed to characterize the rheological behaviors of non-Newtonian fluid. The mechanical responses of the fractal dashpot are investigated with different strains and stresses, which are compared with the existing dashpot models, including the Newton dashpot and the Abel dashpot. The results show that as the derivative order is between 0 and 1, the viscoelastic behavior of the fractal dashpot is similar to that of the Abel dashpot. However, the fractal dashpot has a high computational efficiency compared with the Abel dashpot. On the other hand, the fractal dashpot can be reduced to the Newton dashpot when the derivative order equals to 1. As an extension of fractal dashpot, a fractal Bingham model is also introduced in this study. The accuracy of proposed fractal models is verified by the relevant rheological experimental data. Moreover, the obtained parameters can not only provide quantitative insights into both the viscoelasticity and the relative strength of rheopexy and thixotropy, but also quantitatively distinguish shear thinning and thickening phenomena.

[Back]

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Comparison between classical Kelvin-Voigt and fractional derivative Kelvin-Voigt models in prediction of linear viscoelastic behaviour of waste activated sludge

Farno, Ehsan; Baudez, Jean-Christophe; Eshtiaghi, Nicky

Publication information: SCIENCE OF THE TOTAL ENVIRONMENT Volume: 613 Pages: 1031-1036 Published: FEB 1 2018

http://europepmc.org/abstract/MED/28950665

Abstract

Appropriate sewage sludge rheological models are essential for computational fluid dynamic simulation of wastewater treatment processes, in particular aerobic and anaerobic digestions. The liquid-like behaviour of sludge is well documented but the solid-like behaviour remains poorly described despite its importance for dead-zone formation. In this study, classical Kelvin-Voigt model, commonly used for sludge in literature, were compared with fractional derivative Kelvin-Voigt model regarding their predictive ability for describing the solid-like behaviour. Results showed that the fractional Kelvin-Voigt model best fitted the experimental data obtained from creep and frequency sweep tests. Whereas, classical Kelvin-Voigt could not fit the frequency sweep data as this model is not a function of angular velocity. Also, the Kelvin-Voigt model was unable to predict the creep data at low stresses.

[Back]

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