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[Fractal derivative and operators and their applications](#)

[Fractional Calculus & Applied Analysis](#)

Latest SCI Journal Papers on FDA

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[Numerical Simulation of Noninteger Order System in Subdiffusive, Diffusive, and Superdiffusive Scenarios](#)

By: Owolabi, Kolade M.; Atangana, Abdon

JOURNAL OF COMPUTATIONAL AND NONLINEAR DYNAMICS Volume: 12 Issue: 3 Article Number: 031010 Published: MAY 2017

[Stabilization of Fractional-Order Systems Subject to Saturation Element Using Fractional Dynamic Output Feedback Sliding Mode Control](#)

By: Shahri, Esmat Sadat Alaviyan; Alfi, Alireza; Tenreiro Machado, J. A.

JOURNAL OF COMPUTATIONAL AND NONLINEAR DYNAMICS Volume: 12 Issue: 3 Article Number: 031014 Published: MAY 2017

[The discontinuous Galerkin finite element method for fractional cable equation](#)

By: Zheng, Yunying; Zhao, Zhengang

APPLIED NUMERICAL MATHEMATICS Volume: 115 Pages: 32-41 Published: MAY 2017

[Discontinuous Galerkin time stepping method for solving linear space fractional partial differential equations](#)

By: Liu, Yanmei; Yan, Yubin; Khan, Monzorul

APPLIED NUMERICAL MATHEMATICS Volume: 115 Pages: 200-213 Published: MAY 2017

[Image Retrieval Based on Discrete Fractional Fourier Transform Via Fisher Discriminant](#)

By: Zhang, Xiao-Zhi; Ling, Bingo Wing-Kuen; Lun, Daniel Pak-Kong; et al.

CIRCUITS SYSTEMS AND SIGNAL PROCESSING Volume: 36 Issue: 5 Pages: 2012-2030 Published: MAY 2017

[A multigrid method for linear systems arising from time-dependent two-dimensional space-fractional diffusion equations](#)

By: Lin, Xue-lei; Ng, Michael K.; Sun, Hai-Wei

JOURNAL OF COMPUTATIONAL PHYSICS Volume: 336 Pages: 69-86 Published: MAY 1 2017

[Fractional Burgers equation with nonlinear non-locality: Spectral vanishing viscosity and local discontinuous Galerkin methods](#)

By: Mao, Zhiping; Karniadakis, George Em

JOURNAL OF COMPUTATIONAL PHYSICS Volume: 336 Pages: 143-163 Published: MAY 1 2017

[Finite-Element Formulation of a Nonlocal Hereditary Fractional-Order Timoshenko Beam](#)

By: Alotta, Gioacchino; Failla, Giuseppe; Zingales, Massimiliano

JOURNAL OF ENGINEERING MECHANICS Volume: 143 Issue: 5 Article Number: D4015001 Published: MAY 2017

[Caputo-Fabrizio Derivative Applied to Groundwater Flow within Confined Aquifer](#)

By: Atangana, Abdon; Baleanu, Dumitru

JOURNAL OF ENGINEERING MECHANICS Volume: 143 Issue: 5 Article Number: D4016005 Published: MAY 2017

[Fractional Viscoelastic Modeling of Antirutting Response of Bituminous Binders](#)

By: Baglieri, Orazio; Santagata, Ezio; Sapora, Alberto; et al.

JOURNAL OF ENGINEERING MECHANICS Volume: 143 Issue: 5 Article Number: D4016002 Published: MAY

Call for Papers

8th International conference TMSF 2017, “Transform Methods and Special Functions”

(Sofia, Bulgaria, August 27–30, 2017)

<http://www.math.bas.bg/~tmsf/2017/>

Organized and hosted by the Institute of Mathematics and Informatics
– Bulgarian Academy of Sciences (IMI–BAS),
<http://math.bas.bg/index.php/en/> (founding publisher of FCAA),
with the kind cooperation of the University of Ruse “Angel Kanchev”,
<https://www.uni-ruse.bg/en>

Description

The aim of this conference is to continue the traditions of the series of TMSF conferences in Bulgaria,

<http://www.math.bas.bg/~tmsf/>, and to mark some jubilee events, among which are: the **70 years of IMI–BAS**, and

the **20th volume of “Fractional Calculus and Applied Analysis”** journal.

The Conference is organized under the auspices of the bilateral academic agreements between Bulgarian Academy of Sciences and Academies of neighboring Balkan countries (Serbia, Macedonia, Romania); and some projects with National Science Fund of Bulgaria, Institutions and Universities, related to the TMSF 2017 topics.

Organizing Committee: Emilia Bazhlekova and Jordanka PanevaKonovska (Co-Chairs), Julian Tsankov, Donka Pashkouleva, Georgi Dimkov, Nikolay Ikonov, Ivan Bazhlevkov (Local Members), Miglena Koleva (Ruse University), Djurdjica Takaci (Serbia), Biljana Jolevska-Tuneska (Macedonia), Nicoleta Breaz (Romania)

Scientific Program Committee: Virginia Kiryakova, Stepan Tersian (Co-Chairs), Blagovest Sendov, Ivan Dimovski, Nedyu Popivanov, Tsvyatko Rangelov (Bulgaria), Teodor Atanackovic, Stevan Pilipovic, Arpad Takaci, Predrag Rajkovic (Serbia), Nikola Tuneski (Macedonia), Daniel Breaz (Romania), Yuri Luchko (Germany, FCAA)

TMSF Scientific Program:

- “Fractional Calculus and Applied Analysis” Day (FCAA)

- “Geometric Function Theory and Applications” Day (GFTA)

- “Transform Methods and Special Functions” Day (TMSF),

with TMSF basic topics as: Special Functions, Integral Transforms, Convolutional Calculus, Fractional and High Order Differential Equations, Numerical Methods, Generalized Functions, Complex Analysis, etc.

Schedule: Arrivals: 27 August (Sunday); Working days: 28-29-30 August 2017 (Monday-Wednesday); Departures: 31 August.

Venue of the conference: Institute of Mathematics and Informatics - Bulgarian Academy of Sciences, Sofia.

Accommodation: Hotels in walking distance in the area of Institute, with basic prices 30-35 EUR/ night/ single room/ 3-stars hotel. Details and offers will be given in Second announcement.

Registration fees: 100 EUR (195 BGN), by bank transfer (details will be provided) or cash at the desk - to cover: conference materials, publication of short paper, coffee breaks, welcome cocktail, conference party, sightseeing tour. Accompanying persons: 45 EUR.

Publications: Along with abstracts of the accepted talks, and some invited survey papers, the participants will have the opportunity to submit short papers (6-12 pages) to special issues of two refereed and indexed international mathematical journals. All papers will be peer-reviewed.

Timetable: Please, confirm your interest in receiving next information and possible participation by May 10 with e-mail to: , and returning the Preliminary Registration Form.

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International Conference on Fractional Signals and Systems

----- FSS 2017 (Lodz, Poland, September 9-11, 2017)

(organized by Institute of Applied Computer Science, Lodz University of Technology)

<http://www.fss17.p.lodz.pl/>

Description

The conference will offer three stimulating days of newest results presentation and discussions. It encompasses a broad spectrum of the Fractional Calculus applications in technical sciences. The main tracks will be: the fractional-order continuous-, and discrete-time linear or non-linear fractional-order control, dynamic system identification via fractional models, fractional order filtering, image processing using fractional methods. The mentioned range is not meant to exclude other applicable areas.

Main topics: – Fractional order control; – Signal analysis and filtering with fractional tools; – Fractional modeling; – Fractional system identification; – Image processing using methods based on the fractional calculus; – Numerical methods for fractional calculus.

Important dates: – Early registration deadline: March 1st, 2017; – Mini-symposiums proposal: March 15th, 2017; – Submission deadline: May 15th, 2017; – Notification of acceptance: 15th June, 2017; – Submission of final version: 1st July, 2017.

Contacts: fss17@info.p.lodz.pl

Communicated by: *Piotr Ostalczyk*

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Books

Fractional calculus view of complexity tomorrow's science

Bruce J. West

Book Description

This book is not a text devoted to a pedagogical presentation of a specialized topic nor is it a monograph focused on the author's area of research. It accomplishes both these things while providing a rationale for why the reader ought to be interested in learning about fractional calculus. This book is for researchers who has heard about many of these scientifically exotic activities, but could not see how they fit into their own scientific interests, or how they could be made compatible with the way they understand science. It is also for beginners who have not yet decided where their scientific talents could be most productively applied. The book provides insight into the long-term direction of science and show how to develop the skills necessary to successfully do research in the twenty-first century.

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

<http://www.crcpress.com/product/isbn/9781498738002>

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Fractional calculus with applications in mechanics :wave propagation, impact and variational principles

Pilipovic, Stevan, Stankovic, Bogoljub, Zorica, Dusan, Atanackovic

Book Description

The books Fractional Calculus with Applications in Mechanics: Vibrations and Diffusion Processes and Fractional Calculus with Applications in Mechanics: Wave Propagation, Impact and Variational Principles contain various applications of fractional calculus to the fields of classical mechanics. Namely, the books study problems in fields such as viscoelasticity of fractional order, lateral vibrations of a rod of fractional order type, lateral vibrations of a rod positioned on fractional order viscoelastic foundations, diffusion-wave phenomena, heat conduction, wave propagation, forced oscillations of a body attached to a rod, impact and variational principles of a Hamiltonian type. The books will be useful for graduate students in mechanics and applied mathematics, as well as for researchers in these fields. Part 1 of this book presents an introduction to fractional calculus. Chapter 1 briefly gives definitions and notions that are needed later in the book and Chapter 2 presents definitions and some of the properties of fractional integrals and derivatives. Part 2 is the central part of the book. Chapter 3 presents the analysis of waves in fractional viscoelastic materials in infinite and finite spatial domains. In Chapter 4, the problem of oscillations of a translatory moving rigid body, attached to a heavy, or light

viscoelastic rod of fractional order type, is studied in detail. In Chapter 5, the authors analyze a specific engineering problem of the impact of a viscoelastic rod against a rigid wall. Finally, in Chapter 6, some results for the optimization of a functional containing fractional derivatives of constant and variable order are presented.

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

<http://onlinelibrary.wiley.com/book/10.1002/9781118909065>

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Journals

Journal of Sound and Vibration

(Selected)

[Mechanical energy and equivalent differential equations of motion for single-degree-of-freedom fractional oscillators](#)

Jian Yuan, Youan Zhang, Jingmao Liu, Bao Shi, Mingjiu Gai, Shujie Yang

[Randomly-disordered-periodic-induced chaos in a piezoelectric vibration energy harvester system with fractional-order physical properties](#)

Di Liu, Yong Xu, Junlin Li

[Nonlinear vibration of viscoelastic beams described using fractional order derivatives](#)

Roman Lewandowski, Przemysław Wielentejczyk

[Coefficient of restitution in fractional viscoelastic compliant impacts using fractional Chebyshev collocation](#)

Arman Dabiri, Eric A. Butcher, Morad Nazari

[A marginal fractional moments based strategy for points selection in seismic response analysis of nonlinear structures with uncertain parameters](#)

Jun Xu, Ding Wang, Chao Dang

[A PDEM based new methodology for stochastic dynamic stability control of nonlinear structures with fractional-type viscoelastic dampers](#)

Jun Xu

[Dichotomous-noise-induced chaos in a generalized Duffing-type oscillator with fractional-order deflection](#)

Youming Lei, Rui Fu, Yong Yang, Yanyan Wang

[Viscoelastic bearings with fractional constitutive law for fractional tuned mass dampers](#)

G. Barone, M. Di Paola, F. Lo Iacono, G. Navarra

[Higher-order stochastic averaging to study stability of a fractional viscoelastic column](#)

J. Deng, W.-C. Xie, M.D. Pandey

[Flutter analysis of a flag of fractional viscoelastic material](#)

Ming Chen, Lai-Bing Jia, Xiao-Peng Chen, Xie-Zhen Yin

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Communications in Nonlinear Science and Numerical Simulation

(selected)

[Conservation laws for certain time fractional nonlinear systems of partial differential equations](#)

Komal Singla, R.K. Gupta

[Applications of homogenous balanced principle on investigating exact solutions to a series of time fractional nonlinear PDEs](#)

Weiguo Rui

[Analytical solutions for coupling fractional partial differential equations with Dirichlet boundary conditions](#)

Xiao-Li Ding, Juan J. Nieto

[On a fractal LC-electric circuit modeled by local fractional calculus](#)

Xiao-Jun Yang, J. A. Tenreiro Machado, Carlo Cattani, Feng Gao

[Efficient modified Chebyshev differentiation matrices for fractional differential equations](#)

Arman Dabiri, Eric A. Butcher

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

Muhammad Arshad, Dianchen Lu, Jun Wang

[Stability analysis of Caputo-like discrete fractional systems](#)

Dumitru Baleanu, Guo-Cheng Wu, Yun-Ru Bai, Fu-Lai Chen

[Amplitude death induced by fractional derivatives in nonlinear coupled oscillators](#)

Q.X. Liu, J.K. Liu, Y.M. Chen

[Persistence of nonlinear hysteresis in fractional models of Josephson transmission lines](#)

J.E. Macías-Díaz

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Paper Highlight

3D Memory Constitutive Equations for Plastic Media

Caputo, Michele; Fabrizio, Mauro

Publication information: JOURNAL OF ENGINEERING MECHANICS Volume: 143 Issue: 5 Article Number: D4016008 Published: MAY 2017

<http://ascelibrary.org/doi/abs/10.1061/%28ASCE%29EM.1943-7889.0001128>

Abstract

In this paper, the authors begin by observing that using the new definition of fractional derivative with an exponential kernel makes it possible to obtain again some generalized constitutive equation of continuum mechanics as a Kelvin-Voigt Maxwell standard linear solid. However, this equivalence holds only in a space of smooth solutions. In the second part, two different fractional derivatives to describe the behavior of some types of plastic materials are considered. Before a kernel with a negative power of the variable and then a kernel with a negative exponential are assumed. The problems related with 1D1D (one dimensional) stress and a 1D1D strain respectively are applied to the 3D3D (three dimensional) body as part of a discussion of the Poisson phenomenon.

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Fractional biharmonic operator equation model for arbitrary frequency-dependent

scattering attenuation in acoustic wave propagation

Chen, Wen; Fang, Jun; Pang, Guofei; et al.

Publication information: JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA Volume: 141 Issue: 1
Pages: 244-253 Published: JAN 2017

<http://asa.scitation.org/doi/pdf/10.1121/1.4973865>

Abstract

This paper proposes a fractional biharmonic operator equation model in the time-space domain to describe scattering attenuation of acoustic waves in heterogeneous media. Compared with the existing models, the proposed fractional model is able to describe arbitrary frequency-dependent scattering attenuation, which typically obeys an empirical power law with an exponent ranging from 0 to 4. In stark contrast to an extensive and rapidly increasing application of the fractional derivative models for wave absorption attenuation in the literature, little has been reported on frequency-dependent scattering attenuation. This is largely because the order of the fractional Laplacian is from 0 to 2 and is infeasible for scattering attenuation. In this study, the definition of the fractional biharmonic operator in space with an order varying from 0 to 4 is proposed, as well as a fractional biharmonic operator equation model of scattering attenuation which is consistent with arbitrary frequency power-law dependency and obeys the causal relation under the smallness approximation. Finally, the correlation between the fractional order and the ratio of wavelength to the diameter of the scattering heterogeneity is investigated and an expression on exponential form is also provided.

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