

# **FDA Express** Vol. 11, No. 5, Jun. 15, 2014

Editors: <http://em.hhu.edu.cn/fda/Editors.htm>

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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

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[Principal resonance responses of SDOF systems with small fractional derivative damping under narrow-band random parametric excitation](#)

By: Liu, Di; Li, Jing; Xu, Yong

COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL

SIMULATION Volume: 19 Issue: 10 Pages: 3642-3652 Published: OCT 2014

[Fault detection based on fractional order models: Application to diagnosis of thermal systems](#)

By: Aribi, Asma; Farges, Christophe; Aoun, Mohamed; et al.

COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL

SIMULATION Volume: 19 Issue: 10 Pages: 3679-3693 Published: OCT 2014

[Image encryption based on synchronization of fractional chaotic systems](#)

By: Xu, Yong; Wang, Hua; Li, Yongge; et al.

COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL

SIMULATION Volume: 19 Issue: 10 Pages: 3735-3744 Published: OCT 2014

[Analytic study on a state observer synchronizing a class of linear fractional differential systems](#)

By: Zhou, Xian-Feng; Huang, Qun; Jiang, Wei; et al.

COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL

SIMULATION Volume: 19 Issue: 10 Pages: 3808-3819 Published: OCT 2014

[Positive solutions to integral systems with weight and Bessel potentials](#)

By: Yin, Hui; Lu, Zhongxue

JOURNAL OF MATHEMATICAL ANALYSIS AND APPLICATIONS Volume: 418 Issue:

1 Pages: 264-282 Published: OCT 1 2014

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## Books

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### **The Realization Problem for Positive and Fractional Systems**

Kaczorek, Tadeusz, Sajewski, Lukasz

#### **Book Description**

Random walk is a stochastic process that has proven to be a useful model in understanding discrete-state discrete-time processes across a wide spectrum of scientific disciplines. Elements of Random Walk and Diffusion ProThis 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.springer.com/engineering/control/book/978-3-319-04833-8>

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## Fractional Derivatives for Physicists and Engineers

Uchaikin Vladimir V

### Book Description

The first derivative of a particle coordinate means its velocity, the second means its acceleration, but what does a fractional order derivative mean? Where does it come from, how does it work, where does it lead to? The two-volume book written on high didactic level answers these questions. Fractional Derivatives for Physicists and Engineers— The first volume contains a clear introduction into such a modern branch of analysis as the fractional calculus. The second develops a wide panorama of applications of the fractional calculus to various physical problems. This book recovers new perspectives in front of the reader dealing with turbulence and semiconductors, plasma and thermodynamics, mechanics and quantum optics, nanophysics and astrophysics.

The book is addressed to students, engineers and physicists, specialists in theory of probability and statistics, in mathematical modeling and numerical simulations, to everybody who doesn't wish to stay apart from the new mathematical methods becoming more and more popular.

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

<http://www.springer.com/physics/theoretical,+mathematical+&+computational+physics/book/978-3-642-33910-3>

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# Journals

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## Entropy

Volume 16, Issue 6

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Shinji Kojima

[Information Geometric Complexity of a Trivariate Gaussian Statistical Model](#)

Domenico Felice, Carlo Cafaro and Stefano Mancini

[How to Determine Losses in a Flow Field: A Paradigm Shift towards the Second Law Analysis](#)

Heinz Herwig and Bastian Schmandt

[Constraints of Compound Systems: Prerequisites for Thermodynamic Modeling Based on Shannon Entropy](#)

Martin Pflieger, Thomas Wallek and Andreas Pfennig

[Tsallis Wavelet Entropy and Its Application in Power Signal Analysis](#)

Jikai Chen and Guoqing Li

[Asymptotically Constant-Risk Predictive Densities When the Distributions of Data and Target Variable Are Different](#)

by Keisuke Yano and Fumiyasu Komaki

[Using Permutation Entropy to Measure the Changes in EEG Signals During Absence Seizures](#)

Jing Li, Jiaqing Yan, Xianzeng Liu and Gaoxiang Ouyang

[Entropy Content During Nanometric Stick-Slip Motion](#)

Paul Creeger and Fredy Zypman

[Information-Geometric Markov Chain Monte Carlo Methods Using Diffusions](#)

Samuel Livingstone and Mark Girolami

[Analysis and Optimization of a Compressed Air Energy Storage—Combined Cycle System](#)

Wenyi Liu, Linzhi Liu, Luyao Zhou, Jian Huang, Yuwen Zhang, Gang Xu and Yongping Yang

[Quantum Flows for Secret Key Distribution in the Presence of the Photon Number Splitting Attack](#)

Luis A. Lizama-Pérez, J. Mauricio López, Eduardo De Carlos-López and Salvador E. Venegas-Andraca

[Minimum Entropy-Based Cascade Control for Governing Hydroelectric Turbines](#)

Mifeng Ren, Di Wu, Jianhua Zhang and Man Jiang

[A Derivation of a Microscopic Entropy and Time Irreversibility From the Discreteness of Time](#)

Roland Riek

[Relative Entropy, Interaction Energy and the Nature of Dissipation](#)

Bernard Gaveau, Léo Granger, Michel Moreau and Lawrence S. Schulman

[On the Fisher Metric of Conditional Probability Polytopes](#)

Guido Montúfar, Johannes Rauh and Nihat Ay

[On Spatial Covariance, Second Law of Thermodynamics and Configurational Forces in Continua](#)

Vassilis P. Panoskaltsis and Dimitris Soldatos

[Density Reconstructions with Errors in the Data](#)

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## Nonlinear dynamics

Volume 76, Issue 4

[Hyperchaos synchronization of fractional-order arbitrary dimensional dynamical systems via modified sliding mode control](#)

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[Adaptive sliding mode control of uncertain chaotic systems with input nonlinearity](#)

Leipo Liu, Jiexin Pu, Xiaona Song, Zhumu Fu, Xiaohong Wang

[Primary and secondary resonance analyses of clamped–clamped micro-beams](#)

D. Younesian, M. Sadri, E. Esmailzadeh

[Nonlinear vibrations of a single-walled carbon nanotube for delivering of nanoparticles](#)

Keivan Kiani

[Highly efficient nonlinear energy sink](#)

Mohammad A. AL-Shudeifat

[The generalized Hamiltonian model for the shafting transient analysis of the hydro turbine generating sets](#)

Yun Zeng, Lixiang Zhang, Yakun Guo, Jing Qian, Chenli Zhang

[Types of coefficient constraints of coupled nonlinear Schrödinger equations for elastic and inelastic interactions between spatial solitons with symbolic computation](#)

Wen-Jun Liu, Ming Lei

[A new image alternate encryption algorithm based on chaotic map](#)

Xingyuan Wang, Kang Guo

[Selection of multi-scroll attractors in Jerk circuits and their verification using Pspice](#)

Jun Ma, Xinyi Wu, Runtong Chu, Liping Zhang

[Bifurcation analysis of a nonlinear pendulum using recurrence and statistical methods: applications to fault diagnostics](#)

C. A. Kitio Kwuimy, M. Samadani, C. Nataraj

[Actuator fault diagnosis for uncertain T–S fuzzy systems with local nonlinear models](#)

Huimin Wang, Dan Ye, Guang-Hong Yang

[Algebraic analysis of a RGB image encryption algorithm based on DNA encoding and chaotic map](#)

Akram Belazi, Houcemeddine Hermassi, Rhouma Rhouma, Safya Belghith

[Postbuckling instability of nonlinear nanobeam with geometric imperfection embedded in elastic foundation](#)

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[A new car-following model with consideration of inter-vehicle communication](#)

Tieqiao Tang, Weifang Shi, Huayan Shang, Yunpeng Wang

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[Distributed proportional plus second-order spatial derivative control for distributed parameter systems subject to spatiotemporal uncertainties](#)

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## Paper Highlight

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### Nondiffusive Transport in Plasma Turbulence: A Fractional Diffusion

#### Approach

Nondiffusive Transport in Plasma Turbulence: A Fractional Diffusion Approach

**Publication information:** D. del-Castillo-Negrete, B. A. Carreras, and V. E. Lynch. Nondiffusive Transport in Plasma Turbulence: A Fractional Diffusion Approach. Physical Review Letters, 94, 065003 (2005).

<http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.94.065003>

#### Abstract

Numerical evidence of nondiffusive transport in three-dimensional, resistive pressure-gradient-driven plasma turbulence is presented. It is shown that the probability density function (pdf) of tracer particles' radial displacements is strongly non-Gaussian and exhibits algebraic decaying tails. To model these results we propose a macroscopic transport model for the pdf based on the use of fractional derivatives in space and time that incorporate in a unified way space-time nonlocality (non-Fickian transport), non-Gaussianity, and nondiffusive scaling. The fractional diffusion model reproduces the shape and space time scaling of the non-Gaussian pdf of turbulent transport calculations. The model also reproduces the observed superdiffusive scaling.

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### Multifractality of the Feigenbaum Attractor and Fractional Derivatives

U. Frisch, K. Khanin and T. Matsumoto

**Publication information:** U. Frisch, K. Khanin and T. Matsumoto. Multifractality of the Feigenbaum Attractor and Fractional Derivatives. Journal of Statistical Physics, 2005, 121(5/6), 671-695.

<http://link.springer.com/article/10.1007/s10955-005-7011-4>

**Abstract**

It is shown that fractional derivatives of the (integrated) invariant measure of the Feigenbaum map at the onset of chaos have power-law tails in their cumulative distributions, whose exponents can be related to the spectrum of singularities ( $f(\alpha)$ ). This is a new way of characterizing multifractality in dynamical systems, so far applied only to multifractal random functions [Frisch and Matsumoto, J. Stat. Phys. 108:1181, 2002]. The relation between the thermodynamic approach [Vul, Sinai and Khanin, Russian Math. Surveys 39:1, 1984] and that based on singularities of the invariant measures is also examined. The theory for fractional derivatives is developed from a heuristic point view and tested by very accurate simulations.

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