Conferences

ICAAM2012 — First International Conference on Analysis and Applied Mathematics

Books

Turbulence and Diffusion: Scaling Versus Equations (Springer Series in Synergetics)

Journals

International Journal of Bifurcation and Chaos (IJBC)

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Classical Papers

An Extension Problem Related to the Fractional Laplacian

Fractional Laplacian in bounded domains

Fractional Laplacian time-space models for linear and nonlinear lossy media exhibiting arbitrary frequency power-law dependency
Conferences

ICAAM2012 — First International Conference on Analysis and Applied Mathematics

18 Oct 2012 → 21 Oct 2012; Gumushane, Turkey

http://icaam2012.gumushane.edu.tr/index/

Abstract: We are proud to announce the First International Conference on Analysis and Applied Mathematics. The aim of this conference is to bring together mathematicians working in the area of analysis and applied mathematics to share new trends of applications of math. In mathematics, the developments in the field of applied mathematics open new research areas in analysis and vice versa. That is why, we plan to found a journal to provide a forum for researchers and scientists to communicate their recent developments and to present their original results in various fields of analysis and applied mathematics.


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**Books**

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**Turbulence and Diffusion: Scaling Versus Equations (Springer Series in Synergetics)**

Oleg G. Bakunin

**Main description**

This book is an introduction to the multidisciplinary field of anomalous diffusion in complex systems, with emphasis on the scaling approach as opposed to techniques based on the quantitative analysis of underlying transport equations. Typical examples of such systems are turbulent plasmas, convective rolls, zonal flow systems and stochastic magnetic fields.

From the more methodological point of view, the approach relies on the general use of correlations estimates, quasilinear equations and continuous time random walk techniques. Yet, the mathematical descriptions are not meant to become a fixed set of recipes but rather develop and strengthen the reader's physical intuition and understanding on the underlying mechanisms involved.

Most of the material stems from class-tested lectures, where graduate students where assumed to have a working knowledge of classical physics, fluid dynamics and plasma physics but otherwise no prior knowledge of the subject matter is assumed from the side of the reader.


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**Journals**

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Theme Section: Complex Network Systems — From Theory To Applications

Editorial
R. Criado, M. Romance, Y. Moreno, J. Gómez-Gardeñes

Theme Section: Complex Network Systems — From Theory To Applications: Tutorials And Reviews

Unsupervised Clustering Analysis: A Multiscale Complex Networks Approach
Clara Granell, Sergio Gómez, Alex Arenas

Theme Section: Complex Network Systems — From Theory To Applications: Papers

Complex Networks Evolutionary Dynamics Using Genetic Algorithms
Daniel Aguilar-Hidalgo, Antonio Córdoba Zurita, Ma Carmen Lemos Fernández

Topological Versus Dynamical Robustness In A Lexical Network
Javier Borge-Holthoefer, Yamir Moreno, Alex Arenas

Redundancy In Functional Brain Connectivity From Eeg Recordings
Fabrizio De Vico Fallani, Jlenia Toppi, Claudia Di Lanzo, Giovanni Vecchiato, Laura Astolfi, Gianluca Borghini, Donatella Mattia, Febo Cincotti, Fabio Babiloni

Reliability Of Optimal Linear Projection Of Growing Scale-Free Networks
Pau Erola, Javier Borge-Holthoefer, Sergio Gomez, Alex Arenas

Detecting Series Periodicity With Horizontal Visibility Graphs
Angel Nuñez, Lucas Lacasa, Eusebio Valero, Jose Patricio Gómez, Bartolo Luque

Pacemakers In A Cayley Tree Of Kuramoto Oscillators
Pablo M. Gleiser, Luce Prignano, Conrad J. Pérez-Vicente, Albert Diaz-Guilera

A Model To Classify Users Of Social Networks Based On Pagerank
Francisco Pedroche
A Post-Processing Method For Interest Point Location In Images By Using Weighted Line-Graph Complex Networks
Regino Criado, Miguel Romance, Ángel Sánchez

Dynamics Of Persistent Infections In Homogeneous Populations
Joaquín Sanz, Luis Mario Floría, Yamir Moreno

Exploring The Kibble–Zurek Mechanism In A Secondary Bifurcation
M. A. Miranda, J. Burguete, W. González-Viñas, H. Mancini

Hybrid Recommendation Algorithm Based On Two Roles Of Social Tags
Zi-Ke Zhang, Chuang Liu

**Theme Section: Dynamics And Processes Of Complex Networks**

Editorial
M. Zanin, R. Gutiérrez, R. Bajo, J. M. Buldú, D. Papo, S. Boccaletti

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J. M. Buldú, I. Sendiña-Nadal, I. Leyva, J. A. Almendral, M. Zanin, S. Boccaletti

Adaptive Growing Networks Coevolving With The Spread Of Diseases
Beniamino Guerra, Jesús Gómez-Gardeñes, Vito Latora

Complex Dynamical Behaviors Of Deflection Routing On Grid Networks
Wilson Wang-Kit Thong, Guanrong Chen

Effects Of Traffic Properties And Degree Heterogeneity In Flow Fluctuations On Complex Networks
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Hierarchical Multiresolution Method To Overcome The Resolution Limit In Complex Networks
Clara Granell, Sergio Gómez, Alex Arenas

Saddle-Node Bifurcation Cascades And Associated Traveling Waves In Weakly Coupling Cml
Ma Dolores Sotelo Herrera, Jesús San Martín, Lucia Cerrada

Bifurcations In A Star-Like Network Of Stuart–Landau Oscillators
Mattia Frasca, André Bergner, Jürgen Kurths, Luigi Fortuna

Structure And Dynamics: The Transition From Nonequilibrium To Equilibrium In Integrate-And-Fire Dynamics
Cesar H. Comin, João L. B. Batista, Matheus P. Viana, Luciano Da F. Costa, Bruno A. N. Travençolo, Marcus Kaiser

Noise-Induced Up/Down Dynamics In Scale-Free Neuronal Networks
Jordi Grau-Moya, Antonio J. Pons, Jordi Garcia-Ojalvo

Pinning Impulsive Stabilization Of Nonlinear Dynamical Networks With Time-Varying Delay
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Targeting And Control Of Synchronization In Chaotic Oscillators
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Global And Partial Phase Synchronizations In Arrays Of Piecewise Linear Time-Delay Systems
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Synchronization Of Moving Integrate And Fire Oscillators
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Modeling The Evolution Of Item Rating Networks Using Time-Domain Preferential Attachment
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Dependency Network And Node Influence: Application To The Study Of Financial Markets
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Amit Pande, Joseph Zambreno, Prasant Mohapatra

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**Applications of some transformations for several variable-coefficient nonlinear evolution equations from plasma physics, arterial mechanics, nonlinear optics and Bose–Einstein condensates**
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Tingchun Wang, Yong Jiang

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Applications of Dynamical System Theory
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Architectures, stability and optimization for clock distribution networks
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Semiconductor ring laser subject to delayed optical feedback: Bifurcations and stability
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A novel GCM chaotic neural network for information processing
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Full-order and reduced-order observers for one-sided Lipschitz nonlinear systems using Riccati equations
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Helical flows of a heated generalized Oldroyd-B fluid subject to a time-dependent shear stress in porous medium
Chunrui Li, Liancun Zheng, Yue Zhang, Lianxi Ma, Xinxin Zhang

Nonlinear rotating convection in a sparsely packed porous medium
A. Benerji Babu, Ragoju Ravi, S.G. Tagare

Unsteady viscous flow over a rotating stretchable disk with deceleration
Tiegang Fang, Hua Tao

Fractional calculus modelling for unsteady unidirectional flow of incompressible fluids with time-dependent viscosity
Roberto Garra, Federico Polito

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Liang-Jian Deng, Ting-Zhu Huang, Xi-Le Zhao

Stable and generalized-$t$ distributions and applications

Chaotic convergence of the decision-directed blind equalization algorithm
Diogo C. Soriano, Everton Z. Nadalin, Ricardo Suyama, João M.T. Romano, Romis Attux

Distributed source coding using chaos-based cryptosystem
Junwei Zhou, Kwok-Wo Wong, Jianyong Chen

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Modeling and analysis of the spread of computer virus
Qingyi Zhu, Xiaofan Yang, Jianguo Ren

Analysis of hepatitis C viral dynamics using Latin hypercube sampling
Gaurav Pachpute, Siddhartha P. Chakrabarty

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On the stochastic response of a fractionally-damped Duffing oscillator
Giuseppe Failla, Antonina Pirrotta

Semilinear fractional differential equations based on a new integral operator approach
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A unified approach to fractional derivatives
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Parameter estimation and topology identification of uncertain fractional order complex networks
Gangquan Si, Zhiyong Sun, Hongying Zhang, Yanbin Zhang

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Temporal and spectral responses of a softening Duffing oscillator undergoing route-to-chaos
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Nonlinear Cournot oligopoly games with isoelastic demand function: The effects of different behavior rules
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Steady state bifurcation of a periodically excited system under delayed feedback controls
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Rollers in low-head dams – Challenges and solutions
Piroz Zamankhan

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Robert A. Van Gorder, K. Vajravelu
Corrigendum to “Global asymptotic stability of a stochastic Lotka–Volterra model with infinite delays”
Meng Liu, Ke Wang

Classical Papers

An Extension Problem Related to the Fractional Laplacian

Luis Caffarellia & Luis Silvestre


Abstract

The operator square root of the Laplacian \((-\Delta)^{1/2}\) can be obtained from the harmonic extension problem to the upper half space as the operator that maps the Dirichlet boundary condition to the Neumann condition. In this article, we obtain similar characterizations for general fractional powers of the Laplacian and other integro-differential operators. From those characterizations we derive some properties of these integro-differential equations from purely local arguments in the extension problems.

Fractional Laplacian in bounded domains

A. Zoia, A. Rosso and M. Kardar


Abstract

The fractional Laplacian operator \(-(-\Delta)^{a/2}\) appears in a wide class of physical systems, including Lévy flights and stochastic interfaces. In this paper, we provide a discretized version of this operator
which is well suited to deal with boundary conditions on a finite interval. The implementation of boundary conditions is justified by appealing to two physical models, namely, hopping particles and elastic springs. The eigenvalues and eigenfunctions in a bounded domain are then obtained numerically for different boundary conditions. Some analytical results concerning the structure of the eigenvalue spectrum are also obtained.

Fractional Laplacian time-space models for linear and nonlinear lossy media exhibiting arbitrary frequency power-law dependency

W. Chen, S. Holm


Abstract

Frequency-dependent attenuation typically obeys an empirical power law with an exponent ranging from 0 to 2. The standard time-domain partial differential equation models can describe merely two extreme cases of frequency-independent and frequency-squared dependent attenuations. The otherwise nonzero and nonsquare frequency dependency occurring in many cases of practical interest is thus often called the anomalous attenuation. In this study, a linear integro-differential equation wave model was developed for the anomalous attenuation by using the space-fractional Laplacian operation, and the strategy is then extended to the nonlinear Burgers equation. A new definition of the fractional Laplacian is also introduced which naturally includes the boundary conditions and has inherent regularization to ease the hypersingularity in the conventional fractional Laplacian. Under the Szabo's smallness approximation, where attenuation is assumed to be much smaller than the wave number, the linear model is found consistent with arbitrary frequency power-law dependency.


The End of This Issue