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Latest SCI Journal Papers on FDA

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(Searched on Nov 30, 2019)

Mixed fractional Brownian motion: A spectral take
By: Chigansky, P.; Kleptsyna, M.; Marushkevych, D.
JOURNAL OF MATHEMATICAL ANALYSIS AND APPLICATIONS Volume: 482 Issue: 2 Published: NOV 15 2020

A spline collocation method for a fractional mobile-immobile equation with variable coefficients
By: Yang, Xuehua; Zhang, Haixiang; Tang, Qiong
COMPUTATIONAL & APPLIED MATHEMATICS Volume: 39 Issue: 1 Published: MAR 2020

Non-local fractional calculus from different viewpoint generated by truncated M-derivative
By: Acay, Bahar; Bas, Erdal; Abdeljawad, Thabet
JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS Volume: 366 Published: MAR 1 2020

New fractional Lanczos vector polynomials and their application to system of Abel-Volterra integral equations and fractional differential equations
By: Conte, D.; Shahmorad, S.; Talaei, Y.
JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS Volume: 366 Published: MAR 1 2020

On some analytic properties of tempered fractional calculus
By: Fernandez, Arran; Ustaoglu, Ceren
JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS Volume: 366 Published: MAR 1 2020

Cubic B-spline approximation for linear stochastic integro-differential equation of fractional order
By: Mirzaee, Farshid; Alipour, Sahar
JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS Volume: 366 Published: MAR 1 2020

Initial-boundary value problems for multi-term time-fractional diffusion equations with x-expendent coefficients
By: Li, Zhiyuan; Huang, Xinchi; Yamamoto, Masahiro
EVOLUTION EQUATIONS AND CONTROL THEORY Volume: 9 Issue: 1 Pages: 153-179 Published: MAR 2020

Exact Solution for Nonlinear Local Fractional Partial Differential Equations
By: Ziane, Djelloul; Cherif, Mountassir Hamdi; Baleanu, Dumitru; etc..
JOURNAL OF APPLIED AND COMPUTATIONAL MECHANICS Volume: 6 Issue: 2 Pages: 200-208 Published: SPR 2020

Implicit RBF Meshless Method for the Solution of Two- dimensional Variable Order Fractional Cable Equation
By: Mohebbi, Akbar; Saffarian, Marziyeh
JOURNAL OF APPLIED AND COMPUTATIONAL MECHANICS Volume: 6 Issue: 2 Pages: 235-247 Published: SPR 2020

Theory and application for the system of fractional Burger equations with Mittag leffler kernel
By: Korpinar, Zeliha; Inc, Mustafa; Bayram, Mustafa
APPLIED MATHEMATICS AND COMPUTATION Volume: 367 Published: FEB 15 2020

A sparse fractional Jacobi-Galerkin-Levin quadrature rule for highly oscillatory integrals
By: Ma, Junjie; Liu, Huilan
APPLIED MATHEMATICS AND COMPUTATION Volume: 367 Published: FEB 15 2020

Two novel linear-implicit momentum-conserving schemes for the fractional Korteweg-de Vries equation
By: Yan, Jingye; Zhang, Hong; Liu, Ziyuan; etc..
APPLIED MATHEMATICS AND COMPUTATION Volume: 367 Published: FEB 15 2020

Well-posedness results for fractional semi-linear wave equations
By: Djida, Jean-Daniel; Fernandez, Arran; Area, Ivan
DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS-SERIES B Volume: 25 Issue: 2 Pages: 569-597 Published: FEB 2020

On an optimal control problem of time-fractional advection-diffusion equation
By: Tang, Qing
DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS-SERIES B Volume: 25 Issue: 2 Pages: 761-779 Published: FEB 2020

A novel image encryption system merging fractional-order edge detection and generalized chaotic maps
By: Ismail, Samar M.; Said, Lobna A.; Radwan, Ahmed G.; etc..
SIGNAL PROCESSING Volume: 167 Published: FEB 2020

Boundedness and homogeneous asymptotics for a fractional logistic keller-segel equations
By: Burczak, Jan; Granero-Belinchon, Rafael
DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS-SERIES S Volume: 13 Issue: 2 Pages: 139-164 Published: FEB 2020

Exact solutions and numerical study of time fractional Burgers' equations
By: Li, Lili; Li, Dongfang
APPLIED MATHEMATICS LETTERS Volume: 100 Published: FEB 2020

Numerical investigation of a fractional diffusion model on circular comb-inward structure
By: Liu, Chunyan; Fan, Yu; Lin, Ping
APPLIED MATHEMATICS LETTERS Volume: 100 Published: FEB 2020

[Back]

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Conference

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Fractional Order Systems and Controls Conference 2019

(December 27-29, 2019, Jinan Shandong, China)

Deadline: October 10, 2019

All details on this conference are now available at: https://cms.amss.ac.cn/resources.

Consulting E-mail: fosc@sdu.edu.cn

[Back]

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Books

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Analysis, Modeling, and Stability of Fractional Order Differential Systems 2: The Infinite State Approach

(Authors: Jean-Claude Trigeassou, Nezha Maamri)

Details: https://www.wiley.com/en-us/Analysis%2C+Modeling%2C+and+Stability+of+Fractional+Order+Differential+Systems+2%3A+The+Infinite+State+Approach-p-9781786304551

Introduction

This book introduces an original fractional calculus methodology (the infinite state approach) which is applied to the modeling of fractional order differential equations (FDEs) and systems (FDSs). Its modeling is based on the frequency distributed fractional integrator, while the resulting model corresponds to an integer order and infinite dimension state space representation. This original modeling allows the theoretical concepts of integer order systems to be generalized to fractional systems, with a particular emphasis on a convolution formulation. With this approach, fundamental issues such as system state interpretation and system initialization long considered to be major theoretical pitfalls have been solved easily. Although originally introduced for numerical simulation and identification of FDEs, this approach also provides original solutions to many problems such as the initial conditions of fractional derivatives, the uniqueness of FDS transients, formulation of analytical transients, fractional differentiation of functions, state observation and control, definition of fractional energy, and Lyapunov stability analysis of linear and nonlinear fractional order systems. This second volume focuses on the initialization, observation and control of the distributed state, followed by stability analysis of fractional differential systems.

About the author

Jean-Claude Trigeassou is Honorary Professor at Bordeaux University, France, and has been associated with the research activities of its IMS-LAPS lab since 2006. His main research interests include the modeling of fractional order systems, based on the infinite state approach. Nezha Maamri is Associate Professor at Poitiers University, France. Her research activities concern the method of moments, robust control using integer order and fractional order controllers, plus the modeling, initialization and stability of fractional order systems.

Chapters

-Initialization of Fractional Order Systems

-Observability and Controllability of FDEs/FDSs

-Improved Initialization of Fractional Order Systems

-State Control of Fractional Differential Systems

-Fractional Model-based Control of the Diffusive RC Line

-Stability of Linear FDEs Using the Nyquist Criterion

-Fractional Energy

-Lyapunov Stability of Non-commensurate Order Fractional Systems

-An Introduction to the Lyapunov Stability of Nonlinear Fractional Order Systems

[Back]

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Journals

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Physica A: Statistical Mechanics and its Applications

(Selected)

Continuous time random walk and diffusion with generalized fractional Poisson process
Thomas M. Michelitsch, Alejandro P. Riascos

A new application of fractional Atangana-Baleanu derivatives: Designing ABC-fractional masks in image processing
Behzad Ghanbari, Abdon Atangana

On a more general fractional integration by parts formulae and applications
Thabet Abdeljawad, Abdon Atangana, J. F. Gómez-Aguilar, Fahd Jarad

Finite difference scheme for a fractional telegraph equation with generalized fractional derivative terms
Kamlesh Kumar, Rajesh K. Pandey, Swati Yadav

Chaos and multiple attractors in a fractal-fractional Shinriki's oscillator model
J. F. Gómez-Aguilar

A new exploration on existence of fractional neutral integro- differential equations in the concept of Atangana-Baleanu derivative
K. Logeswari, C. Ravichandran

Symmetry analysis of the time fractional Gaudrey-Dodd-Gibbon equation
Ben Gao, Yao Zhang

Caputo-Fabrizio fractional order model on MHD blood flow with heat and mass transfer through a porous vessel in the presence of thermal radiation
S. Maiti, S. Shaw, G. C. Shit

Extended feedback and simulation strategies for a delayed fractional-order control system
Chengdai Huang, Heng Liu, Xiaoping Chen, Jinde Cao, Ahmed Alsaedi

An adaptive numerical approach for the solutions of fractional advection-diffusion and dispersion equations in singular case under Riesz's derivative operator
Omar Abu Arqub, Mohammed Al-Smadi

Ergodicity of stochastic Rabinovich systems driven by fractional Brownian motion
Pengfei Xu, Jianhua Huang, Caibin Zeng

A new analysis of fractional Drinfeld-Sokolov-Wilson model with exponential memory
Sanjay Bhatter, Amit Mathur, Devendra Kumar, Jagdev Singh

Delay-asymptotic solutions for the time-fractional delay-type wave equation
Marwan Alquran, Imad Jaradat

Exact traveling and non-traveling wave solutions of the time fractional reaction-diffusion equation
Bailin Zheng, Yue Kai, Wenlong Xu, Nan Yang, Kai Zhang, P.M.Thibado

[Back]

Applied Mathematics and Computation

(Selected)

Flow and heat transfer of double fractional Maxwell fluids over a stretching sheet with variable thickness
Weidong Yang, Xuehui Chen, Xinru Zhang, Liancun Zheng, Fawang Liu

[Back]

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Paper Highlight

Audio Signal Processing Using Fractional Linear Prediction

Tomas Skovranek, Vladimir Despotovic

Publication information: Mathematics, Volume 7, Issue, July 2019, ID 580

https://doi.org/10.3390/math7070580

Abstract

Fractional linear prediction (FLP), as a generalization of conventional linear prediction (LP), was recently successfully applied in different fields of research and engineering, such as biomedical signal processing, speech modeling and image processing. The FLP model has a similar design as the conventional LP model, i.e., it uses a linear combination of “fractional terms” with different orders of fractional derivative. Assuming only one “fractional term” and using limited number of previous samples for prediction, FLP model with “restricted memory” is presented in this paper and the closed-form expressions for calculation of FLP coefficients are derived. This FLP model is fully comparable with the widely used low-order LP, as it uses the same number of previous samples, but less predictor coefficients, making it more efficient. Two different datasets, MIDI Aligned Piano Sounds (MAPS) and Orchset, were used for the experiments. Triads representing the chords composed of three randomly chosen notes and usual Western musical chords (both of them from MAPS dataset) served as the test signals, while the piano recordings from MAPS dataset and orchestra recordings from the Orchset dataset served as the musical signal. The results show enhancement of FLP over LP in terms of model complexity, whereas the performance is comparable.

[Back]

An Efficient Approximation of Non-Fickian Transport Using A Time-Fractional Transient Storage Model

Liwei Sun, Jie Niu, Bill X. Hu, Chuanhao Wu, Heng Dai

Publication information: Advances in Water Resources, Available online 5 December 2019

https://doi.org/10.1016/j.advwatres.2019.103486

Highlights

-Introduced a fractional-in-time transient storage (FTTS) model that can describe both the exponential and the power-law RTD

-Global Sensitivity analysis was conducted for the FTTS

-Proved that the FTTS can well describe the various tailing phenomenon of BTCs

Abstract

The classical transient storage (TS) model is widely used to describe a non-Fickian solute transport process induced by solute mass exchange between a main channel and an immobile zone. It has been shown that the single rate TS model tends to underestimate the slower exchange that occurs in a deeper or longer hyporheic flow path. This long-term retention can be better described by the fractional mobile/immobile model (FMIM). However, in a real-world application, this method usually overestimates the late time concentrations in a breakthrough curve (BTC), which can be better described by the tempered-time-fractional model (TTFM). In this study, we introduced a fractional-in-time derivative TS model (FTTS), which can describe broad waiting times in a particle motion process. First, a fully-implicit numerical scheme was applied to solve the FTTS and the method was validated by comparing with the analytical solutions of the classical advection-dispersion model (ADE) and the FMIM. Then, the FTTS was applied to fit the synthetic data generated by the STAMMT-L and field tracer experiment data. Further, a variance-based global sensitivity analysis was performed to assess the influence rank of the parameters to the heavy tail of the BTCs. The results indicated that the FTTS could fit the BTCs generated by the ADE and FMIM well. In the synthetic cases, the FTTS could reproduce different heavy tailing BTCs accurately. In addition, the FTTS could well describe tracer data in natural streams and performed better than the TTFM. The sensitivity analysis indicated that both the fractional-in-time term and the TS term in the FTTS had important impacts on the tail of the BTC, which could make the FTTS more flexible for describing the tailing phenomenon in a BTC.

[Back]

Fractional derivative heat conduction modeling based on thermal elements combination

Jun Fang, HongGuang Sun, Cuiping Zhang

Publication information: Mathematical Methods in the Applied Sciences, November 2019
https://doi.org/10.1002/mma.6011

Abstract

This paper proposes a general theoretical framework to establish the time-space fractional derivative models for non-Fourier heat conduction. Similar to viscoelastic modeling in mechanics, some new heat conduction elements are proposed instead of mechanical ones. With different combinations of the thermal elements, the time-space fractional generalizations, such as the Kelvin-Voigt model, the Maxwell model, and the Zener model, are presented. In addition, it is possible to obtain the fractional derivative heat conduction equations from the corresponding transport equations. While incorporating the existing non-Fourier heat conduction models into the proposed theoretical framework, some new time-space fractional derivative models are presented. Finally, the nonlocal models considering the long-range heat fluxes are investigated and confirmed to be consistent with the proposed framework.

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The End of This Issue

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