FDA Express Vol. 33, No. 1, Oct 30, 2019

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◆ Websites of Interest

Fractal derivative and operators and their applications

Fractional Calculus & Applied Analysis

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Latest SCI Journal Papers on FDA

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(Searched on Oct 30, 2019)

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

A high order numerical method and its convergence for time-fractional fourth order partial differential equations
By: Roul, Pradip; Goura, V. M. K. Prasad
APPLIED MATHEMATICS AND COMPUTATION Volume: 366 published: FEB 1 2020

The generalized bifurcation method for deriving exact solutions of nonlinear space-time fractional partial differential equations
By: Wen, Zhenshu
APPLIED MATHEMATICS AND COMPUTATION Volume: 366 published: FEB 1 2020

Output power quality enhancement of PMSG with fractional order sliding mode control
By: Xiong, Linyun; Li, Penghan; Ma, Meiling; etc..
INTERNATIONAL JOURNAL OF ELECTRICAL POWER & ENERGY SYSTEMS Volume: 115 published: FEB 2020

On a conservative Fourier spectral Galerkin method for cubic nonlinear Schrodinger equation with fractional Laplacian
By: Zou, Guang-an; Wang, Bo; Sheu, Tony W. H.

MATHEMATICS AND COMPUTERS IN SIMULATION Volume: 168 pages: 122-134 published: FEB 2020

Winding Scheme With Fractional Layer for Differential-Mode Toroidal Inductor
By: Liu, Bo; Ren, Ren; Wang, Fei; etc..
IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS Volume: 67 Issue: 2 pages: 1592-1604 published: FEB 2020

PATHWISE SOLUTION TO ROUGH STOCHASTIC LATTICE DYNAMICAL SYSTEM DRIVEN BY FRACTIONAL NOISE
By: Zeng, Caibin; Lin, Xiaofang; Huang, Jianhua; etc..
COMMUNICATIONS ON PURE AND APPLIED ANALYSIS Volume: 19 Issue: 2 pages: 811-834 published: FEB 2020

NON-EXISTENCE RESULTS FOR COOPERATIVE SEMI-LINEAR FRACTIONAL SYSTEM VIA DIRECT METHOD OF MOVING SPHERES
By: Ji, Xiaoxue; Niu, Pengcheng; Wang, Pengyan
COMMUNICATIONS ON PURE AND APPLIED ANALYSIS Volume: 19 Issue: 2 pages: 1111-1128 published: FEB 2020

Approximate solution of nonlinear fractional integro-differential equations using fractional alternative Legendre functions
By: Rahimkhani, Parisa; Ordokhani, Yadollah
JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS Volume: 365 published: FEB 2020

Positive solutions for semilinear fractional elliptic problems involving an inverse fractional operator
By: Alvarez-Caudevilla, P.; Colorado, E.; Ortega, Alejandro
NONLINEAR ANALYSIS-REAL WORLD APPLICATIONS Volume: 51 published: FEB 2020

Finite-time stability for fractional-order complex-valued neural networks with time delay
By: Hu, Taotao; He, Zheng; Zhang, Xiaojun; etc.. APPLIED MATHEMATICS AND COMPUTATION Volume: 365 published: JAN 15 2020

Local discontinuous Galerkin methods for the time tempered fractional diffusion equation
By: Sun, Xiaorui; Li, Can; Zhao, Fengqun
APPLIED MATHEMATICS AND COMPUTATION Volume: 365 published: JAN 15 2020

The global analysis on the spectral collocation method for time fractional Schrodinger equation
By: Zheng, Minling; Liu, Fawang; Jin, Zhengmeng
APPLIED MATHEMATICS AND COMPUTATION Volume: 365 published: JAN 15 2020

An unstructured mesh control volume method for two-dimensional space fractional diffusion equations with variable coefficients on convex domains
By: Feng, Libo; Liu, Fawang; Turner, Ian
JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS Volume: 364 published: JAN 15 2020

Existence of solution of an infinite system of generalized fractional differential equations by Darbo's fixed point theorem
By: Seemab, Arjumand; Rehman, Mujeeb Ur
JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS Volume: 364 published: JAN 15

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Call for Papers

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Fractional Order Operators and their Applications in Material Science

(May 18-22, 2020, Bilbao, Spain)

Deadline: December 1st, 2019

Since 1994, every 2 to 4 years the SIAM Materials Activity Group organizes the SIAM Conference on Mathematical Aspects of Materials Science. This conference focuses on interdisciplinary approaches that bridge mathematical and computational methods to the science and engineering of materials. The conference provides a forum to highlight significant advances as well as critical or promising challenges in mathematics and materials science and engineering. In keeping with tradition, the conference seeks diversity in people, disciplines, methods, theory, and applications.

All details on this conference are now available at:
https://www.siam.org/conferences/cm/conference/ms20.

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Books

Theory and Numerical Approximations of Fractional Integrals and Derivatives

(Authors: Changpin Li and Min Cai)

Details: https://my.siam.org/Store/Product/viewproduct/?ProductId=31173135

Introduction

Due to its ubiquity across a variety of fields in science and engineering, fractional calculus has gained momentum in industry and academia. While a number of books and papers introduce either fractional calculus or numerical approximations, no current literature provides a comprehensive collection of both topics. This monograph introduces fundamental information on fractional calculus and provides a detailed treatment of existing numerical approximations.

Theory and Numerical Approximations of Fractional Integrals and Derivatives: presents an inclusive review of fractional calculus in terms of theory and numerical methods;systematically examines almost all existing numerical approximations for fractional integrals and derivatives;considers the relationship between the fractional Laplacian and the Riesz derivative, a key component absent from other related texts; and highlights recent developments, including the authors' own research and results.

Audience

The book's core audience spans several fractional communities, including those interested in fractional partial differential equations, the fractional Laplacian, and applied and computational mathematics. Advanced undergraduate and graduate students will find the material suitable as a primary or supplementary resource for their studies.

Chapters

-Fractional integrals

-Fractional derivatives

-Numerical fractional integration

-Numerical Caputo differentiation

-Numerical Riemann-Liouville differentiation

-Numerical Riesz differentiation

-Numerical fractional Laplacian

-Back Matter

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Journals

Fractional Calculus and Applied Analysis

(Volume 22, Issue 4 Aug 2019)

Analysis of fractional order error models in adaptive systems: Mixed order cases
Aguila-Camacho, N. / Gallegos, J. / Duarte-Mermoud, M.A.

Fractional calculus of variations: a novel way to look at it
Ferreira, Rui A.C.

Pricing of perpetual American put option with sub-mixed fractional Brownian motion
Xu, Feng / Zhou, Shengwu

The vertical slice transform on the unit sphere
Rubin, Boris

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Applied Mathematics and Computation

(Selected)

The global analysis on the spectral collocation method for time fractional Schr?dinger equation
Minling Zheng, Fawang Liu, Zhengmeng Jin

Theory and application for the system of fractional Burger equations with Mittag leffler kernel
Zeliha Korpinar, Mustafa Inc, Mustafa Bayram

A sparse fractional Jacobi-Galerkin-Levin quadrature rule for highly oscillatory integrals
Junjie Ma, Huilan Liu

A remark on the q-fractional order differential equations
Yongchao Tang, Tie Zhang

The generalized bifurcation method for deriving exact solutions of nonlinear space-time fractional partial differential equations
Zhenshu Wen

Error estimates of generalized spectral iterative methods with accurate convergence rates for solving systems of fractional two - point boundary value problems
S. Erfani, E. Babolian, S. Javadi

Fractional spectral collocation method for optimal control problem governed by space fractional diffusion equation
Shengyue Li, Zhaojie Zhou

Influence of multiple time delays on bifurcation of fractional-order neural networks

Changjin Xu, Maoxin Liao, Peiluan Li, Ying Guo, Qimei Xiao, Shuai Yuan

Finite-time stability for fractional-order complex-valued neural networks with time delay
Taotao Hu, Zheng He, Xiaojun Zhang, Shouming Zhong

Response of fractional order on energy ratios at the boundary surface of fluid-piezothermoelastic media
Rajneesh Kumar, Poonam Sharma

A new family of predictor-corrector methods for solving fractional differential equations
Manoj Kumar, Varsha Daftardar-Gejji

A high order numerical method and its convergence for time-fractional fourth order partial differential equations
Pradip Roul, V. M. K. Prasad Goura

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Paper Highlight

Optimal fractional linear prediction with restricted memory

Tomas Skovranek, Vladimir Despotovic, Zoran Peric

Publication information:IEEE Signal Processing Letters, Volume 26, Issue 5, March 2019, Pages 760-764

https://doi.org/10.1109/LSP.2019.2908278

Abstract

Linear prediction is extensively used in modeling, compression, coding, and generation of speech signal. Various formulations of linear prediction are available, both in time and frequency domain, which start from different assumptions but result in the same solution. In this letter, we propose a novel, generalized formulation of the optimal low-order linear prediction using the fractional (non-integer) derivatives. The proposed fractional derivative formulation allows for the definition of predictor with versatile behavior based on the order of fractional derivative. We derive the closed-form expressions of the optimal fractional linear predictor with restricted memory, and prove that the optimal first-order and the optimal second-order linear predictors are only its special cases. Furthermore, we empirically prove that the optimal order of fractional derivative can be approximated by the inverse of the predictor memory, and thus, it is a priori known. Therefore, the complexity is reduced by optimizing and transferring only one predictor coefficient, i.e., one parameter less in comparison to the second-order linear predictor, at the same level of performance.

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Fractional creep and relaxation models of viscoelastic materials via a non-Newtonian time-varying viscosity: physical interpretation

Xianglong Su, Wenxiang Xu, Wen Chen, HaixiaYang

Publication information: Mechanics of Materials, Volume 140, January 2020, 103222
https://doi.org/10.1016/j.mechmat.2019.103222

Abstract

Fractional viscoelastic models have been confirmed to achieve good agreement with experimental data using only a few parameters, in contrast to the classical viscoelastic models in previous studies. With an increasing number of applications, the physical meaning of fractional viscoelastic models has been attracting more attention. This work establishes an equivalent viscoelasticity (including creep and relaxation) between the fractional Maxwell model and the time-varying viscosity Maxwell model to reveal the physical meaning of fractional viscoelastic models. The obtained time-varying viscosity functions are used to interpret the physical meaning of the order of the fractional derivative α from the perspective of rheology. When α changes from 0 to 1, the viscosity functions quantitatively exhibit the transformation of viscoelasticity from elastic solid to Newtonian fluid, which can be considered as an extension of the Deborah number. The infinite viscosity coefficient for α=0 shows the elastic solid property, while the constant viscosity coefficient for α=1 exhibits the Newtonian fluid property. The sharply decreasing viscosity coefficient (versus α) near α=0 indicates that the elastic solid property decays rapidly. In addition, similar viscoelastic responses between the Hausdorff and fractional derivative models are found due to a similar time-varying viscosity.

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