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[Fractional Calculus & Applied Analysis](#)

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## **Latest SCI Journal Papers on FDA**

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[Fourier spectral method for higher order space fractional reaction-diffusion equations](#)  
By: Pindza, Edson; Owolabi, Kolade M.

COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL  
SIMULATION Volume: 40 Pages: 112-128 Published: NOV 2016

[About accuracy increase of fractional order derivative and integral computations by applying the Grunwald-Letnikov formula](#)

By: Brzezinski, Dariusz W.; Ostalczyk, Piotr

COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL  
SIMULATION Volume: 40 Pages: 151-162 Published: NOV 2016

[Mixed problems of fractional coupled systems of Riemann-Liouville differential equations and Hadamard integral conditions](#)

By: Ntouyas, S. K.; Tariboon, Jessada; Thiramanus, Phollakrit

JOURNAL OF COMPUTATIONAL ANALYSIS AND APPLICATIONS Volume:  
21 Issue: 5 Pages: 813-828 Published: NOV 2016

[State estimation based on fractional order sliding mode observer method for a class of uncertain fractional-order nonlinear systems](#)

By: Zhong, Fuli; Li, Hui; Zhong, Shouming

SIGNAL PROCESSING Volume: 127 Pages: 168-184 Published: OCT 2016

[Localized numerical impulse solutions in diffuse neural networks modeled by the complex fractional Ginzburg-Landau equation](#)

By: Mvogo, Alain; Tambue, Antoine; Ben-Bolie, Germain H.; et al.

COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL  
SIMULATION Volume: 39 Pages: 396-410 Published: OCT 2016

[On Cauchy problems with Caputo Hadamard fractional derivatives](#)

By: Adjabi, Y.; Jarad, F.; Baleanu, D.; et al.

JOURNAL OF COMPUTATIONAL ANALYSIS AND APPLICATIONS Volume:  
21 Issue: 4 Pages: 661-681 Published: OCT 2016

[On piecewise continuous solutions of higher order impulsive fractional differential equations and applications](#)

By: Liu, Yuji

APPLIED MATHEMATICS AND COMPUTATION Volume: 287 Pages: 38-49  
Published: SEP 5 2016

[Stochastic P-bifurcation and stochastic resonance in a noisy bistable fractional-order system](#)

By: Yang, J. H.; Sanjuan, Miguel A. F.; Liu, H. G.; et al.

COMMUNICATIONS IN NONLINEAR SCIENCE AND NUMERICAL  
SIMULATION Volume: 41 Pages: 104-117 Published: DEC 2016

[A note on exponential stability for second-order neutral stochastic partial differential equations with infinite delays in the presence of impulses](#)

By: Jiang, Feng; Yang, Hua; Shen, Yi

APPLIED MATHEMATICS AND COMPUTATION Volume: 287 Pages: 125-133  
Published: SEP 5 2016

[Time-fractional heat transfer equations in modeling of the non-contacting face seals](#)

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## Call for Papers

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### Special Session on Advances in Fractional Calculus. Theory and Applications - IFAC 2017

<http://nas.isep.pw.edu.pl/fractional>

-----to be hold during the 20th Word Congress of the International Federation of Automatic Control (IFAC 2017) in Toulouse, France, July 9-14, 2017.

<https://www.ifac2017.org/>.

#### Abstract

In the last couple of decades, fractional calculus had played a very important role in various fields such as: physics, chemistry, mechanics, electricity, biology, economy and control theory. Moreover, it has been found that the dynamical behavior of many complex systems can be properly described by fractional order models. Such tool has been extensively applied in many fields which has seen an overwhelming growth in the last decade. The special session is intended to review new developments based on the fractional differentiation, both on theoretical and application aspects. This special session is a place for researchers and practitioners sharing ideas on the theories, applications, numerical methods and simulations of fractional calculus and fractional differential equations. Our interested topics are enumerated in the below and submissions in the relevant fields are welcome. The topics of interest include, but are not limited to:

- numerical and analytical solutions to fractional order systems;
- new implementation methods;

- improvements in fractional order derivatives approximation methods;
- time response analysis of fractional order systems;
- the analysis, modeling and control of phenomena in:
  - electrical engineering; – electromagnetism; – electrochemistry; – thermal engineering; – mechanics; – mechatronics; – automatic control; – biology; – biophysics; – physics, etc.

### **Organizer's Information:**

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### **Deadlines**

Paper submission: 31 October 2016

Notification of acceptance: 20 February 2017

Final paper submission deadline: 31 March 2017

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## Books

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### Fractional Calculus and Waves in Linear Viscoelasticity

Francesco Mainardi

#### Book Description

Fractional Calculus and Waves in Linear Viscoelasticity (Second Edition) is a self-contained treatment of the mathematical theory of linear (uni-axial) viscoelasticity (constitutive equation and waves) with particular regard to models based on fractional calculus. It serves as a general introduction to the above-mentioned areas of mathematical modelling. The explanations in the book are detailed enough to capture the interest of the curious reader, and complete enough to provide the necessary background material needed to delve further into the subject and explore the research literature. In particular the relevant role played by some special functions is pointed out along with their visualization through plots. Graphics are extensively used in the book and a large general bibliography is included at the end. This new edition keeps the structure of the first edition but each chapter has been revised and expanded, and new additions include a novel appendix on complete monotonic and Bernstein functions that are known to play a fundamental role in linear viscoelasticity. This book is suitable for engineers, graduate students and researchers interested in fractional calculus and continuum mechanics..

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

<http://www.worldscientific.com/worldscibooks/10.1142/p926>

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## **Special Functions in Fractional Calculus and Related Fractional Differential Equations**

Hari M Srivastava, R K Raina, and Xiao-Jun Yang

### **Book Description**

The subject of fractional calculus (that is, calculus of integrals and derivatives of any arbitrary real or complex order) has gained considerable popularity and importance during the past four decades, due mainly to its demonstrated applications in numerous seemingly diverse and widespread fields of science and engineering. It does indeed provide several potentially useful tools for solving differential, integral and differintegral equations, and various other problems involving special functions of mathematical physics as well as their extensions and generalizations in one and more variables. Many books and monographs (and conference proceedings) deal with the subject of fractional calculus and its applications. However, to the best of our knowledge, there does not exist an exclusive work that co-ordinates the disciplines of fractional calculus and special functions in a potentially useful manner. This book is an attempt in that direction and would serve a dual purpose: in providing key formulas and identities involving special functions and also in opening up some novel avenues of applications of fractional calculus.

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

<http://www.worldscientific.com/worldscibooks/10.1142/8936>

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## **Journals**

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**Physica D: Nonlinear Phenomena**

(selected)

[Fractional Schrödinger dynamics and decoherence](#)

Kay Kirkpatrick, Yanzhi Zhang

[Stochastic shell models driven by a multiplicative fractional Brownian-motion](#)

Hakima Bessaih, María J. Garrido-Atienza, Björn Schmalfuss

[Approximate self-similar solutions to a nonlinear diffusion equation with time-fractional derivative](#)

Łukasz Płociniczak, Hanna Okraśńska

[Chaotic attractors in incommensurate fractional order systems](#)

Mohammad Saleh Tavazoei, Mohammad Haeri

[Front-type solutions of fractional Allen–Cahn equation](#)

Y. Nec, A.A. Nepomnyashchy, A.A. Golovin

[Synchronization in fractional-order differential systems](#)

Tianshou Zhou, Changpin Li

[On the global well-posedness of the Euler–Boussinesq system with fractional dissipation](#)

T. Hmidi, M. Zerguine

[Fractional kinetics: from pseudochaotic dynamics to Maxwell’s Demon](#)

G.M. Zaslavsky, M.A. Edelman

[Dynamics of curved fronts in systems with power-law memory](#)

M. Abu Hamed, A.A. Nepomnyashchy

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## Journal of Computational Physics

(selected)

[Spectral approximation methods and error estimates for Caputo fractional derivative with applications to initial-value problems](#)

Beiping Duan, Zhoushun Zheng, Wen Cao

[Efficient implementation to numerically solve the nonlinear time fractional parabolic problems on unbounded spatial domain](#)

Dongfang Li, Jiwei Zhang

[Preconditioned iterative methods for space-time fractional advection-diffusion equations](#)

Zhi Zhao, Xiao-Qing Jin, Matthew M. Lin

[Fractional Adams–Bashforth/Moulton methods: An application to the fractional Keller–Segel chemotaxis system](#)

Mohsen Zayernouri, Anastasios Matzavinos

[New quadrature approach based on operational matrix for solving a class of fractional variational problems](#)

S.S. Ezz-Eldien

[Fractional Modeling of Viscoelasticity in 3D Cerebral Arteries and Aneurysms](#)

Yue Yu, Paris Perdikaris, George Em Karniadakis

[Numerical approximation of higher-order time-fractional telegraph equation by using a combination of a geometric approach and method of line](#)

M.S. Hashemi, D. Baleanu

[Lie group analysis and similarity solution for fractional Blasius flow](#)

Mingyang Pan, Liancun Zheng, Fawang Liu, Xinxin Zhang

[Finite difference methods with non-uniform meshes for nonlinear fractional differential equations](#)

Changpin Li, Qian Yi, An Chen

[Numerical solution of distributed order fractional differential equations by hybrid functions](#)

S. Mashayekhi, M. Razzaghi

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## Paper Highlight

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### **A Comparative Study of Finite Element and Finite Difference Methods for Two-Dimensional Space-Fractional Advection-Dispersion Equation**

Pang, Guofei; Chen, Wen; Sze, Kam Yim

**Publication information:** ADVANCES IN APPLIED MATHEMATICS AND MECHANICS Volume: 8 Issue: 1 Pages: 166-186 Published: FEB 2016

<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=10075989&fileId=S2070073315000491>

#### **Abstract**

The paper makes a comparative study of the finite element method (FEM) and the finite difference method (FDM) for two-dimensional fractional advection-dispersion equation (FADE) which has recently been considered a promising tool in modeling non-Fickian solute transport in groundwater. Due to the non-local property of integro-differential operator of the space-fractional derivative, numerical solution of FADE is very challenging and little has been reported in literature, especially for high-dimensional case. In order to effectively apply the FEM and the FDM to the FADE on

a rectangular domain, a backward-distance algorithm is presented to extend the triangular elements to generic polygon elements in the finite element analysis, and a variable-step vector Grünwald formula is proposed to improve the solution accuracy of the conventional finite difference scheme. Numerical investigation shows that the FEM compares favorably with the FDM in terms of accuracy and convergence rate whereas the latter enjoys less computational effort.

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## On The Generalized Mass Transfer with a Chemical Reaction: Fractional Derivative Model

Ansari, Alireza; Darani, Mohammadreza Ahmadi

**Publication information:** IRANIAN JOURNAL OF MATHEMATICAL CHEMISTRY Volume: 7 Issue: 1 Pages: 77-88 Published: WIN-SPR 2016

[ijmc.kashanu.ac.ir/article\\_12404\\_0.html](http://ijmc.kashanu.ac.ir/article_12404_0.html)

### Abstract

In this article using the inverse Laplace transform, we show analytical solutions for the generalized mass transfers with (and without) a chemical reaction. These transfers have been expressed as the Couette flow with the fractional derivative of the Caputo sense. Also, using the Hankel contour for the Bromwich's integral, the solutions are given in terms of the generalized Airy functions.

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