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### ◆ Latest SCI Journal Papers on FDA

(Searched on Oct. 30, 2018)

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## Call for Papers

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### **Special Issue on Advances in Fractional Differential Equations (V): Time-space fractional PDEs**

Computers & Mathematics with Applications (Published by Elsevier, impact factor: 1.860)

In the past forty years, fractional calculus had played a very important role in various fields such as mechanics, electricity, chemistry, biology, economics, control theory, and signal and image processing. Moreover, it has been found that the dynamical behavior of many complex systems can be properly described by fractional order models. Such models are interesting for engineers and physicists but also for mathematicians. The most important among such models are those described by partial differential equations containing fractional derivatives. Their evolutions behave in a much more complex way than in the classical integer-order case and the study of the corresponding theory, numerical methods and applications is a hugely demanding task. In the past few years, the increase of the subject is witnessed by hundreds of research papers, several monographs, many international conferences.

This is the fifth special issue on Advances in Fractional Differential Equations of the journal CAMWA. This special issue shall deal with some new and different topics with high current interest falling within the scope of the CAMWA, and attract more attention from contributors and readers.

#### **Topics of special issue:**

Theory, Theory, numerical methods and applications for [fractional PDEs in multiple space dimension](#)

#### **Submission Guidelines:**

Manuscripts should be submitted online through EES at the following link: <http://ees.elsevier.com/camwa/> . Please select "**SI: Fractional PDEs**" when you reach the "Select Article Type" step in the submission process, and select "Yong Zhou, Managing Guest Editor (SI: Time-fractional PDEs) " as the Requested Editor. All papers will be peer reviewed. There are no page charges. **Be advised that each author may submit at most two manuscripts to this special issue either as a corresponding author or contributing author.**

#### **Important Dates:**

Submission Deadline: 31 Oct. 2018

#### **Guest Editors:**

Professor Yong Zhou  
School of Mathematics and Computational Science  
Xiangtan University  
Xiangtan, Hunan 411105  
P.R. China

Professor Michal Feckan  
 Department of Mathematical Analysis and Numerical Mathematics  
 Faculty of Mathematics, Physics and Informatics  
 Comenius University  
 Slovakia

Professor Fawang Liu  
 School of Mathematical Sciences  
 Queensland University of Technology  
 Australia

Professor J. A. Tenreiro Machado  
 Department of Electrical Engineering  
 ISEP-Institute of Engineering Polytechnic of Porto  
 Portugal

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## Books

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### **Advances in Synchronization of Coupled Fractional Order Systems**

( Martínez-Guerra, Rafael, Pérez-Pinacho, Claudia Alejandra)

Details: <https://www.springer.com/us/book/9783319939452>

#### **Book Description**

After a short introduction to the fundamentals, this book provides a detailed account of major advances in applying fractional calculus to dynamical systems. Fractional order dynamical systems currently continue to gain further importance in many areas of science and engineering.

As with many other approaches to mathematical modeling, the first issue to be addressed is the need to couple a definition of the fractional differentiation or integration operator with the types of dynamical systems that are analyzed. As such, for the fundamentals the focus is on basic aspects of fractional calculus, in particular stability analysis, which is required to tackle synchronization in coupled fractional order systems, to understand the essence of estimators for related integer order systems, and to keep track of the interplay between synchronization and parameter observation. This serves as the common basis for the more advanced topics and applications presented in the subsequent chapters, which include an introduction to the 'Immersion and Invariance' (I&I) methodology, the masterslave synchronization scheme for partially known nonlinear fractional order systems, Fractional Algebraic Observability (FAO) and Fractional Generalized quasi-Synchronization (FGqS) to name but a few.

This book is intended not only for applied mathematicians and theoretical physicists, but also for anyone in applied science dealing with complex nonlinear systems.

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## Paper Highlight

**[Numerical simulations of chaotic and complex spatiotemporal patterns in fractional reaction-](#)**

**diffusion systems**

Owolabi, Kolade M.; Atangana, Abdon

**Publication information:** COMPUTATIONAL & APPLIED MATHEMATICS Volume: 37 Issue: 2 Pages: 2166-2189  
Published: MAY 2018

[http://apps.webofknowledge.com/full\\_record.do?product=UA&search\\_mode=GeneralSearch&qid=6&SID=5BryrzCO6win7EqIn19&page=1&doc=3&cacheurlFromRight](http://apps.webofknowledge.com/full_record.do?product=UA&search_mode=GeneralSearch&qid=6&SID=5BryrzCO6win7EqIn19&page=1&doc=3&cacheurlFromRight)

**Abstract**

The generalized fractional reaction-diffusion equations which exist in the form of noninteger order partial differential equations have now found wide application for illustrating important and useful physical phenomena, such as subdiffusive and superdiffusive scenarios. The space fractional derivatives are defined in the Riesz sense on the intervals  $0 < \alpha < 1$  and  $1 < \alpha \leq 2$ . We propose robust numerical techniques, such as a spectral representation of the fractional Laplacian operator in conjunction with the exponential time differencing method, and present the equivalent relationship between the Riesz fractional derivative and fractional Laplacian operator. We apply these techniques to numerically solve a range of chaotic processes, such as the Chua's equations, Rossler system, Lorenz and Lorenz-type systems. Simulation results revealed various complex and spatiotemporal chaos, spiral chaos, intermittent chaos and spots patterns in two-dimensional space fractional reaction-diffusion problems.

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**Time fractional derivative model with Mittag-Leffler function kernel for describing anomalous diffusion: Analytical solution in bounded-domain and model comparison**

Xiangnan Yu; Yong Zhang; HongGuang Sun; Chunmiao Zheng

**Publication information:** Chaos, Solitons & Fractals, Volume 115, October 2018, Pages 306-312

<https://www.sciencedirect.com/science/article/pii/S0960077918305770>

**Abstract**

Non-Fickian or anomalous diffusion had been well documented in material transport through heterogeneous systems at all scales, whose dynamics can be quantified by the time fractional derivative equations (fDEs). While analytical or numerical solutions have been developed for the standard time fDE in bounded domains, the standard time fDE suffers from the singularity issue due to its power-law function kernel. This study aimed at deriving the analytical solutions for the time fDE models with a modified kernel in bounded domains. The Mittag-Leffler function was selected as the alternate kernel to improve the standard power-law function in defining the time fractional derivative, which was known to be able to overcome the singularity issue of the standard fractional derivative. Results showed that the method of variable separation can be applied to derive the analytical solution for various time fDEs with absorbing and/or reflecting boundary conditions. Finally, numerical examples with detailed comparison for fDEs with different kernels showed that the models and solutions obtained by this study can capture anomalous diffusion in bounded domains.

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## Call for Papers

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### **The first announcement** **International Workshop on Numerical Analysis and Applications of Fractional Differential Equations**

(November 16-18, 2018 in Xuchang, China)

Organizer: Xuchang University; Queensland University of Technology

Main topic (but not limited to):

- Finite element methods,
- Finite difference methods,
- Spectral methods,
- Fast algorithms and Conservative schemes of fractional differential equations.

Conference Secretary:

Yanhua Shi: sdysdq@163.com 13839032380

Yadong Zhang: yadzhang@126.com 13782399682

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## Books

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## Advances in Synchronization of Coupled Fractional Order Systems

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## Paper Highlight

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