

FUTURE CHALLENGES OF ADVANCED COMPUTATIONAL MODELING ON NONLINEAR PHYSICAL PHENOMENA

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DESCRIPTION

Many physical problems and laws are expressed in term of ordinary and partial differential equations. Nonlinear systems play an important role in physics. New ideas in physics including astrophysics, Computational Physics, Mathematical Physics, Biological and Medical Physics often explain the fundamental mechanisms studied by other sciences and suggest new avenues of research in academic disciplines such as mathematics. Therefore, the main interest of this special issue is to describe theoretical, experimental, analytical as well as numerical approaches for solving nonlinear physical problems. This special issue offers a new platform for recent and the original research results on nonlinear physical systems, computational physics, theoretical physics through both singular and non-singular theory fractional operator. More, fractal geometry is a new branch of geometry which includes not differentiable curves in the senses of ordinary calculus. Recently, fractal calculus and analysis have been studied using stochastic process, harmonic analysis, measure theory, and Riemann-like method. Generalized standard calculus, which is called F^α - calculus has local and non-local derivatives. The local fractal derivatives not only have physical meaning but also geometrical meaning. The geometrical meaning of fractal order derivatives is equal to the dimension of fractal support or domain of function and its physical meaning is given by relation of spectral dimension of medium and electric resistance exponent. More, it was used to characterized sub and super diffusion on fractal sets.

The original research papers with theoretical studies, new analytical and numerical techniques, and engineering applications are especially welcome.

We invite authors to contribute original research articles for the special issue "*Future challenges of advanced computational modeling of nonlinear physical phenomena*" in the following potential topics that include, but are not limited to:

- ▶ Computational modeling of physical phenomena
- ▶ Calculus of variations and their applications in physics
- ▶ Wave propagation
- ▶ Modeling the dynamics of the physical phenomena within difference equations
- ▶ Analytical and numerical methods for flow, transport problems and frictional phenomena
- ▶ Modeling on fractional dynamical systems
- ▶ Bifurcation and chaos of fractional differential systems

- ▶ Fractional stochastic dynamical systems
- ▶ Fractional dynamics in chemical and bio-systems
- ▶ Complex fractional dynamics with applications in Physics
- ▶ Fractional order models and their experimental verifications and applications
- ▶ Wavelet methods for fractional differential equations
- ▶ Fractal calculus (F^{α} -Calculus) and fractal analysis with physical applications
- ▶ Fractal differential equations and their applications in Physics

SUBMISSION DEADLINES

- ▶ **Full paper submission due: June 30, 2020**
- ▶ **Revised submission due: September 30, 2020**
- ▶ **Paper acceptance decision: October 31, 2020**
- ▶ **Published: November 28, 2020**

Manuscripts should be submitted to the journal via online submission system, Editorial Manager, available for this journal at <http://www.editorialmanager.com/openphys/default.aspx>.

All the submissions will undergo the standard single-blind peer review system. When entering your submission please choose the option type of an article: "***Special Issue on Future challenges of advanced computational modeling on nonlinear physical phenomena***"

Submissions for the special issue are now open.

We are looking forward to your submission. If you have any question, please contact us at paulina.lesna-szreter@degruyter.com