

Special Issue

Applied Mathematics and Fractional Calculus II

Message from the Guest Editors

In the last three decades, fractional calculus has broken into the field of mathematical analysis, both at the theoretical level and at the level of its applications. In essence, the fractional calculus theory is a mathematical analysis tool applied to the study of integrals and derivatives of arbitrary order, which unifies and generalizes the classical notions of differentiation and integration. These fractional and derivative integrals, which until not many years ago had been used in purely mathematical contexts, have been revealed as instruments with great potential to model problems in various scientific fields, such as: fluid mechanics, viscoelasticity, physics, biology, chemistry, dynamical systems, signal processing or entropy theory. Since the differential and integral operators of fractional order are nonlinear operators, fractional calculus theory provides a tool for modeling physical processes, which in many cases is more useful than classical formulations. That is why the application of fractional calculus theory has become a focus of international academic research.

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Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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