Special Issue

Symmetry in Numerical Solutions

Message from the Guest Editor

Many physical systems—such as those governed by conservation of energy, momentum, and angular momentum—possess inherent symmetries. A central challenge in developing numerical algorithms and schemes to solve these continuous systems is the preservation of geometric or algebraic invariants (e.g., conservation laws, time reversibility, and rotational invariance) during discretization. Standard methods often introduce discretization errors that break symmetry, leading to numerical instabilities, unphysical artifacts, or long-term drift in conserved quantities. This Special Issue emphasizes the development of accurate, stable, and state-of-the-art methods for solving systems arising in celestial mechanics, molecular dynamics, quantum physics, and related fields, with the goal of ensuring physically faithful solutions in long-term simulations.

Guest Editor

Dr. Chuan Li

Department of Mathematics, West Chester University of Pennsylvania, West Chester, PA 19383, USA

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Symmetry
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
symmetry@mdpi.com

mdpi.com/journal/symmetry

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Message from the Editor-in-Chief

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.

Editor-in-Chief

Prof. Dr. Sergei Odintsov
ICREA, 08010 Barcelona and Institute of Space Sciences (IEEC-CSIC), C. Can Magrans s/n, 08193 Barcelona, Spain

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