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Nonlinear Vibrations and Chaos: Symmetry and Topics of Symmetry

Guest Editor:

Dr. Issam Abu-Mahfouz
School of Science, Engineering, and Technology, Penn State Harrisburg, 777 West Harrisburg Pike, W-255 Olmsted Building, Middletown, PA 17057, USA

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Message from the Guest Editor

Dear Colleagues,

Nonlinear structural and mechanical systems are known to exhibit extensively rich and complex motion patterns. Such a diverse vibrational response is characterized by the presence of bifurcations, multiple coexisting modes, period doubling, and chaos. It is also documented that some manufacturing processes—for example, metal cutting—exhibit nonlinear vibrations that may include unpredictable chaotic behavior. Nonlinear and chaotic vibrations are usually described using tools such as iterated maps, phase plane analysis, Poincaré sections, bifurcation diagrams, fractal dimension, statistical parameters, and time–frequency wavelet analysis. Understanding the correlation between the patterns of symmetry in the vibration response and system parameters is fundamental to predicting and controlling these nonlinear systems. This Special Issue emphasizes the implications of symmetry and asymmetry of nonlinear vibrations and chaotic motion and the consideration of symmetry in structural properties that influence system response....

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Editor-in-Chief

Prof. Dr. Sergei D. Odintsov
1. Institució Catalana de Recerca i Estudis Avançats (ICREA), Passeig Luis Companys, 23, 08010 Barcelona, Spain
2. Institute of Space Sciences (ICE-CSIC), C. Can Magrans s/n, 08193 Barcelona, Spain

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.

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Symmetry Editorial Office
MDPI, St. Alban-Anlage 66
4052 Basel, Switzerland

Tel: +41 61 683 77 34
www.mdpi.com

mdpi.com/journal/symmetry
symmetry@mdpi.com
𝕏@Symmetry_MDPI