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Symmetry in Control System Theory and Applications

Guest Editors:

Dr. Staniša Perić
Associate Professor, Faculty of Electronic Engineering, Department of Control Systems, University of Niš, 18000 Niš, Serbia

Dr. Saša S. Nikolic
Associate Professor, Faculty of Electronic Engineering, Department of Control Systems, University of Niš, 18000 Niš, Serbia

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Message from the Guest Editors

Dear Colleagues,

The purpose of this Special Issue is to gather articles pertaining to control system engineering, where design and analysis might benefit from symmetry. In general, symmetry serves as a powerful tool in control systems, offering a structured approach to understanding and designing control systems for a wide range of applications. Symmetry often implies a form of balance or equivalence, and in control theory, this can be leveraged to simplify system analysis and design. Additionally, symmetry can help in identifying invariant properties of a system under certain transformations, providing insights into its behavior and enabling more efficient control strategies.

In this Special Issue, original research articles and reviews are welcome. The research areas may include (but not limited to) the following:

- Symmetric control laws;
- Symmetric structures in neural networks;
- Sliding mode control with symmetry;
- Symmetric state-space representations;
- Symmetric stability analysis;
- Symmetry-based fault detection and isolation;
- Symmetric trajectories in robotics;
- Symmetry in model predictive control;
- Autonomous driving and vehicles;
- Cyber physical systems.

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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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Contact Us

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