Special Issue

Symmetry in Intelligent Control and Application of Uncertain Nonlinear Systems

Message from the Guest Editors

In the context of intelligent control design, symmetry is often considered in the system dynamics and actuator characteristics. Symmetric properties are utilized in the design of controllers for systems with symmetric dead-zones or actuator nonlinearities. Moreover, in the context of adaptive control for uncertain nonlinear systems, the consideration of symmetry is required to address constraints and uncertainties. For instance, adaptive neural network control techniques are developed for systems with asymmetric saturation actuators, highlighting the importance of handling asymmetry in control design. Symmetry is also a key aspect in the application of uncertain nonlinear systems. Various control strategies, such as Passivity-Based Control (PBC), are designed based on the assumption of system symmetry, especially in the lateral dynamics of intelligent vehicles. Additionally, the design of controllers for uncertain nonlinear systems often involves the consideration of symmetry and positive definiteness, especially in the presence of disturbances.

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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.

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