Special Issue

Symmetry and Asymmetry in Dynamics and Control of Biomimetic Robots

Message from the Guest Editors

In the study of biomimetic robotics, dynamics and control play a fundamental role in replicating the sophisticated movements of natural organisms. These robots often mimic the locomotion of animals, requiring a deep understanding of the interaction between mechanical structures and their surrounding environment, such as air or water. A critical aspect of this research lies in addressing symmetry and asymmetry in their dynamic and control systems. Symmetry, commonly observed in the design of flapping-wing robots or bipedal walkers, simplifies control strategies by assuming balanced movements across bilateral structures, thereby reducing computational complexity and enabling efficient system stabilization. However, in practical scenarios, asymmetry frequently arises due to design imperfections, environmental disturbances, or intentional control strategies tailored for specific tasks. For instance, in robots inspired by insects or birds, asymmetrical wing motions may enhance maneuverability or optimize energy efficiency...

Guest Editors

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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

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