Special Issue

Challenges and New Trends in Optimization and Control Theory in the Era of AI: Analysis, Modelling, and Symmetrical Mathematical Methods

Message from the Guest Editors

This Special Issue offers an in-depth exploration of optimization and control theory, examining the intricate relationship between traditional methodologies and the burgeoning influence of artificial intelligence (AI). Contributors may delve into the integration of AI techniques with conventional methods, navigating the evolving landscape of optimization and control to harness AI algorithms for improved predictive accuracy and real-time decision-making. With a focus on symmetrical mathematical techniques, the collection spans diverse domains, from fractional and ordinary differential equations to the complexities of biomathematics, providing insightful analyses and innovative modeling approaches. Within mathematical methods, the exploitation of symmetry serves to reduce computational complexity and derive efficient algorithms. For example, leveraging symmetry in matrix computations can yield faster solutions for linear systems or eigenvalue problems. A comprehensive understanding of both symmetry and asymmetry in mathematical analysis enables researchers and practitioners to approach problem solving and optimization with versatility and effectiveness...

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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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