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Symmetry in Discrete Dynamical Systems and Ordinary Differential Equations

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Message from the Guest Editors

Nowadays, numerous real world phenomena and processes are mathematically modelled by discrete dynamical systems and ordinary differential equations. Many of such models exhibit different kinds of symmetry. It can be symmetry of discrete or differential equations with respect to some groups of transformation, symmetry of phase portraits, symmetry of certain solutions, time-reversible symmetry etc. Sometimes symmetry is hidden and can be seen only after some nonlinear transformations. Some kinds of symmetry in dynamical systems are often related to specific properties of the systems, like integrability, linearizability and periodicity of solutions. Existence of symmetry can be helpful in the control theory since it can allow to control real world models described by ordinary differential equations or discrete dynamical equations. Sometimes symmetry can be used in order to reduce a system of differential equations to an equivalent system of a simple form. It is also important on studies on Hilbert's 16th problem, since it allows to construct polynomial systems of ODEs with many limit cycles.

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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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