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Optimized Machine Learning Algorithms for Modeling Dynamical Systems

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Message from the Guest Editors

Mathematical objects used to make models of physical phenomena dependent on time are dynamical systems. These models are used in economic forecasting, medical issues, environmental modelings, etc. There is an overlap between machine learning and dynamical systems. To address this relation, let us assume a framework for dynamical system learning, using the idea of instrumental–variable regression to transform dynamical system learning to a sequence of machine learning problems. This transformation allows applying a strong literature on machine learning to incorporate many types of prior knowledge. Hence, a family of fast and practical learning algorithms for a variety of dynamical system models are employed to forecast the real behavior of such dynamical systems precisely. Further, machine learning folks often use dynamical systems' taxonomy and reformulate it to some fancy term to make the idea sound sort of new.

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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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