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Editorial

Modeling and Control of Complex Dynamic Systems: Applied Mathematical Aspects

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1. Introduction

The concept of complex dynamic systems arises in many varieties, including the areas of energy generation, storage and distribution, ecosystems, gene regulation and health delivery, safety and security systems, telecommunications, transportation networks, and the rapidly emerging research topics seeking to understand and analyse. Such systems are often concurrent and distributed, because they have to react to various kinds of events, signals, and conditions. They may be characterized by a system with uncertainties, time delays, stochastic perturbations, hybrid dynamics, distributed dynamics, chaotic dynamics, and a large number of algebraic loops. This special issue provides a platform for researchers to report their recent results on various mathematical methods and techniques for modelling and control of complex dynamic systems and identifying critical issues and challenges for future investigation in this field. This special issue amazingly attracted one-hundred-and-eighteen submissions, and twenty-seven of them are selected through a rigorous review procedure.

The selected papers contribute mathematical modelling, parameter identification, monitoring and diagnosis, optimization, and control for a variant of complex systems such as chaotic systems (4 papers), impulsive and singular systems (4 papers), nonlinear systems (12 papers), delay systems (3 papers), stochastic systems (3 papers), and gene complex network (1 paper). From the viewpoint of modelling, the related papers mainly investigate mathematical modelling for complex systems by using physical laws or deal with model identification by using the data based training and estimation. Along with the dynamic