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CHAOS CONTROL AND SYNCHRONIZATION

A Special Issue

edited by

G.R. Chen and X. Liu

Preface

The past two decades have witnessed steadily increasing recognition and appreciation of nonlinear dynamics across a broad range of disciplines. Applications of chaos and bifurcations have appeared in many areas of engineering, physics, and natural and social sciences. All these have led to a remarkable change in the way engineers and scientists interact with nonlinear dynamics. While twenty years ago nonlinear dynamics to most of us was somewhat a novelty, it has become an indispensable part of our toolkits today. Classical design methods were based on the premise that nonlinearities in feedback systems should be viewed as lying somewhere between novelties and undesirable features to be avoided if at all possible. This viewpoint has undergone dramatic change, and recent developments – from circuit design to neurobiology to secure communication – have generated a great deal of excitement and interest in the emerging tools aimed at exploiting (rather than avoiding) nonlinear features in various system designs.

It is within this context that we organized this special issue which consists of a collection of high-quality papers written by experts in the field. Investigations of control systems in issues related to chaos and bifurcations began relatively recently. Despite its short history, the literature on control and anti-control of chaos and bifurcations contains a large variety of new ideas, methodologies, and approaches, as well as many interesting ongoing and potential applications. This special issue presents some of the most representing developments. It provides the readers with motivations, techniques, theories, approaches, and applications achieved today on control and anti-control of chaos and bifurcations, emphasizing on the much needed interplay between nonlinear dynamics and control systems design.

Control and anti-control of chaos and bifurcations are an emerging and rapidly developing area with many interesting avenues for both research and applications. This special issue will be useful to those who are interested in this new and challenging research area that encompasses chaos, bifurcations, control, and systems theories, as well as engineering and technological applications.

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