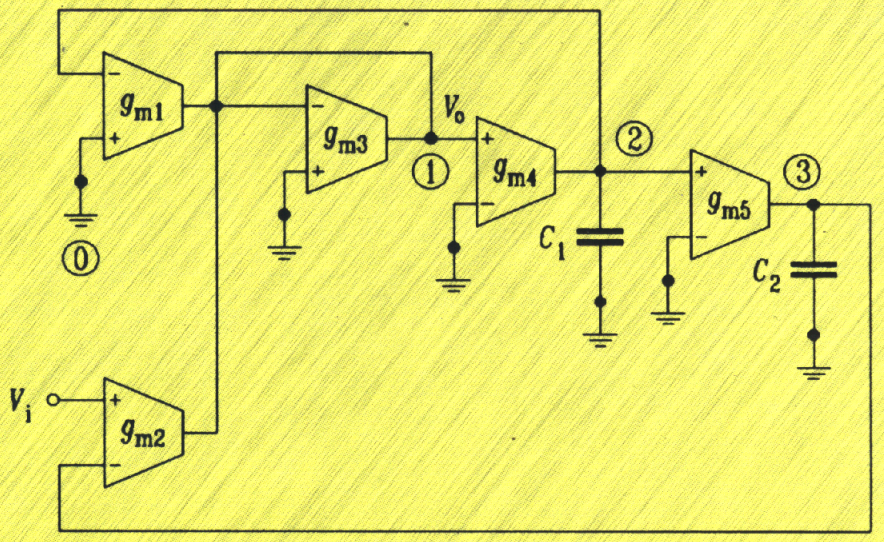
Recent Advances in Circuits and Systems



Nikos E. Mastorakis

(Editor)

World Scientific

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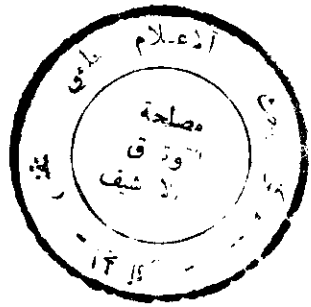

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To Maria

Preface

Much research effort has been devoted in recent years to systems theory and in particular to the analysis and synthesis of electrical and electronic circuits, automatic control and robotics and to the neural networks, genetic algorithms, fuzzy and expert systems. Many challenging problems of systems theory are solved by a variety of mathematical methods and computational techniques and many important results have been derived, which are diffused in the technical literature.

The main aim of this book is to present most of the new trends and most of the recent advances of the impressive evolution in the discipline of circuits and systems. Special emphasis is given in the interaction between the classic areas of systems theory (feedback control, circuits design, electronics, etc.) and the modern techniques of computational intelligence (neural networks, genetic algorithms, fuzzy logic and expert systems). I believe that this fertile interaction will open up new horizons in circuits and systems theory.

This "anthology of papers" contains the latest developments and reflects the experience of many eminent researchers working in different environments (universities, research centers and industry).

The book is composed of four Parts. Part I is devoted to Circuits and Electronics. In this Part, Power Systems are also included. Part II refers to Systems Theory and Control (H infinity problems, feedback control, non-linear systems, robust stability and robust control, multivariable systems, multirate systems, hybrid systems, mechanical systems and hydraulic systems). Part III presents the latest developments in Robotics (theory and applications) while Part IV is devoted to Computational Intelligence in Systems Theory.

I am grateful to all authors who willingly responded to my invitation to present their recent research results as well as in many cases to give excellent surveys on the topics of their interest. I am sure that their efforts to provide high quality contributions will be appreciated by the electrical-electronics and computer engineers as well as by the applied mathematicians, physicists, systems scientists, mechanical engineers and other scientists.

I am convinced that the book will be a source of knowledge and inspiration for all researchers and practitioners working or interested in the areas of Circuits and Systems.

I wish to thank Professor Emmanuel Skordalakis (National Technical University of Athens) for his various facilities that he provided me during the preparation of the book.

Finally, I also wish to thank my wife, Maria, for her patience and her understanding during the period of the editing of this textbook.

Nikos E. Mastorakis

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