

Preface

The present book is based on results of scientific investigations and on the materials of special courses, offered for graduate and undergraduate students. The purpose of this book is to acquaint the reader with the developments in bilinear systems theory and its applications. Particular attention is paid to control of open physical processes functioning in a nonequilibrium mode.

The text consists of eight chapters. Chapter 1 is concerned with the problems of systems analysis of bilinear processes. Chapter 2 solves the problem of optimal control of bilinear systems on the basis of differential geometry methods. Chapter 3 deals with the progress made in an adaptive estimation technique. Chapter 4 is devoted to the application of the Yang–Mills fields to investigation of nonlinear control problems. Chapter 5 considers intelligent sensors, used to examine weak signals. This chapter also describes and analyzes bilinear models of intelligent sensing elements. Chapter 6 illustrates control problems of a quantum system. Chapter 7 discusses the problems of control and identification in systems with chaotic dynamics. Finally, Chapter 8 examines the controlled processes running in biomolecular systems.

This book is directed to students, postgraduate students, and specialists engaged in the fields of control of physical processes, quantum and molecular computing, biophysics, and physical information science.

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Theory, Algorithms, and Applications

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