journal of dynamic systems, measurement, and control

book reviews

MODERN OPERATIONAL CIRCUIT DESIGN, by J. I. Smith, Wiley-Interscience, 1971, pp. 256.

REVIEWED BY BERNARDO RETCHKIMAN[1]

THIS work is described as an introductory text on the techniques of operational amplifiers and circuits that use them, for solving everyday technological electronic problems. It is aimed at the "practicing technologist, who is not conversant with electronics." A bit of background in the concepts, notation and electronic drawing conventions of basic electricity and electronics would, however, make some portions more readily digestible.

The book is amply illustrated in all 15 chapters. The examples taken are purposely kept simple, in order to best demonstrate the principles involved, which explain in an easy-to-understand way, the science and mechanisms of active electronic circuits.

The book is well written and the coverage is comprehensive, though at a limited depth. In spite of a complete lack of a bibliography, the book will be very useful for those in many fields, who need general information regarding the practical use of electronic circuits, in which the operational amplifier plays the most important role.

INTRODUCTION TO THE MATHEMATICAL THEORY OF CONTROL PROCESSES, Vol. I, *Linear Equations and Quadratic Criteria*, by R. Bellman, Academic Press, 1967, 245 pp.

REVIEWED BY BERNARDO RETCHKIMAN

OVER the past decade many books have been published, which deal with what is now called "modern" control systems and with optimization techniques. The present book was written in 1967 and has become by now, for many people involved in the field, a "classical" book. As so, it is needless to say that for some of us the opinion about the content is that it is basic literature. For others this may not be so.

The subject matter is well represented by the title. The book covers five main subjects: calculus of variations, dynamic programming (of course), discrete control processes, multidimensional control processes via calculus of variations and via dynamic programming, and functional analysis. The subjects are treated from the mathematical point of view, in which the physical basis of the phenomenon involved is presented in sufficient depth to be understandable. Only the necessary mathematical background is reviewed.

Overall, the book is very well written with a most extensive bibliography, and some comments and exercises at the end of each of the 9 chapters. Besides being a reference book, it is suitable for a first year graduate introductory course.

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EXPERIMENTAL ANALYSE DER DYNAMIK VON REGELSYSTEMEN IDENTIFIKATION I; THEORETISCHE ANALYSE DER DYNAMIK INDUSTRIELLER PROZESSE IDENTIFIKATION II, by Rolf Isermann, Published by Bibliographisches Institut, 1971, I: 276 pp., II: 122 pp., as parts of a series entitled, *Theoretical and Experimental Methods in Control Engineering.*

REVIEWED BY STANLEY H. JOHNSON[2]

EXPERIMENTAL ANALYSIS OF CONTROL SYSTEM DYNAMICS—IDENTIFICATION I:

A wide variety of methods for the experimental determination of the parameters of linear time-invariant transfer functions is presented. Aperiodic, periodic, stochastic, and pseudo-random test signals are employed and compared. The various effects of noisy data are discussed. Examples are limited to digital computer simulations.

THEORETICAL ANALYSIS OF INDUSTRIAL PROCESS DYNAMICS—IDENTIFICATION II:

In this smaller book, analytical methods for obtaining transfer functions are discussed. Emphasized is the derivation of differential equations, both ordinary and partial, utilizing conservation of mass, energy, and momentum for familiar processes. The final sections are devoted to the simplification of the transfer functions and an investigation of the effects of inexact parameters.

DYNAMICAL SYSTEM THEORY IN BIOLOGY, by R. Rosen, Wiley-Interscience, 1970, 302 pp.

Reviewed by GEORGE OSTER[3]

THIS is the first in a (promised) 2-volume series on system theory in biology. Volume 1 is intended to deal with stability theory and Volume 2 with control aspects.

It is difficult to assess this book in the context of conventional texts on dynamical systems theory, since, by the author's own admission, ... "this book does not attempt to compete with them or substitute for them." In some sense, this is not a completely accurate statement, for at least half the book is devoted to developing theory: stability, linearization, etc. The only difference with conventional texts is that the examples are drawn mostly from chemical kinetics and population dynamics. This is an unusually lucid exposition, liberally illustrated and strong on the geometric aspects of the theory. However, the depth of treatment varies somewhat; theorem-proof format in

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