interested in the design of control systems. Modern Control Theory is composed of nine practically independent chapters contributed by seven different authors. The book opens with a review of classical control methods and a discussion of Lyapunov's direct method. It then offers a very short chapter on digital computing followed by a very long one on analog and hybrid computing. The remainder of the book (about half) is devoted to random processes, identification, adaptive control, and multivariable and optimal control systems. Though there is, of course, not much continuity of style from chapter to chapter, each is written with the apparent intent to introduce subject areas with just enough depth so that a reader gains an appreciation for the advantages and limitations involved and enough basic understanding of the material to be able to proceed further on his own.

The only major disappointment with the book, particularly in light of its title, is its failure to integrate computing and modern control theory. For example, computing techniques and problems connected with the second half of the book are hardly discussed, though the material in question requires extensive computation in order to be successfully implemented.


REVIEWED BY ILAN ADLER

This book intends to present linear programming as a practical problem solving tool. The book contains four main subjects: Formulation, presentation of the simplex method, presentation of a computer program (in Fortran) for the simplex method, and the transportation problem.

The part on formulation gives a good, step by step, explanation on how to build a linear programming model and includes many examples and exercises.

The presentation of the simplex method uses a nonstandard intuitive approach which may benefit the reader who has some previous knowledge of the simplex method. However, since the discussion in this chapter is sometimes misleading and lacking (e.g., the author does not even mention the possibility of the existence of no feasible solution) the reader who is not familiar with the subject may be confused more than he is helped.

The chapter on the computer program for the simplex method may interest only those who would like to program the simplex method themselves.

The chapter on the transportation problem presents one of several variants of the simplex algorithms which takes advantage of the special structure of this problem. Yet, it is strange that in a book which emphasizes the practical aspects, the author does not introduce another variant which is more efficient and easier to execute (for a nonmathematical presentation of such variant we refer the reader to Sassi, et al., Operations Research: Methods and Problems, John Wiley & Sons, Inc., 1959).

It is also unfortunate that in an applied book there is very limited discussion of post optimality analysis and the additional valuable information which is available from the last tableau of the simplex method.

The book contains no list of references.

In summation, this book can be valuable to the reader who is interested in the model building phase of linear programming but it is not recommended as the sole (or main) introduction to the subject of linear programming.


REVIEWED BY D. N. WORMLEY

In Fundamentals of Automatic Control Professors Gupta and Hasdorff present classical analysis and design techniques for continuous and sampled-data linear control systems. Their book has been developed for use in an advanced undergraduate course and is specifically organized so that it may be conveniently used for (1) a one-quarter course dealing with continuous control systems, (2) a one-quarter course dealing with sampled-data systems or (3) a one-semester course which includes selected material from both the continuous and sampled-data subject areas.

In Chapter 1 the concepts of a linear, time invariant plant and of both continuous and sampled-data system compensation are presented. Chapters 2, 3, and 4 describe classical methods of analysis for single-input, single-output systems and include discussions of LaPlace transforms, transient analysis, stability by Routh and Nyquist methods, steady-state error constants, frequency response, root locus and Mitrovic's method. In a parallel fashion Chapters 5 and 6 develop classical methods of analysis for sampled-data systems, while state variable methods of representation are introduced in Chapter 7 for both continuous and sampled-data systems. A number of excellent examples are used to illustrate each of the methods of analysis discussed in the book's first seven chapters.

Classical methods of control system compensation (lead, lag, and lead-lag) and design methods (root locus, Nichols charts, Mitrovic's method, and the s-plane synthesis technique) for continuous systems are described in detail in Chapter 8. In the last section of the chapter a qualitative discussion comparing each of the design methods places the relative merits of each method in perspective. In Chapter 9, design methods for sampled-data systems (root loci, Z-plane synthesis, and Mitrovic's method) are described, while in Chapter 10 state variable feedback compensation is presented with a very clear interpretation of state variable feedback in terms of system root loci. In the final chapter the integral square error performance index is introduced.

Professors Gupta and Hasdorff have provided a lucid presentation of classical automatic control techniques. Highlighting their work is the explicit parallel development of techniques for continuous and sampled-data systems and the background formed in state variable methods. The approach used by the authors strongly emphasizes the detailed mathematical techniques used in classical control work, and places little emphasis on the application of the design techniques to physical and engineering systems. Very few physical systems are discussed in either the text's examples, or problems. An instructor using the text may wish to use supplementary examples and problems to provide a strong link between the mathematical techniques and their application to engineering systems of current interest. Other areas in which the text might be augmented include the relationship of linear system analysis to nonlinear systems, particularly the use of linearization, and the general area of performance indices. While the mathematical techniques of the integral square error (ISE) performance index are described in some detail, very little discussion is devoted to the general concept of a performance index and to use of ISE in comparison to other performance indices. In summary, the presentation in Fundamentals of Automatic Control is precise and lucid and the book should provide a good text for control courses in which a strong emphasis is placed upon the development of the mathematical techniques used for classical control systems analysis and design.

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