

BOOK REVIEW

LAPIDUS, L.—LUUS, R.: *Optimal Control of Engineering Processes*. Blaisdell Publishing Co. Waltham, Massachusetts—Toronto—London, 1967. 446 pages, \$ 12.50

This book is designed as a textbook for seniors or graduate students, thus it gives a concise treatise of optimal control problems. It is intended to present the fundamentals and the application possibilities of the process control and on-line digital control of systems.

The first chapter is devoted to vector and matrix manipulations and serves as an introduction. This chapter also presents the fundamental mathematical and physical definitions or concepts to be used in later chapters.

The second chapter gives a good review of the general mathematical procedures applied in optimal control. Dynamic programming, the continuous and discrete maximum principle Liapunov second method, gradient methods and constrained optima as well as linear and nonlinear programming are introduced. Simple illustrations make clear for the reader the computational difficulties and the relative advantages or disadvantages of certain methods.

In chapter three the methods of optimal control are applied to engineering problems which are linear in nature or can be linearized without difficulties. Here quadratic performance indices and minimum-time controls are also presented.

Chapter four deals with the optimum control of non-linear multidimensional systems.

The fifth and sixth chapter is devoted to the stability analysis of linear and nonlinear systems, respectively. Here the main stability concepts are introduced and applied also in control synthesis.

This work pretends to give a unified approach to the recent techniques and methods available for the treatment of optimal control problems. Within the text there are many well detailed worked examples which help to explain and understand the practical applications of the theoretical techniques described. In this manner an effort is made to bridge the gap between theory and practice.

Although most of the examples are chosen from the field of chemical engineering it seems that a sufficient background is given also for readers not quite familiar with these problems.

The book can be recommended to engineers and applied mathematicians wishing to learn about the optimal control problems of deterministic systems.

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