E. B. Lee and L. Markus: Foundations of optimal control theory. John Wiley & Sons. Ltd. 1967. 576 pages, price 168Sh.

The authors' aim was to present an organized treatment of control theory that would be thorough and complete within the limitations set by the restriction to deterministic problems definable in terms of ordinary differential systems.
This resulted in a book pleasant to read, with the following contents.

Chapter 1. Methods, theory, and practices in optimal control synthesis.

The general theory of optimal control for linear and nonlinear processes are described and illustrated by the application of these basic principles in the synthesis of optimal controllers. However, continuous deterministic processes are investigated here only.

Chapter 2. Optimal control of linear systems.

Here the minimal time - optimal control theory is developed thoroughly. The basic theory of controllability is developed by a study of the geometry of the set of attainability.

Chapter 3. Optimal control for linear processes with integral convex cost criteria.

The first part of this chapter deals only with quadratic error criteria and applications of the corresponding theory. The second part deals with general convex integral criteria and also processes in which the control function is further restrained.

Chapter 4. The maximum principle and the existence of optimal controllers for nonlinear processes.

Chapter 5. Necessary and sufficient conditions for optimal control.

In these two chapters the maximum principle is proved and it is shown that this principle and the transversality conditions are necessary conditions for an optimal controller. Also some sufficient conditions for optimality are proved.

Chapter 6. Control system properties: controllability, observability and stability.

The concepts of controllability and observability are examined for general nonlinear control processes. Extensions of the results of chapter 2 are obtained.

Chapter 7. Synthesis of optimal controllers for some basic nonlinear control processes.

In this chapter applications of the previously developed general theory of optimal control are made to a number of control problems of technology and science.

Appendix A. Steepest descent and computational techniques for optimal control problems.

Appendix B. Bibliography on optimal processes governed by ordinary and partial functional-differential systems.

These last two appendices are mentioned here because they are very extensive and a good help in studying the theory of optimal control.

It is obvious that for studying this textbook a good undergraduate course in differential equations and advanced calcules is necessary.

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