

Sethi, Suresh P.; Thompson, Gerald L.

Optimal control theory. Applications to management science and economics. 2nd ed. (English) [Zbl 0998.49002](#)

Dordrecht: Kluwer Academic Publishers. xviii, 505 p. (2000).

In comparison with the first edition (1981; [Zbl 0495.49001](#)), the material of the second edition was reorganized and extended with new results in the area of optimal control, which have appeared since the first edition was published. The main aim of the book is to exposit, as simply as possible, new results obtained in the last 20 years in application of optimal control theory to management science. Therefore, the emphasis of this book is not on mathematical rigor, but rather on developing models of realistic situations faced in business and management. For that reason, only heuristic proofs for some theorems are presented in the text and, alternatively, more complicated proofs appear only as an appendix at the end of the book. This holds especially for some parts of Chapters 2-4 and Chapter 8, in which various versions of the continuous and discrete time maximum principles are explained. One of the most important changes in comparison with the first edition is a substantial expansion of the material dealing with differential games, distributed systems, impulse control and stochastic optimal control in Chapters 12 and 13. The material of the remaining chapters covers an extraordinarily wide range of applications of optimal control. The applications to the following areas are considered in the book: finance (Chapter 5), production and inventory (Chapter 6), marketing (Chapter 7), maintenance and replacement (Chapter 9), natural resources consumption management (Chapter 10) and some application to economics (Chapter 11). Since the authors intended to use the book not only for research purposes, but also as a textbook for students having the necessary mathematical background of 2 or 3 semesters of calculus, they included as appendices some mathematics, which is necessary for understanding the material of the book (e.g., differential equations or calculus of variations). For this purpose, the authors also have included in the text numerous worked-out examples and a large number of exercises in the back of the book.

Reviewer: [Karel Zimmermann \(Praha\)](#)

MSC:

- [49-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to calculus of variations and optimal control
- [90-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to operations research and mathematical programming
- [49N90](#) Applications of optimal control and differential games
- [91-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to game theory, economics, and finance
- [49K15](#) Optimality conditions for problems involving ordinary differential equations
- [91B62](#) Economic growth models
- [90B05](#) Inventory, storage, reservoirs
- [90B25](#) Reliability, availability, maintenance, inspection in operations research
- [93E20](#) Optimal stochastic control

Cited in **2** Reviews
Cited in **136** Documents

Keywords:

[optimal control theory](#); [management science](#); [finance](#); [production](#); [inventory](#); [marketing](#); [natural resources](#); [economics](#)