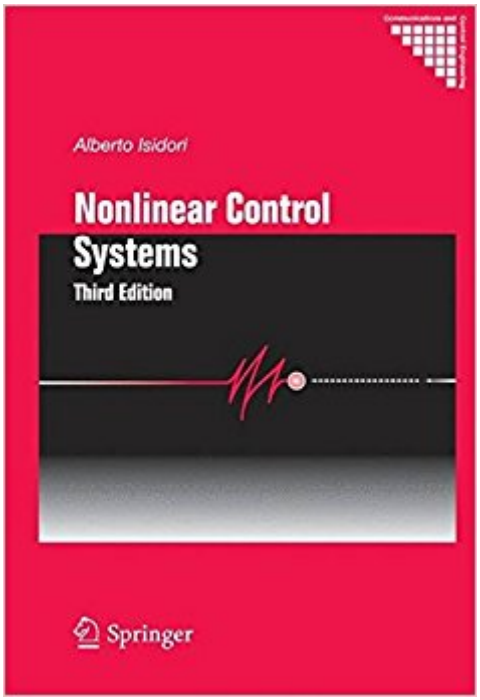
Nonlinear Control Systems (Communications And Control Engineering)



Synopsis

The purpose of this book is to present a self-contained description of the funÃ Â- damentals of the theory of nonlinear control systems, with special emphasis on the differential geometric approach. The book is intended as a graduate text as weil as a reference to scientists and engineers involved in the analysis and design of feedback systems. The first version of this book was written in 1983, while I was teachÃ Â- ing at the Department of Systems Science and Mathematics at Washington University in St. Louis. This new edition integrates my subsequent teaching experience gained at the University of Illinois in Urbana-Champaign in 1987, at the Carl-Cranz Gesellschaft in Oberpfaffenhofen in 1987, at the University of California in Berkeley in 1988. In addition to a major rearrangement of the last two Chapters of the first version, this new edition incorporates two additional Chapters at a more elementary level and an exposition of some relevant research findings which have occurred since 1985.

Book Information

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Customer Reviews

From the reviews: Isidori's book is essential for anyone preparing for serious reading or basicÃ Â research in the differential geometric approach to control theory and will not disappoint those mathematicallyÃ Â trained. I have observed its use in the hands of two teachers other than the author; the students enjoyed it and made good use of it later. There is no universal solvent for

nonlinear control problems, but the methods presented here are powerful. IEEE Transactions on Automatic Control 43 (1997) 1043-1044 (Reviewer: David L. Elliott) Ã Â

This established and authoritative text focuses on the design and analysis of nonlinear control systems. The author considers the latest research results and techniques in this updated and extended edition. Topics covered include: Ã¢â ¬Â¢ local and global decompositions of control systems; Ã¢â ¬Â¢ input-ouput maps and realization theory; Ã¢â ¬Â¢ nonlinear feedback for single-input/single-output systems and multi-input/multi-output systems; Ã¢â ¬Â¢ applications of state feedback; Ã¢â ¬Â¢ output regulation and Ã¢â ¬Â¢ global stabilization and disturbance attenuation. Examples are given from mechanical, electrical and aerospace engineering. The approach consists of a rigorous mathematical formulation of control problems and respective methods of solution. The two appendices outline the most important concepts of differential geometry and present some specific data not often found in other standard works. This makes Nonlinear Control Systems suitable as a graduate and undergraduate text and as a source of reference.

It is an excellent book to understand the theoretical foundations of nonlinear control systems. Although I have taken 2 graduate level courses in this subject, I have not seen such rigorous analysis in the courses. The books provides the mathematical backbone, which I missed in the courses (which jump straight from dot(x) = f(x), to designing filtered states). Key examples are provided to strengthen some ideas. Equivalents of Reachability and Observability in nonlinear systems are provided with a differential geometric perspective. This is as far as I have come in this book. I guess I will edit my review if my opinion changes further down the lane!Warning: One needs to be very familiar with concepts of real analysis and differential topology to begin with.

The book is not readable and you have to be an expert in the geometric nonlinearcontrol area to follow the book. Before reading the book, you have to masterthe related concepts of differential geometry.The differential geometry summary given in the book is not easy to understand and digest.The book does not have enough examples also.Finally, it just involves geometric control techniques and not others.Hence, its title should be geometric nonlinear control.This book is not a book to learn different nonlinear control techniques in the nonlinear control area.

This is simply the best book written on nonlinear control theory. The contents form the basis for

feedback linearization techniques, nonlinear observers, sliding mode control, understanding relative degree, nonminimum phase systems, exact linearization, and a host of other topics. A careful reading of this book will provide vast rewards. A fantastic book.

Be prepared with differential manifolds before start with this book. I enjoy the way the author explained his thought flow. If there is more examples it will definite help people from engineering side.

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