

<<非线性控制系统的分析与设计>>

图书基本信息

书名：<<非线性控制系统的分析与设计>>

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前言

The purpose of this book is to present a comprehensive introduction to the theory and design technique of nonlinear control systems. It may serve as a standard reference of nonlinear control theory and applications for control scientists and control engineers as well as Ph.D students majoring in Automation or some related fields such as Operational Research, Management, Communication etc. In the book we emphasize on the geometric approach to nonlinear control systems. In fact, we intend to put nonlinear control theory and its design techniques into a geometric framework as much as we can. The main motivation to write this book is to bring readers with basic engineering background promptly to the frontier of the modern geometric approach on the dynamic systems, particularly on the analysis and control design of nonlinear systems. We have made a considerable effort on the following aspects: First of all, we try to visualize the concepts. Certain concepts are defined over local coordinates, but in a coordinate free style. The purpose for this is to make them easily understandable, particularly at the first reading. Through this way a reader can understand a concept by just considering the case in n . Later on, when the material has been digested, it is easy to lift them to general topological spaces or manifolds. Secondly, we emphasize the numerical or computational aspect. We believe that making things computable is very useful not only for solving engineering problems but also for understanding the concepts and methods. Thirdly, certain proofs have been simplified and some elementary proofs are pre-sented to make the materials more readable for engineers or readers not specializing in mathematics. Finally, the topics which can be found easily in some other standard textbooks or references are briefly introduced and the corresponding references are included. Much attention has been put on new topics, new results, and new design techniques. For convenience, a brief survey on linear control theory is included, which can be skipped for readers who are already familiar with the subject. For those who are not majoring in control theory, it provides a tutorial introduction to the field, which is sufficient for the further study of this book. The other mathematical pre-requirements are Calculus, Linear Algebra, Ordinal Differential Equation.

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内容概要

本书全面介绍了非线性控制系统的分析与设计。

全书共分为两部分。

其中第一部分为第1~4章。

第1章介绍了拓扑空间,第2章介绍了微流形,第3章介绍了代数、Lie群和Lie代数,它们为本书提供了研究数学背景。

第二部分包括12章,即第5~16章,这些章节涵盖了可控性、可观测性、稳定性、解耦、投入产出的实现、线性化、中心流技术、输出调节、耗散系统、 H^{∞} 控制、切换系统和非平稳控制等方面,并给出了有关的详细设计技术。

本书可供理工科大学自动控制专业的教师及研究生阅读,也可供自然科学和工程技术领域中相关专业的研究人员参考。

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作者简介

Dr. Daizhan Cheng , a professor at Institute of Systems Science , Chinese Academy of Sciences , has been working on the control of nonlinear systems for over 30 years and is currently a Fellow of IEEE and a Fellow of IFAC , he is also the chairman of Technical Committee on Control Theory , Chinese Association of Automation.

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编辑推荐

Analysis and Design of Nonlinear Control Systems provides a comprehensive and up to date introduction to nonlinear control systems , including system analysis and major control design techniques. The book is self-contained , providing sufficient mathematical foundations for understanding the contents of each chapter. Scientists and engineers engaged in the field of Nonlinear Control Systems will find it an extremely useful handy reference book.

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