

<<现代控制系统>>

图书基本信息

书名：<<现代控制系统>>

13位ISBN编号：9787121170652

10位ISBN编号：7121170655

出版时间：2012-7

出版时间：电子工业出版社

作者：(美)多尔夫, (美)毕晓普 著

页数：1103

字数：2017000

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

<<现代控制系统>>

内容概要

《现代控制系统(第12版英文版)》由多尔夫、毕晓普所著,控制系统原理及相近课程是高等学校工科学生的核心课程之一。

《现代控制系统(第12版英文版)》一直是该类课程畅销全球的教材范本。

主要内容包括控制系统导论、系统数学模型、状态空间模型、反馈控制系统的特性、反馈控制系统的性能、反馈系统的稳定性、根轨迹法、频率响应方法、频域稳定性、反馈控制系统设计、状态变量反馈系统设计、鲁棒控制系统和数字控制系统等。

本书的例子和习题大多取材于现代科技领域中的实际问题,新颖而恰当。

学习和解决这些问题,可以使学生的创造性精神得到潜移默化的提升。

本书可作为高等学校工科(自动化、航空航天、电力、机械、化工等)

本科高年级学生和研究生的双语教学教材,也可供从事相关工作的人员作为参考用书使用。

<<现代控制系统>>

作者简介

作者:(美)Richard C. Dorf , (美)Robert H. Bishop

书籍目录

CHAPTER 1 Introduction to Control Systems

- 1.1 Introduction
- 1.2 Brief History of Automatic Control
- 1.3 Examples of Control Systems
- 1.4 Engineering Design
- 1.5 Control System Design
- 1.6 Mechatronic Systems
- 1.7 Green Engineering
- 1.8 The Future Evolution of Control Systems
- 1.9 Design Examples
- 1.10 Sequential Design Example: Disk Drive Read System
- 1.11 Summary

CHAPTER 2 Mathematical Models of Systems

- 2.1 Introduction
- 2.2 Differential Equations of Physical Systems
- 2.3 Linear Approximation of Physical Systems
- 2.4 The Laplace Transform
- 2.5 The Transfer Function of Linear Systems
- 2.6 Block Diagram Models
- 2.7 Signal-Flow Graph Models
- 2.8 Design Examples
- 2.9 The Simulation of Systems Using Control Design Software
- 2.10 Sequential Design Example: Disk Drive Read System
- 2.11 Summary

CHAPTER 3 State Variable Models

- 3.1 Introduction
- 3.2 The State Variables of a Dynamic System
- 3.3 The State Differential Equation
- 3.4 Signal-Flow Graph and Block Diagram Models
- 3.5 Alternative Signal-Flow Graph and Block Diagram Models
- 3.6 The Transfer Function from the State Equation
- 3.7 The Time Response and the State Transition Matrix
- 3.8 Design Examples
- 3.9 Analysis of State Variable Models Using Control Design Software
- 3.10 Sequential Design Example: Disk Drive Read System
- 3.11 Summary

CHAPTER 4 Feedback Control System Characteristics

- 4.1 Introduction
- 4.2 Error Signal Analysis
- 4.3 Sensitivity of Control Systems to Parameter Variation
- 4.4 Disturbance Signals in a Feedback Control System
- 4.5 Control of the Transient Response
- 4.6 Steady-State Error
- 4.7 The Cost of Feedback

<<现代控制系统>>

- 4.8 Design Examples
- 4.9 Control System Characteristics Using Control Design Software
- 4.10 Sequential Design Example: Disk Drive Read System
- 4.11 Summary

CHAPTER 5 The Performance of Feedback Control Systems

- 5.1 Introduction
- 5.2 Test Input Signals
- 5.3 Performance of Second-Order Systems
- 5.4 Effects of a Third Pole and a Zero on the Second-Order System

Respo

- 5.5 The s-Plane Root Location and the Traient Respo
- 5.6 The Steady-State Error of Feedback Control Systems
- 5.7 Performance Indices
- 5.8 The Simplification of Linear Systems
- 5.9 Design Examples
- 5.10 System Performance Using Control Design Software
- 5.11 Sequential Design Example: Disk Drive Read System
- 5.12 Summary

CHAPTER 6 The Stability of Linear Feedback Systems

- 6.1 The Concept of Stability
- 6.2 The Routh – Hurwitz Stability Criterion
- 6.3 The Relative Stability of Feedback Control Systems
- 6.4 The Stability of State Variable Systems
- 6.5 Design Examples
- 6.6 System Stability Using Control Design Software
- 6.7 Sequential Design Example: Disk Drive Read System
- 6.8 Summary

CHAPTER 7 The Root Locus Method

- 7.1 Introduction
- 7.2 The Root Locus Concept
- 7.3 The Root Locus Procedure
- 7.4 Parameter Design by the Root Locus Method
- 7.5 Seitivity and the Root Locus
- 7.6 PID Controlle
- 7.7 Negative Gain Root Locus
- 7.8 Design Examples
- 7.9 The Root Locus Using Control Design Software
- 7.10 Sequential Design Example: Disk Drive Read System
- 7.11 Summary

CHAPTER 8 Frequency Respo

- 8.1 Introduction
- 8.2 Frequency Respo Plots
- 8.3 Frequency Respo Measurements
- 8.4 Performance Specificatio in the Frequency Domain
- 8.5 Log Magnitude and Phase Diagrams
- 8.6 Design Examples
- 8.7 Frequency Respo Methods Using Control Design Software

<<现代控制系统>>

8.8 Sequential Design Example: Disk Drive Read System

8.9 Summary

CHAPTER 9 Stability in the Frequency Domain

9.1 Introduction

9.2 Mapping Contour in the s -Plane

9.3 The Nyquist Criterion

9.4 Relative Stability and the Nyquist Criterion

9.5 Time-Domain Performance Criteria in the Frequency Domain

9.6 System Bandwidth

9.7 The Stability of Control Systems with Time Delays

9.8 Design Examples

9.9 PID Control in the Frequency Domain

9.10 Stability in the Frequency Domain Using Control Design

Software

9.11 Sequential Design Example: Disk Drive Read System

9.12 Summary

CHAPTER 10 The Design of Feedback Control Systems

10.1 Introduction

10.2 Approaches to System Design

10.3 Cascade Compensation Networks

10.4 Phase-Lead Design Using the Bode Diagram

10.5 Phase-Lead Design Using the Root Locus

10.6 System Design Using Integration Networks

10.7 Phase-Lag Design Using the Root Locus

10.8 Phase-Lag Design Using the Bode Diagram

10.9 Design on the Bode Diagram Using Analytical Methods

10.10 Systems with a Prefilter

10.11 Design for Deadbeat Response

10.12 Design Examples

10.13 System Design Using Control Design Software

10.14 Sequential Design Example: Disk Drive Read System

10.15 Summary

CHAPTER 11 The Design of State Variable Feedback Systems

11.1 Introduction

11.2 Controllability and Observability

11.3 Full-State Feedback Control Design

11.4 Observer Design

11.5 Integrated Full-State Feedback and Observer

11.6 Reference Inputs

11.7 Optimal Control Systems

11.8 Internal Model Design

11.9 Design Examples

11.10 State Variable Design Using Control Design Software

11.11 Sequential Design Example: Disk Drive Read System

11.12 Summary

CHAPTER 12 Robust Control Systems

12.1 Introduction

<<现代控制系统>>

- 12.2 Robust Control Systems and System Sensitivity
- 12.3 Analysis of Robustness
- 12.4 Systems with Uncertain Parameters
- 12.5 The Design of Robust Control Systems
- 12.6 The Design of Robust PID-Controlled Systems
- 12.7 The Robust Internal Model Control System
- 12.8 Design Examples
- 12.9 The Pseudo-Quantitative Feedback System
- 12.10 Robust Control Systems Using Control Design Software
- 12.11 Sequential Design Example: Disk Drive Read System
- 12.12 Summary

CHAPTER 13 Digital Control Systems

- 13.1 Introduction
- 13.2 Digital Computer Control System Applications
- 13.3 Sampled-Data Systems
- 13.4 The z-Transform
- 13.5 Closed-Loop Feedback Sampled-Data Systems
- 13.6 Performance of a Sampled-Data, Second-Order System
- 13.7 Closed-Loop Systems with Digital Computer Compensation
- 13.8 The Root Locus of Digital Control Systems
- 13.9 Implementation of Digital Controllers
- 13.10 Design Examples
- 13.11 Digital Control Systems Using Control Design Software
- 13.12 Sequential Design Example: Disk Drive Read System
- 13.13 Summary

APPENDIX A MATLAB Basics

References

Index

章节摘录

版权页：插图： A fluid flow system is shown in Figure 2.38. The reservoir (or tank) contains water that evacuates through an output port. Water is fed to the reservoir through a pipe controlled by an input valve. The variables of interest are the fluid velocity V (m/s), fluid height in the reservoir H (m), and pressure p (N/m²). The pressure is defined as the force per unit area exerted by the fluid on a surface immersed (and at rest with respect to) the fluid. Fluid pressure acts normal to the surface. For further reading on fluid flow modeling. The elements of the control system design process emphasized in this example are shown in Figure 2.39. The strategy is to establish the system configuration and then obtain the appropriate mathematical models describing the fluid flow reservoir from an input-output perspective. The general equations of motion and energy describing fluid flow are quite complicated. The governing equations are coupled nonlinear partial differential equations. We must make some selective assumptions that reduce the complexity of the mathematical model. Although the control engineer is not required to be a fluid dynamicist, and a deep understanding of fluid dynamics is not necessarily acquired during the control system design process, it makes good engineering sense to gain at least a rudimentary understanding of the important simplifying assumptions. For a more complete discussion of fluid motion. To obtain a realistic, yet tractable, mathematical model for the fluid flow reservoir, we first make several key assumptions. We assume that the water in the tank is incompressible and that the flow is inviscid, irrotational and steady. An incompressible fluid has a constant density ρ (kg/m³). In fact, all fluids are compressible to some extent. The compressibility factor, k , is a measure of the compressibility of a fluid. A smaller value of k indicates less compressibility.

编辑推荐

《国外计算机科学教材系列:现代控制系统(英文版)(第12版)》是国外计算机科学系列教材的英文版，由电子工业出版社出版，是控制系统原理及相近课程是高等学校工科学生的核心课程之一。

《国外计算机科学教材系列:现代控制系统(英文版)(第12版)》可作为高等学校工科（自动化、航空航天、电力、机械、化工等）本科高年级学生和研究生双语教学教材，也可供从事相关工作的人员作为参考用书使用。

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>