《自动控制原理与设计》

图书基本信息

书名：《自动控制原理与设计》

13位ISBN编号：9787121191022

10位ISBN编号：7121191024

出版时间：2013-1

出版社：电子工业出版社

页数：590

版权说明：本站所提供下载的PDF图书仅提供预览和简介以及在线试读，请支持正版图书。

更多资源请访问：www.tushu000.com

《自动控制原理与设计》

内容概要

《国外计算机科学教材系列:自动控制原理与设计(第6版)(英文版)》是自动控制领域的经典著作，以自动控制系统的分析和设计为主线，在回顾自动控制系统动态响应和反馈控制的基本特性基础上，重点介绍了自动控制系统的三种主流设计方法，即根轨迹设计法、频率响应设计法和状态空间设计法。

《自动控制原理与设计》

书籍目录

Cbapter 1 An Overview and Brief History of Feedback Control A Perspective on Feedback Contro Chapter Overview 1.1 A Simple Feedback System 1.2 A First Analysis of Feedback 1.3 A Brief History 1.4 An Overview of the Book Problems Chapter 2 Dynamic Response A Perspective on System Response Chapter Overview 2.1 Review ofLaplace Transforms 2.1.1 Response by Convolution 2.1.2 Transfer Functions and Frequency Response 2.1.3 The L_ Laplace Transform 2.1.4 Properties of Laplace Transforms 2.1.5 Inverse LaplaceTransform by Partial —Fraction Expansion 2.1.6 The FinalValue Theorem 2.1.7 Using Laplace Transforms to Solve Problems 2.1.8 Poles and Zeros 2.1.9 Linear System Analysis Using MATLAB 2.2 System Modeling Diagrams 2.2.1 The Block Diagram 2.2.2 Block Diagram Reduction Using MATLAB 2.3 Effect of Pole Locations 2.4 Time—Domain Specifications 2.4.1 Rise Time 2.4.2 Overshoot and PeakTime 2.4.3 Settling Time 2.5 Effects of Zeros and Additional Poles 2.6 Stability 2.6.1 Bounded Input—Bouded Output Stability 2.6.2 Stability of LTI Systems 2.6.3 Routh's Stability Criterion 2.7 Historical Perspective Problems Chapter 3 AFirstAnalysis ofFeedback A Perspective on the Analysis of Feedback Chapter Overview 3.1 The Basic Equations of Control 3.1.1 Stability 3.1.2 Tracking 3.1.3 Regulation 3.1.4 Sensitivity 3.2 Control of Steady—State Error to Polynomial Inputs： SystemType 3.2.1 System Type for Tracking 3.2.2 System Type for Regulation and Disturbance Rejection 3.3 The Three—Term Controller： PID Control 3.3.1 Proportional Control （P） 3.3.2 Proportional Plus Integral Control （PI） 3.3.3 PID Control 3.3.4 Ziegler—Nichols Tuning of the PID Controller 3.4 Introduction to Digital Control 3.5 Historical Perspective Problems Chapter 4 The Root—Locus Design Method A Perspective on the Root—Locus Design Method Chapter Overview 4.1 Root Locus of a Basic Feedback System 4.2 Guidelines for Determining a Root Locus 4.2.1 Rules for Plotting a Positive （180 °） Root Locus 4.2.2 Summary of the Rules for Determining a Root Locus 4.2.3 Selecting the Parameter Value 4.3 Selectedlllustrative Root Loc 4.4 Design Using Dynamic Compensation 4.4.1 Design Using Lead Compensation 4.4.2 Design Using Lag Compensation 4.4.3 Design Using Notch Compensation 4.4.4 Analog and Digitallmplementations 4.5 A Design Example Using the Root Locus 4.6 Extensions ofthe Root—Locus Method 4.6.1 Rules for Plotting a Negative （0 °） Root Locus 4.7 Historical Perspective Problems Chapter 5 The Frequency—Response Design Method A Perspective on the Frequency —Response Design Method Chapter Overview 5.1 Frequency Response 5.1.1 Bode Plot Techniques 5.1.2 Steady —State Errors 5.2 Neutral Stability 5.3 The Nyquist Stability Criterion 5.3.1 The Argument Principle 5.3.2 Application to Control Design 5.4 Stability Margins 5.5 Bode's Gain—Phase Relationship 5.6 Closed—Loop Frequency Response 5.7 Compensation 5.7.1 PD Compensation 5.7.2 Lead Compensation 5.7.3 PI Compensation 5.7.4 Lag Compensation 5.7.5 PID Compensation 5.7.6 Design Considerations 5.8 Historical Perspective Problems Chapter 6 State—Space Design A Perspective on State—Space Design Chapter Overview 6.1 Advantages of State —Space 6.2 System Descriptionin State—Space 6.3 Block Diagrams and State—Space 6.3.1 Time and Amplitude Scaling in State—Space 6.4 Analysis of the State Equations 6.4.1 Block Diagrams and Canonical Forms 6.4.2 Dynamic Response from the State Equations 6.5 Control—Law Design for Full—State Feedback 6.5.1 Finding the Control Law 6.5.2 Introducing the Reference Input with Full—State Feedback 6.6 Selection of Pole Locations for Good Design 6.6.1 Dominant Second—Order Poles 6.6.2 Symmetric Root Locus （SRL） 6.6.3 Comments on the Methods 6.7 Estimator Design 6.7.1 Full—Order Estimators 6.7.2 Reduced—Order Estimators 6.7.3 Estimator Pole Selectio 6.8 Compensator Design： Combined Control Law and Estimator 6.9 Introduction of the Reference Input with the Estimator 6.9.1 A General Structure for the Reference Input 6.9.2 Selecting the Gain 6.10 Integral Control and Robust Tracking 6.10.1 Integral Control 6.11 Historical Perspective Problems Chapter 7 Nonlinear Systems Perspective on Nonlinear Systems Chapter Overview 7.1 Introduction and Motivation： Why Study Nonlinear Systems？ 7.2 Analysis by Linearization 7.2.1 Linearization by Small—Signal Analysis 7.2.2 Linearization by Nonlinear Feedback 7.2.3 Linearization by Inverse Nonlinearity 7.3 Equivalent Gain Analysis Using the Root Locus 7.3.1 Integrator Antiwindup 7.4 Equivalent Gain Analysis Using Frequency Response： Describing Functions 7.4.1 Stability Analysis Using Describing Functions 7.5 Historical Perspective Problems Chapter 8 Control System Design:Principles and Case Studies A Perspective on Design Principles Chapter Overview 8.1 An Outline of Control Systems Design 8.2 Design of a Satellite's Attitude Control 8.3 Lateral and Longitudinal Control of a Boeing 8.3.1 Yaw Damper 8.3.2 Altitude-Hold Autopilot 8.4 Control of the Fuel-Air

Ratio in an Automotive Engine 8.5 Control of the Read/Write Head Assembly of a Hard Disk 8.6 Control of RTP Systems in Semiconductor Wafer Manufacturing 8.7 Chemotaxis or How E. Coli Swims Away from Trouble 8.8 Historical Perspective Problems Appendix Solutions to the Review Questions

《自动控制原理与设计》

章节摘录

版权页： 插图： Regulation is central to the process industries, from making beer to making gaso line. In these industries there are a host of variables that need to be kept constant.Typical examples are temperature, pressure, volume, flow rates, composition, and chemical properties such as pH level. However, before one can regulate by feedback,one must be able to measure the variable ofinterest and before there was control there were sensors. In 1851, George Taylor and David Kendall founded the company that later became the Taylor Instrument Company in Rochester, NY, to make thermometers and barometers for weather forecasting. In 1855 they were making thermometers for several industries, including the brewing industry where they were used for manual control. Other early entries into the instrument field were the Bristol Company founded in Naugatuck, CT, in 1889 by William Bristol, and the Foxboro Comppany founded in Foxboro, MA, in 1908 by William's father and two of his brothers. For example, one of Bristol's instruments was used by Henry Ford to measure (and presumably control) steam pressure while he worked at the Detroit Edison Company.The Bristol Company pioneered in telemetry that permitted instruments to be placed at a distance from the process so a plant manager could monitor several variables at once. As the instruments became more sophisticated, and devices such as motordriven valves became available, they were used in feedback control often using simple on-offmethods as described in Chapter l for the home furnace. An important fact was that the several instrument companies agreed upon standards for the variables usedso a plant could mix and match instruments and controllers from different suppliers.In 1920 Foxboro introduced a controller based on compressed air that included reset or integral action. Eventually, each of these companies introduced instruments and controllers that could implement full PID action. A major step was taken for tuning PID controllers in 1942 when Ziegler and Nichols, working for Taylor Instruments,published their method for tuning based on experimental data. The poster child for the tracking problem was that of the anti-aircraft gun, whether on land or at sea. The idea was to use radar to track the target and to have a controller that would predict the path of the aircraft and aim the gun to a position such that the projectile would hit the target when it got there. The Radiation Laboratory was set up at MIT during World War II to develop such radars, one of which was the SCR-584.Interestingly, one of the major contributors to the control methods developed for this project was none other than Nick Nichols who had earlier worked on tuning PID controllers. When the record of the Rad Lab was written, Nichols was selected to be one of the editors of volume 25 on control.

《自动控制原理与设计》

编辑推荐

《国外计算机科学教材系列:自动控制原理与设计(第6版)(英文版)》阐述了非线性系统的分析与设计，给出了一系列经典控制系统设计实例。全书在阐述自动控制原理和设计方法的过程中，适时地穿插有MATLAB仿真源代码和仿真实验结果。《国外计算机科学教材系列:自动控制原理与设计(第6版)(英文版)》由电子工业出版社出版。

《自动控制原理与设计》

精彩短评

1、超好的一本书。好好保存。
2、全新的！印刷神马的完全木有问题！内容正在啃！好评！
3、书名是谁翻译的？为什么要改编？狗尾续貂！
4、这样好的书，为啥不出原版书，为啥要改编。改编后看不习惯，索引绝对不能改掉
5、比较郁闷的是刚买完就降价20，比较在意的是改编，若不是改编就完美了！不过总体上还是一本不可多得的好书。卖家发货有点慢，快速速度嗷嗷的
6、作为手册书挺适合。
7、讲的很好，配合这翻译，两边能看懂的

《自动控制原理与设计》

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:www.tushu000.com