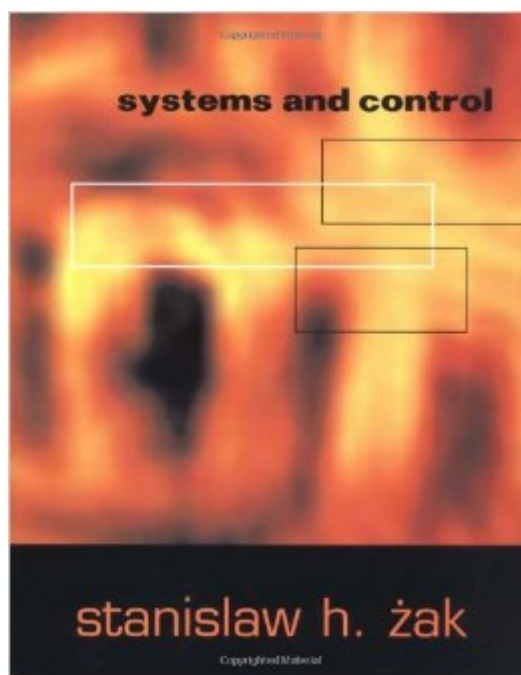# Systems And Control (The Oxford Series In Electrical And Computer Engineering)

Synopsis

Systems and Control presents modeling, analysis, and control of dynamical systems. Introducing students to the basics of dynamical system theory and supplying them with the tools necessary for control system design, it emphasizes design and demonstrates how dynamical system theory fits into practical applications. Classical methods and the techniques of postmodern control engineering are presented in a unified fashion, demonstrating how the current tools of a control engineer can supplement more classical tools. Broad in scope, Systems and Control shows the multidisciplinary role of dynamics and control; presents neural networks, fuzzy systems, and genetic algorithms; and provides a self-contained introduction to chaotic systems. The text employs Lyapunov's stability theory as a unifying medium for different types of dynamical systems, using it--with its variants--to analyze dynamical system models. Specifically, optimal, fuzzy, sliding mode, and chaotic controllers are all constructed with the aid of the Lyapunov method and its extensions. In addition, a class of neural networks is also analyzed using Lyapunov's method. Ideal for advanced undergraduate and beginning graduate courses in systems and control, this text can also be used for introductory courses in nonlinear systems and modern automatic control. It requires working knowledge of basic differential equations and elements of linear algebra; a review of the necessary mathematical techniques and terminology is provided.

Book Information

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Customer Reviews

The important link between modeling and control of dynamical systems is once more emphasized in "Systems & Control" by Stanislaw H. Zak. The book is an excellent addition to the control literature as it revisits the mathematical modeling and analysis problems of dynamical systems while addressing the controller design problem by means of a variety of modern techniques.Chapter 1 introduces the notion of a system and includes numerous examples illustrating the mathematical modeling of dynamical systems by ordinary differential equations. Chapter 2 is devoted to the analysis and approximate solution techniques of the model equations using phase-portraits, numerical methods, linearization and describing functions. Chapter 3 discusses the linear systems and serves as a warm-up for the nonlinear control methods to be addressed in the subsequentchapters. Chapter 4 presents a thorough stability analysis as well as the essentials of the Lyapunov theory for both linear and nonlinear systems. With a section on the stabilizing state-feedback controllers, the reader also gets acquainted with the controller design based on the Lyapunov theory. Chapter 5 is dedicated to the optimal control of the dynamical systems. Especially, the section titled "A Glimpse at the Calculus of Variations" is very helpful in the sense that it equips the reader with the necessary tools required for the rest of the chapter. Variable structure systems are discussed and the design of sliding mode controllers is illustrated in Chapter 6. In Chapter 7, a combined controller-estimator compensator is designed for a class of dynamical systems using Lie derivatives and the vector field methods.

Systems and Control (The Oxford Series in Electrical and Computer Engineering) Error-Control Coding for Computer Systems (Prentice Hall series in computer engineering) Elements of Electromagnetics (The Oxford Series in Electrical and Computer Engineering) A PROLOG Database System (Electronic & Electrical Engineering Research Studies. Computer Engineering Series ; 3) Structure and Interpretation of Computer Programs - 2nd Edition (MIT Electrical Engineering and Computer Science) Show Networks and Control Systems: Formerly "Control Systems for Live Entertainment" Lean for Systems Engineering with Lean Enablers for Systems Engineering Voice and Speech Processing (Mcgraw Hill Series in Electrical and Computer Engineering) Elements of Power System Analysis (Mcgraw Hill Series in Electrical and Computer Engineering) Optimal Control Theory: An Introduction (Dover Books on Electrical Engineering) Transformer and Inductor Design Handbook, Fourth Edition (Electrical and Computer Engineering) Study Guide for Fundamentals of Engineering (FE) Electrical and Computer CBT Exam: Practice over 400 solved problems based on NCEES® FE CBT Specification Version 9.4 Mechanical and Electrical Systems in Architecture, Engineering and Construction (5th Edition) DEWALT Electrical

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