results, the relevant analysis and physical meanings about the analytical results. Each chapter begins with an introduction to the main ideas to be presented and the relationships with the former chapters, imposed with examples to illustrate the design procedures. Each chapter ends with a concise summary of the major points and bibliographical references summarizing related results in the literature, which could be particularly beneficial to the beginners in the field. Several examples are given in every chapter. So it may be used also by undergraduate students who are looking for a general introduction to different areas of fault-tolerant systems and coding approaches to combinational or dynamic system. It seems even adequate for engineers and researchers. However, I would like to complain about the lack of practical applications and real examples, that are usually a valid help for understanding or for clarifying the discussed matters. On the other hand, as usual in some cases, another advantage of the book consists of assembling information on different aspects of fault-tolerance and coding approaches to a combinational or dynamic system. However, such an approach seems inevitably to lead to negligence of details, forcing the author to present only the most representative or the most important methods and problems. Therefore, the reader cannot expect this book to be an exhaustive source of knowledge. People wishing to explore more details about the addressed topics will need other books, while this book is a valuable introduction to advanced topics and undoubtedly can attract students to the subject. Finally, it should be noted that nevertheless this book cannot be the first one to introduce the topic to the reader. The reader is assumed to have at least some knowledge of combinational and fault-tolerant systems even on a basic level and be familiar with the concepts of fault-tolerant dynamic systems, hardware redundant implementation, coding techniques for fault diagnosis, etc.

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Fuzzy control
K. M. Passino and S. Yurkovich; 1998 Addison Wesley Longman, Inc., ISBN 0-201-18074-X

This book appeared in the Addison Wesley Longman's classic series on Control Engineering (see, e.g., Åstrom & Wittenmark, 1995; Dorf & Bishop, 2001; Franklin, Powell, & Emami-Naeini, 2002; Franklin, Powell, & Workman, 1998; Maciejowski, 1991, now belongs to Prentice-Hall). This series has had a major impact on controls education in general. The book by Passino and Yurkovich provides an excellent addition to the Control Engineering series and this book has become a classic text in Fuzzy Control. The book is currently out of print and interested readers can download a copy of the book from http://eewww.eng.ohio-state.edu/~passino/FCbook.pdf.

For many years, there was not any good textbook available on Fuzzy Control. The book by Passino and Yurkovich was published in 1998. Since then, it has become a textbook that has rare company in the market. Even though, several books on similar subject have been published (Driankov, Hellendoorn, & Reinfrank, 1993; Piegat, 2001; Wang, 1997), none of them comes close to what is offered by the present book.

The book is divided into three parts incorporating eight chapters.

The first part of the book consists of Chapters 1–4. The first part of the book covers the basics of direct fuzzy control that concerns non-adaptive fuzzy control. Chapter 1 presents an overview of general methodology for conventional control system design and summarizes the fuzzy control system design process. It also compares the two methodologies. Chapter 2 introduces direct fuzzy control and a general mathematical characterization of fuzzy systems, and then studies their fundamental properties. Chapter 3 provides several case studies to show how to design, simulate, and implement a variety of fuzzy control systems. In particular, the authors make effective use of comparative analysis with conventional approaches. Chapter 4 gives detailed study about nonlinear analysis of non-adaptive fuzzy control systems and presents several techniques on how to solve some fundamental problems that the reader can encounter in the design of fuzzy control systems. This chapter shows how to perform stability analysis of fuzzy control systems using Lyapunov methods or frequency domain-based stability criteria, and then deals with the analysis of tracking error and the theory of describing functions for fuzzy control systems.

The second part of the book is concerned with adaptive fuzzy systems for estimation, identification and control. It consists of three chapters (Chapters 5–7). Chapter 5 provides an introduction to several techniques on how to construct fuzzy systems using numerical data. The chapter gives

how to form rules for fuzzy systems from data pairs and provides details about how to train fuzzy systems from input–output data with least squares, gradient, and clustering methods. Moreover, hybrid approaches that involve a combination of two or more methods are discussed in Chapter 5. Chapter 6 covers several adaptive fuzzy control methods. First, this chapter introduces the fuzzy model reference-learning controller (FMRLC) and provides several guidelines for how to design it. Next, the chapter shows how dynamically focused learning can be used for the FMRLC. Finally, the chapter introduces indirect adaptive fuzzy control. Upon completing this chapter, the reader will be able to design a variety of adaptive fuzzy controllers for practical applications. Chapter 7 presents methods for fuzzy supervisory control. The chapter is basically divided into two parts. In the first half, it shows how to supervise conventional controllers, including PID controllers, and explains how fuzzy systems are useful for gain scheduling. The second half of the chapter shows how to supervise both direct fuzzy controllers and adaptive fuzzy controllers, and provides case studies on the design and implementation of fuzzy supervisory control.

The final part of the book, Chapter 8, summarizes the relationship between fuzzy control and intelligent control. In particular, the chapter highlights neural networks, genetic algorithms, knowledge-based control (expert systems and planning systems), and hierarchical intelligent autonomous control.

One of the best features of the book is that, numerous examples and case studies on the design and implementation of fuzzy control are used throughout the book. These examples and case studies on design and implementation are well organized and studied. The reader can easily understand the analysis and design methods that are central in this book. Each chapter is followed by a list of exercise and/or design problems which will help the reader to digest the material. Furthermore, the design problems at the end of each chapter are sometimes used to introduce new topics.

Some additional benefits to the book are various version of C and Matlab codes for simulation of fuzzy control systems, adaptive fuzzy identification and estimation methods, and adaptive fuzzy control systems (e.g., for some examples and homework problems in the book). They are provided on a web site from the author, http://eewww.eng.ohio-state.edu/∼passino/FCcode.txt.

The book reads very well. The main ideas and final results are presented clearly and are appropriately emphasized so that they can be easily grasped and appreciated. The book is particularly suitable as a text for graduate or advanced undergraduate courses. It is also good for self-study by practicing engineers who have some control background. In addition, the book can be treated as a handbook for practicing engineers and scientists working in the field of fuzzy control. The design, simulation and implementation case studies in the book will provide very good insight into how to construct fuzzy controllers for specific applications. It is a helpful guide for everyone engaged in research or applications of fuzzy control.

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