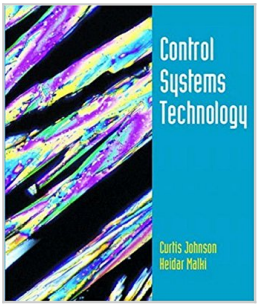

Control Systems Technology

By Curtis D. Johnson, Heidar Malki

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This book presents All of the major topics in modern analog and digital control systems, along with the practical, applications oriented knowledge and skills needed by technicians. It contains user-friendly conceptual explanations and clearly written mathematical developments. Examples of both Mathcad and MATLAB illustrate computer problem solving—but this book emphasizes the ability to use *any* suitable software to achieve successful results in solving problems and performing design. Chapter topics include Measurement; Laplace Transforms; Control System Models; Static and Dynamic Response; Stability; Frequency Response Analysis; Root Locus; State Variable Analysis; Introduction to Discrete Control Systems; Z-Transforms and Discrete State-Space Analysis; Digital Signal Representations; Discrete Time Control Systems; Stability of Discrete Control Systems; and Advanced Topics in Control Systems. For engineers and technicians working for companies that integrate control systems with the use of programmable logic controllers.

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Editorial Review

From the Back Cover

Control Systems Technology is a comprehensive text focused on the knowledge required by practitioners to both understand and evaluate an existing control system. The text also enables readers to devise and design new control system applications.

The text presents classical and digital control systems, emphasizing careful explanations of the concepts. Multiple examples and solutions illustrate the concepts and the operations required to solve problems. The use of computers to implement practical solutions to problems is also emphasized throughout the book.

Topics covered include:

- *Introduction to Control Systems*
- *Laplace Transforms*
- *Constrol System Models*
- *Frequency Response Analysis*
- *State Space Analysis*
- *Introduction to Digital Control Systems*
- *Discrete Control Systems*

Each chapter starts with an introductory section that explains the purpose of that chapter. There is also a summary that contains important points presented within the chapter. A set of review questions reinforces learning. Appendices on complex numbers and matrices will prove to be helpful and informative to readers, and solutions to select odd-numbered problems help readers assure themselves that they have a firm grasp on the subject matter.

This text was written to fill a very important educational niche in the broad spectrum of control systems knowledge. That niche lies between the hands-on electromechanical knowledge and skills needed by technicians and the highly abstract and theoretical knowledge required by scholars who research and develop new control strategies. This book focuses on the knowledge required by control systems practitioners to enable them to both understand and evaluate an existing control system and devise and design new control system applications.

The text presents classical and digital control systems with an emphasis on careful explanations of the concepts. Many examples illustrate key topics and the operations required to solve problems.

The text is an outgrowth of many years of teaching control systems to students in an engineering technology program. It is written for a two-semester course, nominally separated into analog and digital control. The difficulty with this approach is that much of digital control is a spinoff of analog concepts. Therefore, the analog material by itself is more extensive than the digital. In practice, we have found that some of the material on analog control must be delayed to the second course.

Although patterned after the course sequence expected for a particular educational program, this text can be

adapted to other approaches. For example, Chapter 2 (*Measurement*) can be omitted by those who prefer to cover sensors and measurement in other courses. Likewise, if Laplace transforms are covered in an independent course, that section in Chapter 3 can be omitted or assigned as review. It would be important to include, however, the last section of Chapter 3, *Analog Simulation.*

The text emphasizes an *understanding* of control system concepts, but also requires the use of computers to implement practical solutions to problems. There are a number of control and mathematical software packages which are of great value in the study of control systems. Throughout the text; the use of these packages to facilitate solving problems is emphasized, and Mathcad or MATLAB is used to illustrate computer-based mathematical procedures. An attempt has been made to emphasize the use of computers as a tool to implement the mathematical and graphical operations required to solve a problem.

A Web page (**www.uh.edu/~techl3v/ContSysTech**) will be set up for this text as a means for communication between users and authors, and also for sharing ideas and techniques related to teaching control systems. A solutions manual (ISBN: 0-13-090661-1) is available. It contains examples of physical and simulation experiments that can be conducted to enhance learning.

Dr. Malki would like to thank his parents, his wife Layla, and his son Armeen for their support and patience during the long task of writing this book. Dr. Johnson would like to thank his wife Helene and his mother-in-law Lois for their continuing kindness while he undertook this task.

Users Review

From reader reviews:

Nathan Jackson:

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Johnny Cahill:

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