DESCRIPTION

The new 4th edition of Seborg’s *Process Dynamics Control* provides full topical coverage for process control courses in the chemical engineering curriculum, emphasizing how process control and its related fields of process modeling and optimization are essential to the development of high-value products. A principal objective of this new edition is to describe modern techniques for control processes, with an emphasis on complex systems necessary to the development, design, and operation of modern processing plants. Control process instructors can cover the basic material while also having the flexibility to include advanced topics.

ABOUT THE AUTHOR

*Dale E. Seborg* is a Professor and Vice Chair of the Department of Chemical Engineering at the University of California, Santa Barbara. He received his B.S. degree from the University of Wisconsin and his Ph.D. degree from Princeton University. Dr. Seborg has published over 200 articles and co-edited three books on process control and related topics. Dr. Seborg has served on the Editorial Advisor Boards for control engineering journals and book series, and has been a co-organizer of several major conferences. He is an active industrial consultant who serves as an expert witness in legal proceedings.
Thomas F. Edgar holds the Abell Chair in chemical engineering at the University of Texas at Austin. He earned a B.S. degree in chemical engineering from the University of Kansas and a Ph.D. from Princeton University. He has published over 300 papers in the field of process control, optimization, and mathematical modeling of processes such as separations, combustion, and microelectronics processing. Dr. Edgar was president of AIChE in 1997 and President of the American Automatic Control Council in 1989–91.

Duncan A. Mellichamp is professor Emeritus and founding member of the faculty of the chemical engineering department at the University of California, Santa Barbara. He is editor of an early book on data acquisition and control computing and has published more than one hundred papers on process modeling, large scale/plantwide systems analysis, and computer control. He earned a B.S. degree from Georgia Tech and a Ph.D. from Purdue University with intermediate studies at the Technische Universität Stuttgart (Germany). He presently serves on the governing boards of several nonprofit organizations.

Francis J. Doyle III is the Associate Dean for Research in the College of Engineering at the University of California, Santa Barbara. He holds the Duncan and Suzanne Mellichamp Chair in Process Control in the Department of Chemical Engineering, as well as appointments in the Electrical Engineering Department, and the Biomolecular Science and Engineering Program. He received his B.S.E. from Princeton, C.P.G.S. from Cambridge, and Ph.D. from Caltech, all in Chemical Engineering. He is a Fellow of IEEE, IFAC, and AIMBE; he is also the recipient of multiple research awards (including the AIChE Computing in Chemical Engineering Award) as well as teaching awards (including the ASEE Ray Fahien Award).

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NEW TO EDITION

• General revisions for the fourth edition include reducing the emphasis on lengthy theoretical derivations and increasing the emphasis on analysis using widely available software: MATLAB®, Simulink® and Mathematica.
• Material on major topics including control system design, instrumentation, and troubleshooting has been significantly revised to reflect new developments.

• References at the end of each chapter have been updated and new exercises have been added.

Resources and Support

**Instructor Resources**

Solutions manual

Lecture slides

Figures from the book

Links to the authors’ web sites

Errata for current and previous editions

Additional Appendices:

• Appendix G: Introduction to Plantwide Control

• Appendix H: Plantwide Control System Design

• Appendix I: Dynamic Models and Parameters Used for Plantwide Control Chapters

• Appendix J: Additional Closed-Loop Frequency Response Material (Second edition, Chapter 14)

• Appendix K: Contour Mapping and the Principle of the Argument

• Appendix L: Partial Fraction Expansions for Repeated and Complex Roots

**Student Resources**

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**FEATURES**

• Presentation provides a balance of theory and practice, emphasize dynamic behavior, physical and empirical modeling, computer simulation, measurement and control technology, fundamental control concepts, and advanced control strategies.

• Material is divided into reasonably short chapters to make it more readable and modular. This organization allows some chapters to be omitted without a loss of continuity.

• The mathematical level of the book is oriented toward a junior or senior student in chemical engineering who has taken at least one course in differential equations.

• Additional mathematical tools required for the analysis of control systems are introduced as needed. The authors emphasize process control techniques that are used in practice and provide detailed mathematical analysis only when it is essential for understanding the material.

• Key theoretical concepts are illustrated with numerous examples, exercises, and simulations.

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