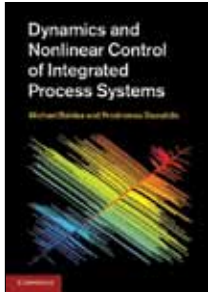




DYNAMICS AND NONLINEAR CONTROL OF INTEGRATED PROCESS SYSTEMS



Michael Baldea and Proromos Daoutidis, Cambridge Univ. Press, New York, NY, \$125, 272 pages, Sept. 2012, ISBN: 978-0-521191-70-8

The chemical process industry's need to reduce utility costs and energy consumption, and to improve raw material use, has led to increasingly integrated process designs that make extensive use of material recycling and energy recovery.

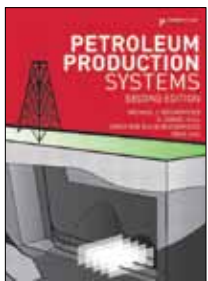
The cost reductions associated with process integration, however, bring new operational and control challenges.

This volume provides an approach for the effective control of integrated process systems, documenting the dynamic behavior that emerges at the plant level when tight integration through material recycling and energy recovery is employed.

After an examination of process systems with large material recycle and/or small purge streams, as well as systems with energy integration, the book presents step-by-step model-reduction procedures to derive nonlinear reduced models of the dynamics at various time scales. Hierarchical control architectures are proposed for each class of process systems. Case studies illustrate the application of the methods and their potential to improve process operations, and MATLAB codes are provided to further encourage the rapid deployment of practical applications.

The book should be useful to practitioners and researchers involved in dynamics and control, and as a reference for students of process systems engineering or process control.

PETROLEUM PRODUCTION SYSTEMS, 2ND EDITION



Michael J. Economides, A. Daniel Hill, Christine Ehlig-Economides, and Ding Zhu, Prentice Hall, Upper Saddle River, NJ, \$150, 752 pages, Oct. 2012, ISBN: 978-0-137031-58-0

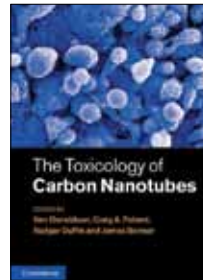
Since the first edition of this book appeared in 1994, many advances have occurred in the practice of petroleum production engineering. This extensively revised second edition reflects the field's latest innovations, and offers a comprehensive introduction to modern petroleum-production systems development and operation, taking into account the combined behaviors of reservoirs, surface equipment, pipeline systems, and storage facilities.

Readers will learn how to optimize these systems for diverse production schedules using queuing theory, linear programming, and dynamic programming. This edition features new coverage of hydraulic fracturing, new sand- and water-

management techniques, new chapters on production analysis and the "emerging oilfield," updated coverage of environmental issues, and more. Hundreds of new illustrations are included, plus an entirely new set of examples and problems.

For senior undergraduates and graduate students, as well as nonpetroleum engineers, the book should provide a useful introduction to the fundamentals of petroleum production.

THE TOXICOLOGY OF CARBON NANOTUBES



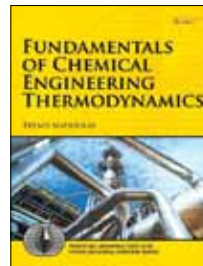
Ken Donaldson, Craig Poland, Roger Duffin, and James Bonner, Eds., Cambridge Univ. Press, New York, NY, \$140, 264 pages, June 2012, ISBN: 978-1-107008-37-3

The increasing use of nanomaterials in scientific and engineering research, and their incorporation into manufactured products, have prompted an assessment

of the risks and hazards associated with exposure to these substances. The field of nanotoxicology studies the toxic nature of nanomaterials such as carbon nanotubes.

This book examines various aspects of carbon nanotubes, from their manufacture and aerodynamic behavior to their effects at the molecular level in the lungs. The authors provide state-of-the-science information on how and why carbon nanotubes are potentially dangerous if inhaled, and elaborate on their similarities to asbestos. As such, the book should be instructive to scientists and organizations involved with research in this area, as well as to regulators and risk assessors.

FUNDAMENTALS OF CHEMICAL ENGINEERING THERMODYNAMICS WITH APPLICATIONS TO CHEMICAL PROCESSES



Themis Matsoukas, Prentice Hall, Upper Saddle River, NJ, \$130, 720 pages, Oct. 2012, ISBN: 978-0-132693-06-6

This text offers an introduction to thermodynamics theory and calculations for chemical engineering students.

The author employs extensive imagery

to help students conceptualize equations, and illustrates thermodynamics concepts with some 200 examples from within and beyond chemical engineering. After introducing the laws of thermodynamics with applications to pure fluids, the book extends thermodynamics to mixtures, emphasizing phase and chemical equilibrium. Throughout, the author links thermodynamics to other key areas of chemical engineering, including separations, reactions, and capstone design. More than 300 end-of-chapter problems are included, ranging from basic calculations to realistic environmental applications.