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OPTIMIZATION: THEORY AND PRACTICE

GORDON S. G. BEVERIDGE, Heriot-Watt University, Edinburgh and ROBERT S. SCHECHTER, University of Texas. *McGraw-Hill Series in Chemical Engineering.* 704 pages, $18.50

Utilizing techniques from all facets of mathematical optimization, this book demonstrates the interrelationships among methods, their range of applicability, and their comparative effectiveness. Part I explores the ways that appropriate information can be assembled to effect the optimization of any system. Part II considers and discusses functions and search regions, and the analytical and numerical approaches to the optimization of one-dimensional, multi-dimensional, and infinitely dimensional functions. Part III examines the difficulties that arise when the aforementioned techniques are applied to practical systems.

COST AND OPTIMIZATION ENGINEERING

Edited by F. C. JELEN, Lamar State College of Technology. 512 pages (tent.), $13.50 (tent.). Available Summer, 1970

Sponsored by the American Association of Cost Engineers to encourage the study of cost and optimization problems, this book covers the general areas of cost engineering, engineering economy, and optimization techniques. Specific topics included are: cost comparisons, profitability, discrete and continuous interest, taxes, technological advancement, inflation, cost control, the learning curve, etc. Seventeen authors representing nine from industry and eight from education give the book a wide perspective. In addition to over 100 worked-out examples, the book also contains extensive tables of discrete and continuous compound interest factors.

OPTIMIZATION BY VARIATIONAL METHODS

MORTON M. DENN, University of Delaware. 448 pages, $16.50

In order to present a comprehensive examination of optimal process design and control, the author has simultaneously developed both analytical and computational considerations and then united them with detailed practical applications. The text utilizes the "variational" approach, incorporating traditional differential calculus procedures and associated computational techniques; classical calculus of variations; Pontryagin-type "minimum principles" and related computational methods; and dynamic programming. Many of the examples cited are examined at various levels of sophistication and solved by several different procedures.

THERMODYNAMICS AND STATISTICAL MECHANICS

LAWRENCE M. GROSSMAN, University of California, Berkeley. 384 pages, $13.50

Intended for either the intermediate or advanced student, this book treats both classical thermodynamics and statistical mechanics from a unified viewpoint, i.e., the predication of the equilibrium properties of bulk matter. Thorough treatments are accorded: "natural" sets of thermodynamic variables and generating functions; the notion of statistical ensembles and the criteria governing the choice of representative ensembles; and the relations among microcanonical, canonical, and grand-canonical ensembles and their physical interpretation.

CHEMICAL ENGINEERING KINETICS, Second Edition

J. M. SMITH, University of California, Davis. 544 pages (tent.), $15.50 (tent.). Available Spring, 1970

With the general purpose of acquainting students with the tools necessary to design new chemical reactors and predict the performance of existing ones, this book develops principles of kinetics and reactor design and then applies them to actual chemical reactors. Emphasis is placed on real reactions using experimental rather than hypothetical data. Special features include, among others, a new chapter (12) on the demonstration of what kinds of reactors are used in the laboratory for research and development purposes, and the rewriting of Chapters 10 and 11 to include recent advances in the handling of external and internal transport processes for heterogeneous catalytic reactions.

PRINCIPLES OF POLYMERIZATION

GEORGE ODIAN, Richmond College, The City University of New York. 672 pages, $18.50. Available April

Written at the advanced undergraduate and graduate level, this book is concerned with the physical and organic chemistry of the reactions by which polymer molecules are synthesized. All types of polymerization reactions—step, chain, and ring-opening—are characterized as to their kinetic and thermodynamic features, their scope and utility for the synthesis of different types of polymer structures, and the process conditions which can be used to carry them out. Emphasis is placed on understanding the reaction parameters which are important in controlling polymerization, polymer molecular weight, and structural features such as branching.

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WILLIAM E. RANZ, University of Minnesota. 256 pages, $9.95

With the intention of demonstrating how physical and mathematical models are built, this participation textbook discusses states and actions of physical and chemical systems; shows the detailed development of material and energy balances; and includes interactions of simple connected systems as they are applied to chemical engineering. This workbook is based on the premise that a student learns by doing—therefore, numerous questions and worked-out examples dominate the text.

PRINCIPLES OF POLYMER SYSTEMS

FERDINAND RODRIGUEZ, Cornell University. 432 pages (tent.), $16.50 (tent.), Available Spring, 1970

Providing information on all important phases of polymers, this text enables the student to describe polymers quantitatively and manipulate quantitative data to predict and correlate the behavior of real polymer systems. This is accomplished by: (1) relating, wherever feasible, the qualitative behavior of polymer systems to everyday examples, and (2) including numerous problems that give the student experience in the quantitative behavior of these systems.

ONE-DIMENSIONAL TWO-PHASE FLOW

GRAHAM B. WALLIS, Dartmouth College. 416 pages, $16.50

Intended as a text for senior/graduate level courses in advanced fluid mechanics, and as a reference for engineers and researchers, this book fulfills three major functions: (1) it serves as a basic introductory book in the field; (2) presents basic principles, methods, nomenclature, and kinematic descriptions; and (3) coordinates the various disciplines (e.g., mechanical, aero-chemical) which make use of similar techniques. This is the first book that treats flows of solid-liquid, liquid-gas, and gas-solid mixtures in ducts, channels, and nozzles in any detail and with such a broad range of practical applications.

DISCONTINUOUS AND OPTIMAL CONTROL

IRMGARD FLÜGGE-LOTZ, Stanford University. *McGraw-Hill Series in Modern Applied Mathematics.* 256 pages, $16.50

This book uses second-order systems to acquaint the prospective engineer with the basic phenom-ena of discontinuously controlled systems and with higher-order systems. The material is of particular interest to students who, in future work, may want to use the rugged relay element in their design work.

DISTILLATION

MATTHEW VAN WINKLE, University of Texas. *McGraw-Hill Series in Chemical Engineering.* 704 pages, $16.50

A guide to distillation process design, this text includes all the information necessary to make a complete distillation column process design without reference to other sources, except for basic data on the compounds in the distilling system. The material, presented in logical sequence, covers the principal subjects of vapor-liquid equilibrium, evaluation of equilibrium stages, azeotropic and extractive distillation, and plate and column design methods.

GAS - LIQUID REACTIONS

P. V. DANCKWERTS, University of Cambridge. 256 pages (tent.), $11.50 (tent.). Available Spring, 1970

This book summarizes all that is known of gas-liquid reactions to date. It concentrates on the effects of reactions on the rate of absorption of gases into liquids, and the dimensions of industrial and laboratory equipment needed for carrying out this process. The reader will find the scientific basis of the subject clearly set out and rigorously developed, and the methods of practical calculation presented and illustrated by numerical examples. Many pertinent references are made to relevant publications and to the literature in general.

PROGRAMMED THERMODYNAMICS

Volume I: 272 pages, $5.95
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These programmed-learning volumes cover the material ordinarily presented in a first course in classical thermodynamics. Volume I is devoted to the first law of thermodynamics; Volume II to the second law. Since they are entirely self-contained, they can be used as core texts or as supplements. Throughout, emphasis is placed on the gradual analysis of problems and processes, and the translation among graphical, verbal, and mathematical statements. Because of the programmed nature of the approach, each section of material is followed by a self-quiz

and a summary which lists the student perform-
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JACK P. HOLMAN, Southern Methodist Univer-
sity. 432 pages, $11.50
This revision of a standard text for undergradu-
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conduction shape factors, an analytical model
for liquid metal heat transfer, and many other
topics.

PLANT DESIGN AND ECONOMICS FOR CHEMICAL ENGINEERS, Second Edition

MAX S. PETERS and KLAUS D. TIMMER-
HAUS, both of the University of Colorado. Mc-
Graw-Hill Series in Chemical Engineering. 704
pages, $16.50
The first part of the text presents an overall
analysis of the major factors involved in process
design with emphasis on economics in the proc-
ess industries and in design work. Costs involved
in industrial processes, capital investments and
investment returns, cost estimation, cost account-
ing, optimum economic design methods, and
other relevant subjects are covered both quan-
titatively. The remainder of the book discusses
methods and important elements in the design of
plants and equipment fabrication.

THERMODYNAMICS, Second Edition

WILLIAM C. REYNOLDS, Stanford University.
496 pages, $11.50
The basic macroscopic principles of thermody-
namics are developed in this fundamental text
with insight obtained by consideration of the
microscopic aspects of matter. Throughout, the
author uses the basic conceptual ideas of statisti-
cal thermodynamics rather than its details. Dis-
order, randomness, and uncertainty notations are
used in conjunction with the Gibb's definition of
entropy to provide an intuitive basis for the
second law postulate.

BOUNDARY-LAYER THEORY, Sixth Edition

HERMANN SCHLICHTING, U n i v e r s i t y of
Braunschweig, Germany. Translated by J.
KESTIN, Brown University. McGraw-Hill Series
in Mechanical Engineering. 768 pages, $18.50
Starting from first principles (the Navier-
Stokes equations), this newly revised classic de-
velops the subject to the frontiers of present-day
knowledge. A clear physical picture is presented

together with an exposition of the mathematical
techniques involved. The sections on laminar
boundary layers have been extended with empha-
sis on axial, symmetrical, and three-dimensional
boundary layers as well as non-steady boundary
layers. In addition, the materials dealing with
thermal boundary layers and with compressible
boundary layers have been expanded.

MASS TRANSFER OPERATIONS, Second Edition

ROBERT E. TREYBAL, New York University.
McGraw-Hill Series in Chemical Engineering.
736 pages, $16.50
The basic approach, which treats the major
subjects in categories of gas-liquid, liquid-liquid,
and fluid-solid contact, has been retained in this
edition as has been the application of modern
theories and data to the practical design of
equipment. This edition features the inclusion
of material on multi-component gas absorption
and distillation.

UNDERSTANDING THERMODYNAMICS

H. C. VAN NESS, Rensselaer Polytechnic Insti-
tute. 128 pages, $4.95
In this short book, the author has presented
the basic concepts of thermodynamics in a way
that demonstrates their usefulness and plausibil-
ity. The book is not intended to supplant a text-
book in thermodynamics, but rather is a supple-
ment that will help the reader with the difficult
ideas that he must grasp as a beginning student
of thermodynamics. The language is informal;
the treatment clear.

LABORATORY PREPARATION FOR MACROMOLECULAR CHEMISTRY

EDWARD L. McCAFFERY, Lowell Technologi-
cal Institute. 416 pages (tent.), $12.00 (tent.).
Available Spring, 1970
This is the first book which provides a complete
program for a polymer laboratory, incorporating
topics in the organic, physical and analytical
chemistry of macromolecules. It is on a level
which can be used by both undergraduate and
graduate students without their first being given
extensive preparatory material. The author has
provided both an elaborate theoretical introduc-
tion to enable the student to comprehend the
principles involved in the experiment, and a de-
tailed presentation of the experimental instruc-
tions to facilitate the mechanical operations.