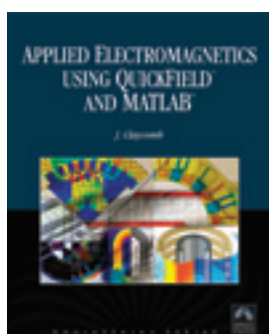
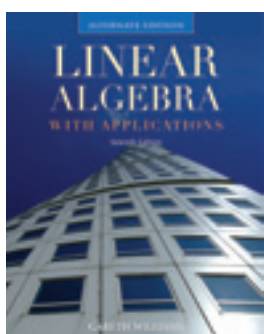
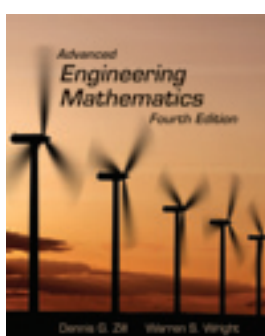
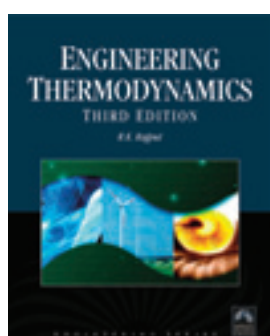
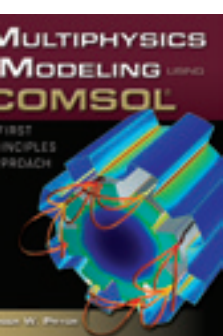


ENGINEERING

ACADEMIC CATALOG **SPRING 2010**



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 CW = Companion Website
 CD = CD-ROM
 WA = WebAssign

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 DVD = Digital Video Disk
 SG = Study Guide

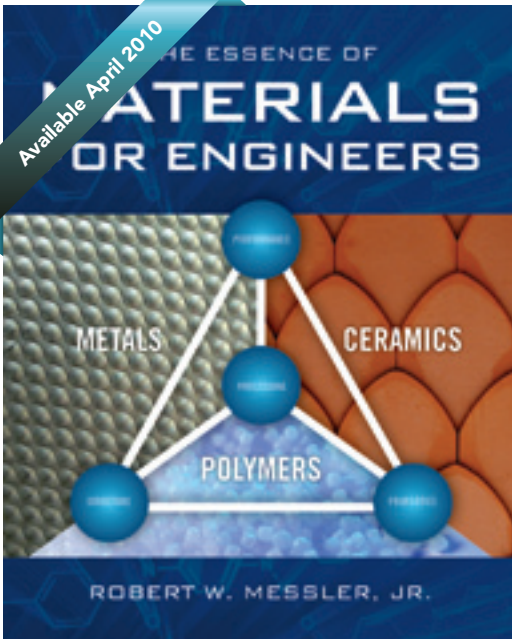
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The Essence of Materials for Engineers

Robert W. Messler, Jr., PhD,
Rensselaer Polytechnic Institute

This text is designed for the introductory, one semester course in materials or as a reference for professional engineers. It provides an overview of the structure of materials and the relationship to their properties. Modern advances in polymers, ceramics, crystals, composites, semiconductors, and more are discussed with an emphasis on applications in industry.



Key Features

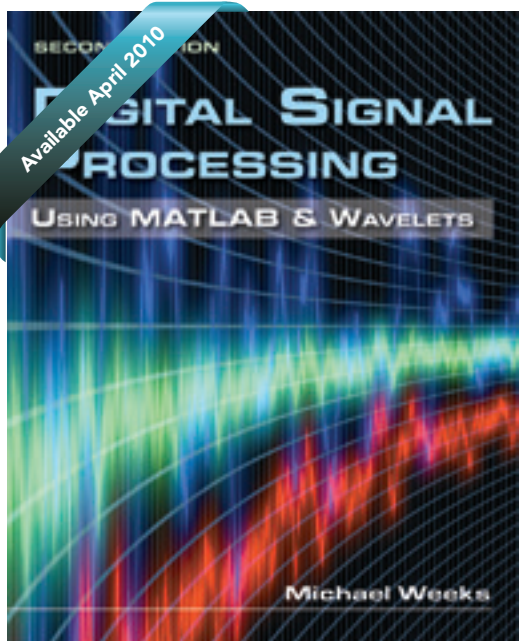
- Stresses the use of materials in practical applications and subsequently provides the importance of learning properties of materials to understand how they will be used in industry
- Relates materials science to the chemistry, physics, and mathematics that students are taking concurrently in their coursework
- Covers modern advances in polymers, ceramics, crystals, composites, semiconductors, and more
- Content is organized into parts and each chapter concludes with a summary to ensure the student understands key concepts
- Accompanying CD-ROM includes interactive computer simulations, code, and “explorations”

Table of Contents

1. Materials: Building Blocks for Engineers. 2. The Periodic Table of Elements: The Key to Understanding Atomic Bonding and Types of Materials. 3. Aggregation of Atoms: The Basis for Solid Materials. 4. Imperfections in Solid Crystalline Materials: Nature’s Better Alternative Than Perfection. 5. Amorphous and Semi-crystalline Materials. 6. Material Properties: The Response of a Solid Material’s Structure to a Stimulus. 7. Mechanical Properties of Solids: A Material’s Response to Loads or Forces. 8. Deformation vs. Fracture: Different Mechanical Responses to Stresses. 9. Electrical Properties of Solids: A Material’s Response to an Electromagnetic Field. 10. Thermal Properties of Solids: A Material’s Response to Heat. 11. Using Processing to Improve the Mechanical Properties of Solids: Strengthening and Toughening Materials. 12. Alloy Phase Diagrams: Maps of Structure as Functions of Composition and Temperature. 13. Heat Induced Transformations in Materials: Improving Properties by Controlled Solidification, Diffusion, or Heat Treatment. 14. Strain Induced Transformations in Materials: Improving Properties by Controlled Deformation. 15. Composite Materials: Another Level of the Structure-Property-Process-Performance Relationship. 16. Environmental Degradation of Materials: A Cost to Society. 17. The Evolution of Materials: Solving Problems and Embarking on New Frontiers.

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⊕ Instructor Resources: PP ⊕ Student Resources: CD



Digital Signal Processing Using MATLAB® and Wavelets

Second Edition

Michael Weeks, PhD,
Georgia State University

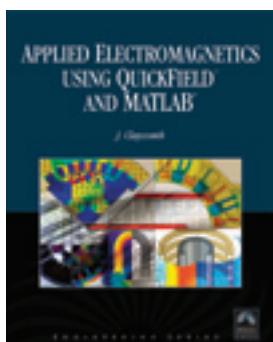
Designed for engineering and computer science students as well as practicing engineers and scientists, this text emphasizes the practical applications of signal processing. Over 100 MATLAB examples and wavelet techniques provide the latest applications of DSP, including image processing, games, filters, transforms, networking, parallel processing, and sound. The book also provides the mathematical processes and techniques needed to ensure an understanding of DSP theory. Beginning with an introduction to MATLAB programming, it moves through filters, sinusoids, sampling, the Fourier transform, the z-transform and other key topics.

Key Features

- Covers modern applications such as bioinformatics, the MP3 audio format, and MPEG-based cable/satellite television
- Includes a NEW chapter on the continuous wavelet transform
- Includes program examples (MATLAB) that are short, easy to understand, and do not depend on earlier code
- Covers formulas in terms of function calls of unambiguous order and meaning; the reader does not need extensive math and programming experience
- Two chapters are devoted to the wavelet transform, a cutting-edge technology!
- Companion CD-ROM has MATLAB projects for each chapter with over 100 MATLAB examples, figures from the book and all the m-files

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Applied Electromagnetics Using Quickfield™ and MATLAB®

J.R. Claycomb, PhD, Houston Baptist University

Intended as a textbook for electromagnetics or a reference for practicing engineers, this book uses the computer software packages QuickField and MATLAB for visualizing electric and magnetic fields, and for calculating their resulting forces, charge, and current distributions. The concepts of electromagnetism “come alive” as the readers model real world problems and experiment with currents in biological tissue under electrical stimulation, for superconducting magnetic shielding, Monte Carlo methods, etc. The accompanying CD includes a fully functional student version of QuickField (widely used in industry), as well as numerous demonstrations and simulations with MATLAB.

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Mechatronics

G. Hegde, PhD

Mechatronics integrates key systems from mechanical, electrical, electronic, and computer engineering to manufacture industrial products, processes, and operations. Intended as a textbook for courses in mechatronics or as an up-to-date reference for practicing engineers, *Mechatronics* uses extensive in-text, solved examples and computer simulations to cover the basic concepts. This book contains information from both the theoretical and application perspectives related to mechatronic systems.



Key Features

- Provides self-explanatory block diagrams, examples, and numerous illustrations that provide the reader with a self-study text to develop systems with motors, circuits, microprocessors, and controls.
- Contains practical applications such as hydraulics, electric motors, signals and systems, machine tools, circuits, microprocessors, and others.
- Includes a CD-ROM with simulations, applications, and third-party software, etc.

Table of Contents

1. Introduction to Mechatronics
2. Sensors and Transducers
3. Hydraulic Systems
4. Electrical Actuation Systems
5. System Models
6. Elements of Machine Tools
7. Signal Conditioning
8. Microprocessors and Microcontrollers

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Robotics

Appin Knowledge Solutions

This up-to-date text and reference is designed to present the fundamental principles of robotics with a strong emphasis on engineering applications and industrial solutions based on robotic technology. It can be used by practicing engineers and scientists or as a text in standard university courses in robotics. The book has extensive coverage of the major robotic classifications, including Wheeled Mobile Robots, Legged Robots, and the Robotic Manipulator. A central theme is the importance of kinematics to robotic principles. The book is accompanied by a CD-ROM with MATLAB simulations.

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Modern Control Systems

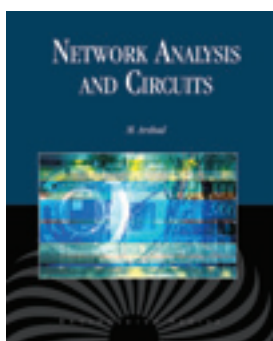
An Introduction

S.M. Tripathi

Designed for a short course on control systems or as a review for the professional engineer, this book provides a lucid introduction to modern control systems topics. The five chapters, “State-Variable Analysis of Continuous-Time Systems,” “Analysis of Discrete-Time Systems,” “Stability Analysis of Non-Linear Systems,” “Optimal Control,” and “Adaptive Control” have been written to emphasize concepts and provide the basic mathematical derivations. Complete coverage of standard topics, such as eigenvalues, eigenvectors, the z-transform, Lyapunov’s Method, controllability, observability, and more are discussed. Numerous examples and exercises have also been included in the book for self-study. A CD-ROM with MATLAB applications and third-party simulations provides practical design techniques and observations of real control systems.

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➤ **Student Resources:** CD



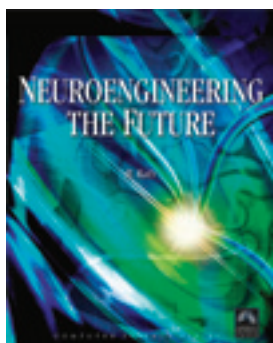
Network Analysis and Circuits

M. Arshad

Intended as a textbook for electronic circuit analysis or a reference for practicing engineers, this book uses a self-study format with hundreds of worked examples to master difficult mathematical topics and circuit design issues. Computer programs using MATLAB on the accompanying CD-ROM provide calculations and executables for visualizing and solving applications from industry. It covers the complex mathematical topics and concepts needed to understand and solve serious circuit problems.

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➤ **Student Resources:** CD



Neuroengineering The Future

Virtual Minds And The Creation Of Immortality

Bruce F. Katz, PhD, Drexel University

This book begins by describing how the brain works, including an overview of the architecture of the brain. It then examines the current state-of-art neural technologies, including devices that read from the brain, and devices that can write information into the brain. The book also describes how insights from the nascent field of consciousness studies show how the full transfer of the “soul” could be realized. Finally, it considers what it would be like to be a mind unbound, and the possibilities beyond those found in ordinary corporeal life.

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Applied and Computational Fluid Mechanics

Scott Post, PhD, Bradley University

Designed for the fluid mechanics course for mechanical engineers or as a reference for professional engineers, this up to date text uses computer algorithms and applications to solve modern problems related to fluid flow, aerodynamics, and thermodynamics. Algorithms for numerical solutions of fluid problems (which can be implemented in programming environments such as MATLAB) will be used throughout the book. Also included is an introduction to Computational Fluid Dynamics, a well-established method in the design of heat transfer and cooling applications. A DVD accompanies the book with source code, MATLAB files, third-party simulations, color figures, and other resources.

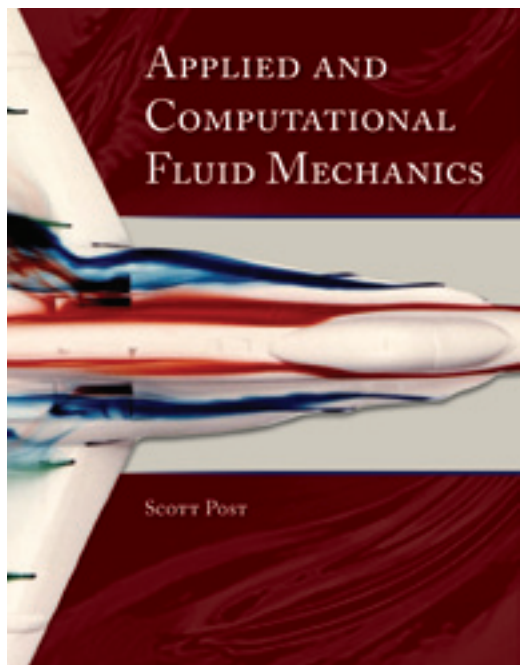


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1. Introduction
2. Fluid Statics
3. Fluid Dynamics
4. Differential Equations of Fluid Motion
5. Internal Flow
6. External Flow
7. Rotating Machinery
8. Additional Applications
9. Fluid Measurement Techniques

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⊕ **Student Resources:** DVD

Key Features

- Covers the basic principles of fluid flows for undergraduate engineering students; a theoretical development of each concept is presented, followed by algorithms, examples and applications
- Includes a DVD with general algorithms, source code, simulations, etc. for fluid problems which can be implemented in programming environments such as MATLAB
- Instructor's Resource Disc and Web site with solutions, additional code, simulations, PowerPoint slides, and a list of suggested projects and experiments are available upon adoption as a textbook



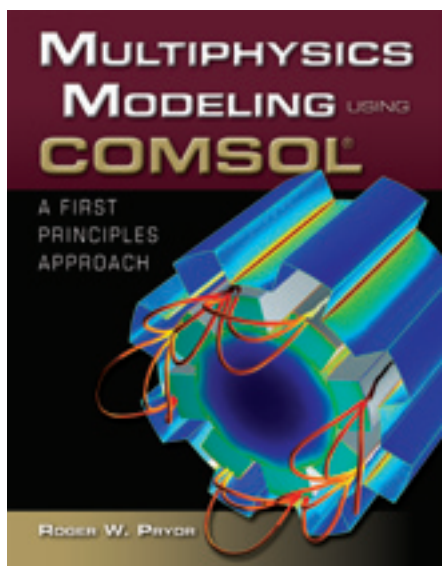
C Programming for Scientists and Engineers with Applications

Rama Reddy, University of Arkansas at Little Rock
Carol Ziegler

This text guides readers through the fundamental, as well as the advanced concepts, of the C programming language as it applies to solving engineering and scientific problems. Ideal for readers with no prior programming experience, this text provides numerous sample problems and their solutions in the areas of mechanical engineering, electrical engineering, heat transfer, fluid mechanics, physics, chemistry, and more. Readers will be writing their own code upon completion of Chapter 2.

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⊕ **Instructor Resources:** IM, AE



Multiphysics Modeling Using COMSOL®

A First Principles Approach

Roger W. Pryor, PhD, COMSOL Certified Consultant

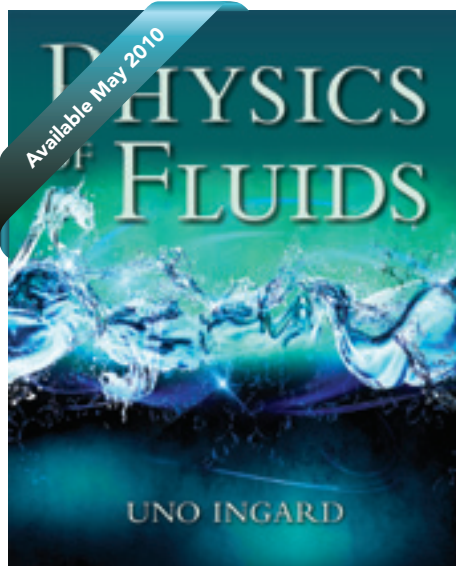
This book rapidly introduces the senior level undergraduate, graduate or professional scientist or engineer to the art and science of computerized modeling for physical systems and devices. It offers a step-by-step modeling methodology through examples that are linked to the Fundamental Laws of Physics through a First Principles Analysis approach. The text explores a breadth of multiphysics models in coordinate systems that range from 1D to 3D and introduces the readers to the numerical analysis modeling techniques employed in the COMSOL® Multiphysics® software.

Table of Contents

- Introduction
- 1. Modeling Methodology
- 2. Materials and Databases
- 3. 1D Modeling
- 4. 2D Modeling
- 5. 2D Axisymmetric Modeling
- 6. 2D Simple Mixed Mode Modeling
- 7. 2D Complex Mixed Mode Modeling
- 8. 3D Modeling
- 9. Perfectly Matched Layer Models
- 10. Bioheat Models
- Index

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Student Resources: DVD



Physics of Fluids

Uno Ingard, PhD, Massachusetts Institute of Technology (Emeritus)

Written by a noted authority in the subject area, this book is a comprehensive study of the theory and the practical applications of fluid properties to numerous disciplines. It may be used as a reference in a variety of fields by scientists and engineers or as a text in senior-undergraduate or graduate-level courses. The book covers standard topics, such as motion of a conducting fluid in a magnetic field, Brownian motion, charged particle motion, surface waves on a liquid, the kinetic theory of gases, and plasma physics. Many applications from aeronautics, acoustics, chemistry, mechanics, electricity, and others have been included to illustrate the mathematical and physical concepts.

Table of Contents

1. Review of Fundamentals.
2. Kinematics of Fluid Motion.
3. Examples of Fluid Flow.
4. Equations of Fluid Flow.
5. Surface Waves on a Liquid.
6. Waves in Fluids.
7. Fluid-solid Body Interactions.
8. Magneto-hydrodynamics.
9. Charged Particle Motion.
10. Kinetic Theory of Gases.
11. Elements of Plasma Dynamics.
- Appendix A. Quasilinear Theory.
- Appendix B. Distribution Functions.

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Engineering Heat Transfer

M.M. Rathore
Raul R. Kapuno, Jr.

This book is designed as a basic text for undergraduate courses in heat transfer for students of mechanical, chemical, aeronautical, and metallurgical engineering, or as a reference for professionals in industry. Treating each subject analytically and then numerically, it emphasizes the clear understanding of theoretical concepts followed by practical applications from industry. It also provides step-by-step solutions of numerical problems through the use of systematic procedures and a prescribed format. This book also includes discussions on how to develop programs that solve heat transfer problems using MATLAB. An accompanying CD-ROM features MATLAB source codes and scripts, and additional simulations and sample problems with answers.

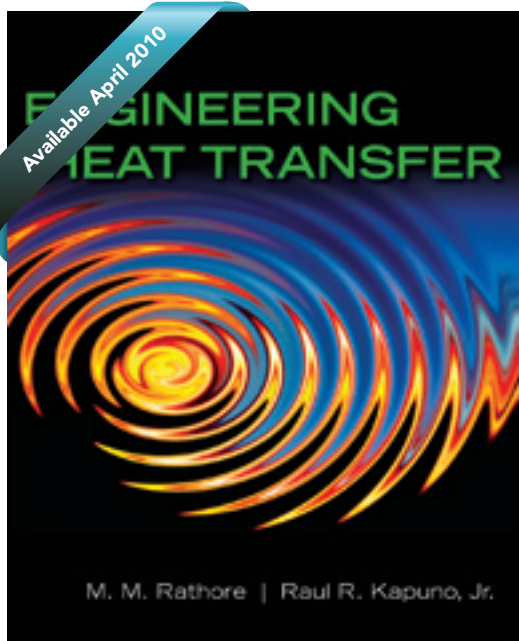


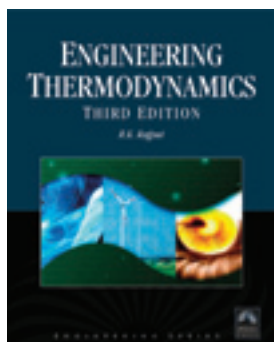
Table of Contents

1. Concept and Mechanisms of Heat Flow. 2. Conduction Basic Equations. 3. Steady State Conduction without Heat Generation. 4. Steady State Conductions with Heat Generation. 5. Heat Transfer from Extended Surfaces. 6. Transient Heat Conduction. 7. Principles of Convection.

8. External Flow. 9. Internal Flow. 10. Natural Convection. 11. Condensation and Boiling. 12. Thermal Radiation: Properties and Processes. 13. Radiation Exchange Between Surfaces. 14. Heat Exchangers. Appendices. Tables

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Engineering Thermodynamics

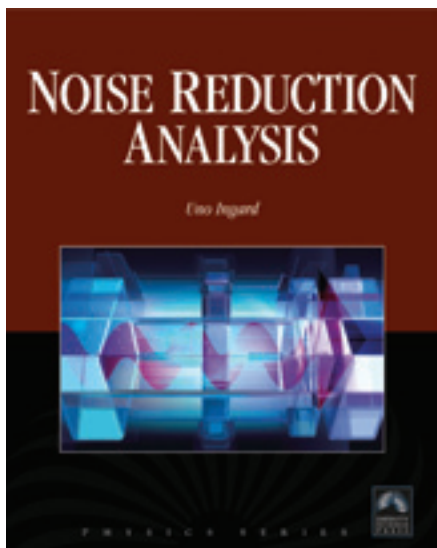
*A Computer Approach (SI Units Version),
Third Edition*

R.K. Rajput

Intended as a textbook for “applied” or engineering thermodynamics, or as a reference for practicing engineers, the book uses extensive in-text, solved examples and computer simulations to cover the basic properties of thermodynamics. Pure substances, the first and second laws, gases, psychrometrics, the vapor, gas and refrigeration cycles, heat transfer, compressible flow, and more are presented in detail and enhanced with practical applications. This version presents the material using SI Units and has ample material on SI conversion, steam tables, and a Mollier diagram. The accompanying CD includes a fully functional version of QuickField and numerous demonstrations and simulations with MATLAB, and other third party software.

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Noise Reduction Analysis

Uno Ingard, PhD, Massachusetts Institute of Technology (Emeritus)

This text is a comprehensive study of the theory and practical application of noise reduction to numerous fields. It may be used as a reference by scientists and engineers or in a senior-undergraduate or graduate-level course. The first six chapters deal with the basic mechanisms of sound absorption by which acoustic energy is converted into heat in viscous and thermal boundaries in a sound field. The second part covers duct attenuators with a discussion of how their performance is described and measured. The main part of each chapter is planned to be descriptive, and contains numerical results that should be of direct interest for design work. Mathematical analysis is placed at the end of the chapters.

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1. Introduction.
2. Sound Absorption Mechanisms.
3. Sheet Absorbers.
4. Resonators.
5. Rigid Porous Materials.
6. Flexible Porous Materials.
7. Duct Acoustics Overview.
8. Lined Ducts.
9. Reactive Duct Elements.
10. Mathematical Supplements & Comments.
- Appendix A. Transmission Matrices.
- Appendix B. Historical Notes/Absorbers.
- Appendix C. Historical Notes/Ducts.

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Acoustics

Uno Ingard, PhD, Massachusetts Institute of Technology (Emeritus)

This text is a comprehensive study of the theory and practical application of acoustics to numerous fields. It may be used as a reference by scientists and engineers or as a senior-undergraduate or graduate-level course. Several of the chapters include notes and numerical results from the author's involvement in specific projects, and contain hitherto unpublished material. Items in this category are aero-acoustic instabilities, flow interaction with acoustic resonators, sound propagation in the atmosphere, sound generation by fans, aspects of nonlinear acoustics, the analysis of an oscillator with "dry friction," and a discussion of the frequency response of the ear.

Table of Contents:

1. Introduction
2. Oscillator Review
3. Elements of Waves
4. Wave Reflection, Absorption, & Transmission
5. Sound Sources & Fields
6. Wave Interference, Diffraction, & Scattering
7. Room and Duct Acoustics
8. Flow Induced Sound and Instabilities
9. Sound Generation by Fans
10. Atmospheric Acoustics
11. Flow Effects & Non-Linear Acoustics
12. Examples

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CATIA® V6 Essentials

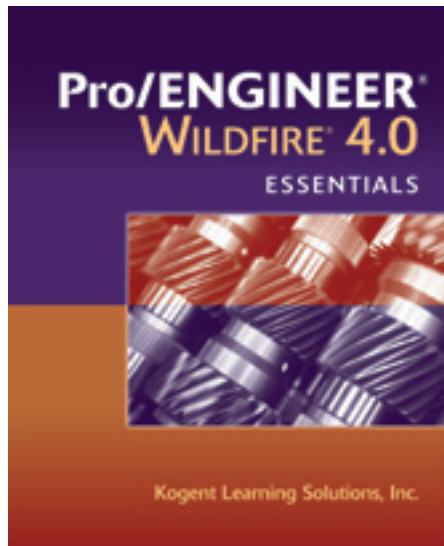
Kogent Learning Solutions, Inc.

CATIA V6 (Computer-Aided Three Dimensional Interactive Application) is the world's leading multi-platform CAD/CAM/CAE software suite marketed worldwide by IBM. It allows the user to apply its capabilities to a variety of industries such as automotive, industrial robots, electronics, manufacturing design, aerospace, and consumer goods. This book includes all the major concepts related to the latest version of CATIA, such as installation, modes, and modeling in an easy-to-understand, step-by-step format. It also covers all the major commands and techniques and provides the reader with all of the details to learn the basics with a clear method of instruction. This comprehensive reference will help you navigate this multifaceted software with ease.

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1. Getting Started with CATIA V6
2. Sketcher Workbench
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4. Assembly Design Workbench
5. Wireframe and Surface Design Workbench
6. Generative Sheetmetal Design Workbench

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Pro/ENGINEER Wildfire 4.0 is a 3D Computer Aided Design (CAD) software application. As a feature-based, parametric, and associative solid modeling software package, it allows the user to create 3D designs for engineering projects. This quick reference includes all the major concepts related to Pro/ENGINEER Wildfire 4.0 functionality, technical configuration, and installation in an easy-to-understand, step-by-step format. It covers all the major commands and modes, including Sketch Mode, Part Mode, Assembly Mode, and Drawing Mode. The format provides the reader with all of the details to learn the basics through an easy method of instruction.

Table of Contents

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2. Exploring the User Interface
3. Exploring Pro/ENGINEER Wildfire 4.0 Sketch Mode
4. Exploring Pro/ENGINEER Wildfire 4.0 Part Mode
5. Exploring Pro/ENGINEER Wildfire 4.0 Assembly Mode
6. Exploring Pro/ENGINEER Wildfire 4.0 Drawing Mode
7. Implementing Surface Modeling

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Autodesk® Revit® Architecture 2010 in Practice

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This book provides basic, step-by-step instructions for getting started and using the Revit Architecture software or for refreshing your Revit skill. It covers only the basics to illustrate the myriad 2D/3D drawing and editing functions for this popular yet complex application. *AutoDesk® Revit® Architecture 2010 in Practice* demonstrates how to design small buildings—from concept through actual plotting. The accompanying DVD includes all the drawing lessons in the text, the ability to view third-party software applications, all of the book’s figures in color, and a trial version of Revit 2010. This comprehensive introduction will help you navigate this multifaceted software with ease.

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AutoCAD® 2010 Essentials

Munir Hamad

Unlike many AutoCAD competitors, this book covers only the basics and uses “mixed units” - inches, meters, feet, kilometers, etc., to illustrate the myriad drawing and editing tools for this popular application. *AutoCAD 2010 Essentials* includes 21 “workshops,” that complete small projects - from concept through actual plotting. Solving all of the workshops will simulate the creation of a “real life” project from beginning to end, without overlooking any of the basic commands and functions in AutoCAD 2010.

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AutoCAD® 2010 Essentials

Comprehensive Edition

Munir Hamad

Suitable for Level 1 and Level 2 AutoCAD courses, this Comprehensive Edition includes all the same information as the *Essentials Edition* plus an added seven chapters for more in depth coverage of AutoCAD 2010. Included are 94 “workshops,” that complete small projects –from concept through actual plotting. The accompanying DVD features the AutoCAD 2010 trial software, drawings, plots, 4-color figures, and all the exercises from the book.

Table of Contents:

1. Introduction to AutoCAD 2010.
2. Drafting Using AutoCAD 2010.
3. How to Set Up Your Drawing.
4. A Few Food Construction Commands.
5. Modifying Commands.
6. Dealing with Blocks.
7. Hatching.
8. Text and Tables.
9. Dimensioning Your Drawing.
10. Plotting Your Drawing.
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12. Advanced Techniques.
13. Parametric Constraints & Advanced Block Techniques.
14. External Referencing (XREF).
15. Sheet Sets.
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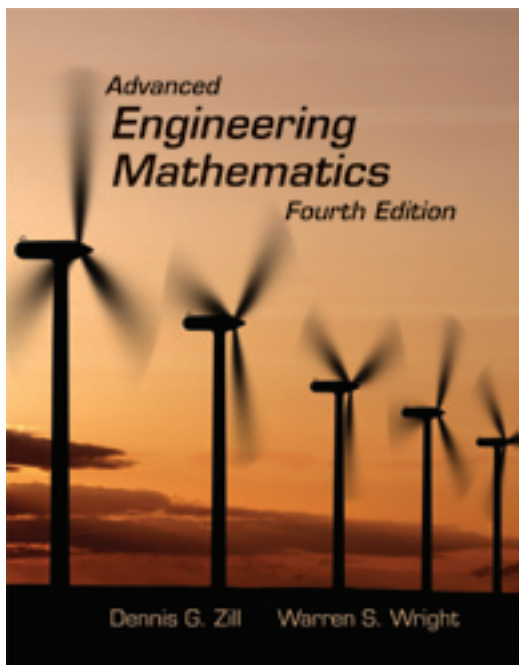
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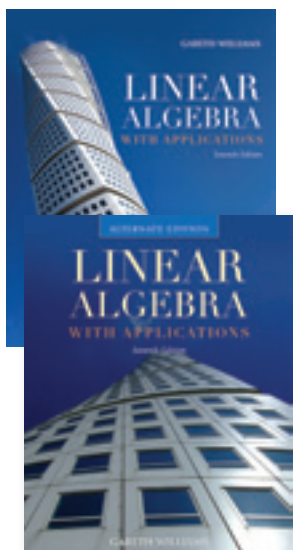
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