Record Nr.	UNINA9910141179403321
Autore	Knopf F. Carl <1952->
Titolo	Modeling, analysis, and optimization of process and energy systems [[electronic resource] /] / F. Carl Knopf
Pubbl/distr/stampa	Hoboken, N.J., : Wiley, 2012
ISBN	1-283-40079-0 9786613400796 1-118-12114-7 1-118-12116-3 1-118-12113-9
Descrizione fisica	1 online resource (486 p.)
Classificazione	TEC009010
Disciplina	658.2/6
Soggetti	Factories - Energy conservation Manufacturing industries - Energy conservation Industrial efficiency - Simulation methods Manufacturing processes - Evaluation Electric power-plants - Efficiency
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Modeling, Analysis and Optimization of Process and Energy Systems; Contents; Preface; Conversion Factors; List of Symbols; Chapter 1: Introduction to Energy Usage, Cost, and Efficiency; 1.1 ENERGY UTILIZATION IN THE UNITED STATES; 1.2 THE COST OF ENERGY; 1.3 ENERGY EFFICIENCY; 1.4 THE COST OF SELF-GENERATED VERSUS PURCHASED ELECTRICITY; 1.5 THE COST OF FUEL AND FUEL HEATING VALUE; 1.6 TEXT ORGANIZATION; 1.7 GETTING STARTED; 1.8 CLOSING COMMENTS; REFERENCES; PROBLEMS; Chapter 2: Engineering Economics with VBA Procedures; 2.1 INTRODUCTION TO ENGINEERING ECONOMICS

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	OPTIMIZATION PROBLEMS; 2.7 ECONOMIC ANALYSIS WITH UNCERTAINTY: MONTE CARLO SIMULATION; 2.8 CLOSING COMMENTS; REFERENCES; PROBLEMS; Chapter 3: Computer-Aided Solutions of Process Material Balances: The Sequential Modular Solution Approach; 3.1 ELEMENTARY MATERIAL BALANCE MODULES; 3.1.1 Mixer 3.1.2 Separator 3.1.3 Splitter; 3.1.4 Reactors; 3.2 SEQUENTIAL MODULAR APPROACH: MATERIAL BALANCES WITH RECYCLE; 3.3 UNDERSTANDING TEAR STREAM ITERATION METHODS; 3.3.1 Single- Variable Successive Substitution Method; 3.3.2 Multidimensional Successive Substitution Method; 3.3.3 Single-Variable Wegstein Method; 3.3.4 Multidimensional Wegstein Method; 3.4 MATERIAL BALANCE PROBLEMS WITH ALTERNATIVE SPECIFICATIONS; 3.5 SINGLE- VARIABLE OPTIMIZATION PROBLEMS; 3.5.1 Forming the Objective Function for Single-Variable Constrained Material Balance Problems 3.5.2 Bounding Step or Bounding Phase: Swann's Equation 3.5.3 Interval Refinement Phase: Interval Halving; 3.6 MATERIAL BALANCE PROBLEMS WITH LOCAL NONLINEAR SPECIFICATIONS; 3.7 CLOSING COMMENTS; REFERENCES; PROBLEMS; Chapter 4: Computer-Aided Solutions of Process Material Balances: The Simultaneous Solution Approach; 4.1 SOLUTION OF LINEAR EQUATION SETS: THE SIMULTANEOUS APPROACH; 4.1.1 The Gauss-Jordan Matrix Elimination Method; 4.1.2 Gauss-Jordan Coding Strategy for Linear Equation Sets; 4.1.3 Linear Material Balance Problems: Alternative Specifications 4.1.4 Linear Material Balance Problems: Alternative Specifications 4.2.2 NonLINEAR EQUATION SETS: THE NEWTON-RAPHSON METHOD; 4.2.1 Equation Linearization via Taylor's Series Expansion; 4.2.2 NonLINEAR EQUATION SETS: THE NEWTON-RAPHSON METHOD; 4.2.1 Equation Set Solution via the Newton-Raphson Method; 4.2.3 Newton-Raphson Coding Strategy for Nonlinear Equation Sets; 4.2.4 Nonlinear Equation Set Solution via the Newton-Raphson Method; 4.2.3 Newton-Raphson Coding Strategy for Nonlinear Equation Sets; 4.1 Nonlinear Material Balance Problems: The Simultaneous Approach; REFERENCES; PROBLEMS; Chapter 5: Process Energy Balances; 5.1 INTRO
Sommario/riassunto	Energy costs impact the profitability of virtually all industrial processes. Stressing how plants use power, and how that power is actually generated, this book provides a clear and simple way to understand the energy usage in various processes, as well as methods for optimizing these processes using practical hands-on simulations and a unique approach that details solved problems utilizing actual plant data. Invaluable information offers a complete energy-saving approach essential for both the chemical and mechanical engineering curricula, as well as for practicing engineers.