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| Nota di contenuto | PRINCIPLES ANDCASE STUDIES OFSIMULTANEOUS DESIGN; PREFACE; 1 INTRODUCTION; 1.1 Overview; 1.2 History; 1.3 Books; 1.4 Tools; Reference Textbooks; 2 PRINCIPLES OF REACTOR DESIGN AND CONTROL; 2.1 Background; 2.2 Principles Derived from Chemistry; 2.2.1 Heat of Reaction; 2.2.2 Reversible and Irreversible Reactions; 2.2.3 Multiple Reactions; 2.3 Principles Derived from Phase of Reaction; 2.4 Determining Kinetic Parameters; 2.4.1 Thermodynamic Constraints; 2.4.2 Kinetic Parameters from Plant Data; 2.5 Principles of Reactor Heat Exchange; 2.5.1 Continuous Stirred-Tank Reactors<br>2.5.2 Tubular Reactors2.5.3 Feed-Effluent Heat Exchangers; 2.6 Heuristic Design of Reactor/Separation Processes; 2.6.1 Introduction; 2.6.2 Process Studied; 2.6.3 Economic Optimization; 2.6.4 Other Cases; 2.6.5 Real Example; 2.7 Conclusion; References; 3 PRINCIPLES OF DISTILLATION DESIGN AND CONTROL; 3.1 Principles of Economic Distillation Design; 3.1.1 Operating Pressure; 3.1.2 Heuristic Optimization; 3.1.3 Rigorous Optimization; 3.1.4 Feed Preheating and |

Intermediate Reboilers and Condensers; 3.1.5 Heat Integration; 3.2 Principles of Distillation Control; 3.2.1 Single-End Control
3.2.2 Dual-End Control3.2.3 Alternative Control Structures; 3.3 Conclusion; References; 4 PRINCIPLES OF PLANTWIDE CONTROL; 4.1 History; 4.2 Effects of Recycle; 4.2.1 Time Constants of Integrated Plant with Recycle; 4.2.2 Recycle Snowball Effect; 4.3 Management of Fresh Feed Streams; 4.3.1 Fundamentals; 4.3.2 Process with Two Recycles and Two Fresh Feeds; 4.4 Conclusion; 5 ECONOMIC BASIS; 5.1 Level of Accuracy; 5.2 Sizing Equipment; 5.2.1 Vessels; 5.2.2 Heat Exchangers; 5.2.3 Compressors; 5.2.4 Pumps, Valves, and Piping; 5.3 Equipment Capital Cost; 5.3.1 Vessels (diameter and length in meters)
5.3.2 Heat Exchangers (area in square meters)5.3.3 Compressors (work in horsepower); 5.4 Energy Costs; 5.5 Chemical Costs; References; 6 DESIGN AND CONTROL OF THE ACETONE PROCESS VIA DEHYDROGENATION OF ISOPROPANOL; 6.1 Process Description; 6.1.1 Reaction Kinetics; 6.1.2 Phase Equilibrium; 6.2 Turton Flowsheet; 6.2.1 Vaporizer; 6.2.2 Reactor; 6.2.3 Heat Exchangers, Flash Tank, and Absorber; 6.2.4 Acetone Column C1; 6.2.5 Water Column C2; 6.3 Revised Flowsheet; 6.3.1 Effect of Absorber Pressure; 6.3.2 Effect of Water Solvent and Absorber Stages; 6.3.3 Effect of Reactor Size
6.3.4 Optimum Distillation Design6.4 Economic Comparison; 6.5 Plantwide Control; 6.5.1 Control Structure; 6.5.2 Column Control Structure Selection; 6.5.3 Dynamic Performance Results; 6.6 Conclusion; References; 7 DESIGN AND CONTROL OF AN AUTO-REFRIGERATED ALKYLATION PROCESS; 7.1 Introduction; 7.2 Process Description; 7.2.1 Reaction Kinetics; 7.2.2 Phase Equilibrium; 7.2.3 Flowsheet; 7.2.4 Design Optimization Variables; 7.3 Design of Distillation Columns; 7.3.1 Depropanizer; 7.3.2 Deisobutanizer; 7.4 Economic Optimization of Entire Process; 7.4.1 Flowsheet Convergence; 7.4.2 Yield
7.4.3 Effect of Reactor Size

Sommario/riassunto

There are many comprehensive design books, but none of them provide a significant number of detailed economic design examples of typically complex industrial processes. Most of the current design books cover a wide variety of topics associated with process design. In addition to discussing flowsheet development and equipment design, these textbooks go into a lot of detail on engineering economics and other many peripheral subjects such as written and oral skills, ethics, ""green"" engineering and product design. This book presents general process design principles in a concise readable form th