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Chemical Equilibrium; 2.3.3 Reaction Engineering Data
2.3.4 Thermodynamic Analysis2.4 Input/Output Analysis; 2.4.1 Input/Output Structure; 2.4.1.1 Number of Outlet Streams; 2.4.1.2 Design Variables; 2.4.2 Overall Material Balance; 2.4.3 Economic Potential; 2.5 Reactor/Separation/Recycle Structure; 2.5.1 Material-Balance Envelope; 2.5.1.1 Excess of Reactant; 2.5.2 Nonlinear Behavior of Recycle Systems; 2.5.2.1 Inventory of Reactants and Make-up Strategies; 2.5.2.2 Snowball Effects; 2.5.2.3 Multiple Steady States; 2.5.2.4 Minimum Reactor Volume; 2.5.2.5 Control of Selectivity; 2.5.3 Reactor Selection; 2.5.3.1 Reactors for Homogeneous Systems
2.5.3.2 Reactors for Heterogeneous Systems2.5.4 Reactor-Design Issues; 2.5.4.1 Heat Effects; 2.5.4.2 Equilibrium Limitations; 2.5.4.3 Heat-Integrated Reactors; 2.5.4.4 Economic Aspects; 2.6 Separation System Design; 2.6.1 First Separation Step; 2.6.1.1 Gas/Liquid Systems; 2.6.1.2 Gas/Liquid/Solid Systems; 2.6.2 Superstructure of the Separation System; 2.7 Optimization of Material Balance; 2.8 Process Integration; 2.8.1 Pinch-Point Analysis; 2.8.1.1 The Overall Approach; 2.8.2 Optimal Use of Resources; 2.9 Integration of Design and Control; 2.10 Summary; References
3 Synthesis of Separation System3.1 Methodology; 3.2 Vapor Recovery and Gas-Separation System; 3.2.1 Separation Methods; 3.2.2 Split Sequencing; 3.3 Liquid-Separation System; 3.3.1 Separation Methods; 3.3.2 Split Sequencing; 3.4 Separation of Zeotropic Mixtures by Distillation; 3.4.1 Alternative Separation Sequences; 3.4.2 Heuristics for Sequencing; 3.4.3 Complex Columns; 3.4.4 Sequence Optimization; 3.5 Enhanced Distillation; 3.5.1 Extractive Distillation; 3.5.2 Chemically Enhanced Distillation; 3.5.3 Pressure-Swing Distillation; 3.6 Hybrid Separations; 3.7 Azeotropic Distillation
3.7.1 Residue Curve Maps

Sommario/riassunto

This practical how-to-do book deals with the design of sustainable chemical processes by means of systematic methods aided by computer simulation. Ample case studies illustrate generic creative issues, as well as the efficient use of simulation techniques, with each one standing for an important issue taken from practice.The didactic approach guides readers from basic knowledge to mastering complex flow-sheets, starting with chemistry and thermodynamics, via process synthesis, efficient use of energy and waste minimization, right up to plant-wide control and process dynamics. The simul

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Nota di contenuto	The essential harbor -- Vita marinae -- The medium : sewers, sludge, and other forms of water torture -- The vessel : bank and bottom, bulldozers and blasts -- How is the harbor doing? -- Epilogue : 2000-2012.
Sommario/riassunto	This title traces the incredible arc of New York Harbor's environmental history. Once a pristine estuary bristling with oysters and striped bass and visited by sharks, porpoises, and seals, the harbor has been marked by centuries of rampant industrialisation and degradation of its natural environment.