

- Preface
- 1 Introduction
 - 1.1 The Emerging Concerns
 - 1.2 The Complexity of the Design Space
 - 1.3 The Level of Details of a System Description
 - 1.4 The Interaction of Energy and Materials Requirements
 - 1.5 The History of Thermoeconomics Development
 - 1.6 The Question Posed for Thermoeconomic Analysis
 - 1.7 The Importance of an Integrated Database
 - 1.8 The Main Pillars of Thermoeconomic Analysis
 - 1.9 General References
- 2 Improved Thermodynamic Analysis
 - 2.1 The Exergy Function
 - 2.2 The Thermodynamic Analysis of a System in the Steady State
 - 2.3 Tutorial
 - 2.4 References
- 3 Improved Costing Analysis
 - 3.1 The Objective Function as a Cost Function
 - 3.2 Making and Operating Resources of an Energy-Conversion Device
 - 3.3 The Quantification of the Making and Operating Resources for a Device
 - 3.4 Making and Operating Resources of a System of Devices
 - 3.5 The Cost Indices CF, (Czi), and (Cai)
 - 3.6 Combining Second-Law and Costing Analyses (Thermoeconomic Analysis)
 - 3.7 Tutorial
 - 3.8 Selected References
- 4 Enhanced System Optimization
 - 4.1 A Two-Level Decomposition Strategy
 - 4.2 Decomposition at the Discipline Level
 - 4.3 Decomposition at the Device Level
 - 4.4 More on the Objective Function and on Decomposition
 - 4.5 Programming Thermoeconomic Analysis
 - 4.6 Tutorial
 - 4.7 Selected References
- 5 The Manipulation of the Design Models of Devices
 - 5.1 Multidisciplinary Problems in General
 - 5.2 The Communication Between the Disciplines of Thermodynamics and Design
 - 5.3 A Heat Exchange Device
 - 5.4 Tutorial
 - 5.5 Selected References
- 6 Managing the Inefficiency of Variable-Load Operation
 - 6.1 Managing the Inefficiency of Variable-Load Operation
 - 6.2 Predicting the Part-Load Performance of a System of Devices
 - 6.3 Handling the System-Design of Variable-Load Problems
 - 6.4 Optimal Operation of a Facility of Systems of Same Product
 - 6.5 Tutorial
 - 6.6 Selected References
- 7.1 Time-Independent Production

- 7.2 Time-Dependent Production
- 7.3 Closing Remarks
- 7.4 Selected References
- 8 Software, Analyzed Systems and their Flow Diagrams:
- 8.1 Contents of the Compact Disc
- 8.2 Brief Description of the Six Executable Tools
- 9 Appendices
- Appendix 9.1 Some Useful Forms of the Flow Exergy
- Appendix 9.2 Thermodynamic and Design Models
- Appendix 9.3 Capital and Performance Equations
- Appendix 9.4 Refreshing Basic Engineering Material
- Appendix 9.5 Selected General Properties
- Appendix 9.6 A Selected Compilation of Heat Transfer Film Coefficients and Friction Factors
- Appendix 9.7 Glossary
- 6 Off-Design Performance Due to Load Variation
- 7 Application Examples
- 8.3 The Analyzed Systems and Their Flow Diagrams
- Appendix 9.8 Nomenclature
- Appendix 9.9 Constants and Conversion Factors
- Subject Index