Contents

Chapter 1
Linear Inequalities 1

1 Some Fundamental Theorems 1
2 Linear Programming and Matrix Games 15
3 Convex Sets and Convex Cones 31
4 Nonlinear Programming 38

Chapter 2
Nonnegative Matrices 74

1 The Perron–Frobenius Theorem 74
2 Power-Nonnegative Matrices 86

Chapter 3
Some Special Matrices 88

1 P-, NP-, PN-, and Semi-PN Matrices 88
2 Fundamental Properties of P-, N-, PN-, and NP Matrices 90
3 Fundamental Properties of Semi-PN Matrices 99
4 Matrices with the Minkowski or Metzler Property 102

Chapter 4
Stability Analysis of Some Dynamic Systems 115

1 Systems of Linear Differential Equations: Solutions, Stability, and Saddle-Point Property 115
2 Systems of Linear *tâtonnement* Processes 130

3 An Existence Theorem for Systems of Ordinary Differential Equations 150
4 Liapunov's Stability Theorems for Systems of Ordinary Differential Equations 157
5 Stability Theorems for Systems of Difference Equations 168

Chapter 5
Neoclassical Economies—Statics 176

1 Neoclassical Technologies 176
2 Mapping from Factor-Rentals and Primary-Factor Endowments to Commodity Prices and Outputs 178
3 Mapping from Commodity Prices and Own-Rates of Return to Primary-Factor Rentals 185
4 Mapping from Commodity Prices and Own-Rates of Return to Gross and Net Outputs 187

Chapter 6
Neoclassical Economies—Dynamics 197

1 Introduction 197
2 Stability of Market Equilibrium 198
3 A Dynamic Heckscher–Ohlin Model 209

Appendix A 219

Appendix B 226

References 236

Name Index 241

Subject Index 244

List of Symbols 247