

Contents

Preface	ix
--------------------------	-----------

Chapter 1

III-Conditioned Linear Systems	1
1.1 Introduction	1
1.2 The Fredholm Integral Equation of the First Kind	2
1.3 Applications of the Fredholm Equation	7
1.4 Numerical Solutions of Fredholm Equations	11
1.5 Examples	16
1.6 Smoothing and Regularizing Techniques	22
References	28

Chapter 2

Linear Estimation	30
2.1 The Linear Regression Model	30
2.2 Point Estimation	32
2.3 Interval Estimation	36
2.4 The Geometry of the κ -Ellipsoid	44
2.5 Poorly Conditioned Normal Equations	47
2.6 The Generalized Inverse	58
References	67

Chapter 3

A Thought Experiment	68
3.1 Introduction	68
3.2 The Experiment	68

3.3	The Wished-for Filters	69
3.4	The Optimal Combination Estimation Method	70
3.5	Nonnegativity	73
3.6	Worst Spectrum Estimation	74
3.7	Errors in the Observations	75
3.8	Random Errors	78

Chapter 4

Constrained Linear Estimation	79	
4.1	Introduction	79
4.2	The Constrained Estimation Technique	86
4.3	An Algebraic Statement of the Problem	90
4.4	A Dual Formulation of the Problem	99
4.5	Generalized Constraints	112
4.6	An Example of Constrained Estimation	115
References	122	

Chapter 5

Mathematical Programming	123	
5.1	The Linear Programming Problem and the Simplex Method	123
5.2	The Symmetric Method	156
5.3	Quadratic Programming	157
5.4	Constrained Estimation and Quadratic Programming	162
References	172	

Chapter 6

Applications and Generalizations of the Constrained Estimation Technique	173	
6.1	Constrained Estimation and the Fredholm Integral Equation	173
6.2	Generalized Constraints	190
6.3	A Second Example of Constrained Estimation	193
6.4	Constrained Estimation of Confidence Intervals	197
References	212	

Author Index	213
-------------------------------	-----

Subject Index	215
--------------------------------	-----

