

# Contents

Preface	v
CHAPTER 1	
Introduction to Statistical Inference	1
CHAPTER 2	
Specification of a Statistical Problem	4
2.1 Additional Remarks on the Loss Function	17
CHAPTER 3	
Classifications of Statistical Problems	23
CHAPTER 4	
Some Criteria for Choosing a Procedure	31
4.1 The Bayes Criterion	32
4.2 Minimax Criterion	47
4.3 Randomized Statistical Procedures	48
4.4 Admissibility: The Geometry of Risk Points	52
4.5 Computation of Minimax Procedures	57
4.6 Unbiased Estimation	61
4.7 The Method of Maximum Likelihood	64
4.8 Sample Functionals: The Method of Moments	66
4.9 Other Criteria	68
CHAPTER 5	
Linear Unbiased Estimation	81
5.1 Linear Unbiased Estimation in Simple Settings	81
5.2 General Linear Models: The Method of Least Squares	86
5.3 Orthogonalization	99
5.4 Analysis of the General Linear Model	104

CHAPTER 6	
Sufficiency	137
6.1 On the Meaning of Sufficiency	137
6.2 Recognizing Sufficient Statistics	141
6.3 Reconstruction of the Sample	145
6.4 Sufficiency: “No Loss of Information”	147
6.5 Convex Loss	148
CHAPTER 7	
Point Estimation	158
7.1 Completeness and Unbiasedness	159
7.2 The “Information Inequality”	169
7.3 Invariance	176
7.4 Computation of Minimax Procedures (Continued)	193
7.5 The Method of Maximum Likelihood	199
7.6 Asymptotic Theory	209
CHAPTER 8	
Hypothesis Testing	246
8.1 Introductory Notions	246
8.2 Testing Between Simple Hypotheses	250
8.3 Composite Hypotheses: UMP Tests; Unbiased Tests	257
8.4 Likelihood Ratio (LR) Tests	263
8.5 Problems Where $n$ Is to Be Found	263
8.6 Invariance	264
8.7 Summary of Common “Normal Theory” Tests	264
CHAPTER 9	
Confidence Intervals	287
APPENDIX A	
Some Notation, Terminology, and Background Material	312
APPENDIX B	
Conditional Probability and Expectation, Bayes Computations	316
APPENDIX C	
Some Inequalities and Some Minimization Methods	319
C.1 Inequalities	319
C.2 Methods of Minimization	323
References	329
Index	331