

## CONTENTS

Preface . . . . .	vii
1. Contents of Statistics . . . . .	1
1.1. Inductive Inference . . . . .	1
1.2. The Nature of a Statistical Problem . . . . .	2
1.3. The Nature of Statistical Inference . . . . .	7
1.4. Transitions in the History of Statistical Methodology . . . . .	13
1.5. Data Reduction and Sufficiency . . . . .	15
1.6. The Exponential Family of Distributions . . . . .	25
2. Order Statistics and Related Distributions . . . . .	31
2.1. Ordered Parameters . . . . .	31
2.2. Order Statistics . . . . .	32
2.3. Some Related Distributions . . . . .	35
3. Statistical Inference - Parametric Point Estimation . . . . .	45
3.1. Criteria for Judging Estimators . . . . .	46
3.2. Completeness and the Best Unbiased Estimator . .	56
3.3. Most Efficient Estimator, Consistent Estimator . . . . .	65
3.4. Different Methods of Estimation . . . . .	76
4. Testing of Statistical Hypotheses . . . . .	93
4.1. Basic Definitions . . . . .	94
4.2. Tests of Simple $H_0$ Against Simple $H_1$ . . . . .	98
4.3. Tests of Simple $H_0$ Against Composite $H_1$ . . . . .	115
4.4. Tests of Composite $H_0$ Against Composite $H_1$ (One-parameter Case) . . . . .	119
4.5. Unbiased Tests . . . . .	125

4.6. Tests of Composite $H_0$ Against Composite $H_1$ (Multiparameter Case): Likelihood- ratio Tests . . . . .	136
4.7. Test of Goodness of Fit . . . . .	160
4.8. Test of Independence in a Contingency Table . . . . .	164
4.9. Confidence Intervals . . . . .	167
5. Sequential Analysis . . . . .	179
5.1. Sequential Probability Ratio Tests . . . . .	180
5.2. Fundamental Relationship Between A,B and the Error Probabilities $\alpha, \beta$ . . . . .	184
5.3. Properties of the Stopping Rule N in the SPRT . . . . .	187
5.4. The Operating Characteristic (OC) Function . . . . .	193
5.5. The Average Sampling Number of the SPRT . . . . .	196
6. Nonparametric Methods . . . . .	201
6.1. One-Sample Methods . . . . .	201
6.2. Two-Sample Methods . . . . .	203
7. The General Linear Hypothesis and Analysis of Variance . . . . .	219
7.1. Least-squares Estimates of $\beta$ . . . . .	220
7.2. Maximum-likelihood Estimates of $\beta$ and $\sigma^2$ . . . . .	225
7.3. Properties of the Maximum-likelihood Estimators $\hat{\beta}$ and $\hat{\sigma}^2$ . . . . .	227
7.4. Test of Hypotheses (Analysis of Variance) . . . . .	232
Appendix A. Vectors and Matrices . . . . .	251
A.1. Vectors . . . . .	251
A.2. Matrices . . . . .	260
Appendix B. Statistical Tables . . . . .	299
Table 1B. Binomial Distribution Function . . . . .	299
Table 2B. The Poisson Distribution Function . . . . .	305
Table 3B. The Unit Normal Distribution . . . . .	307
Table 4B. The $\chi^2$ Distribution . . . . .	308
Table 5B. Student's t Distribution . . . . .	309
Table 6B. The F Distribution . . . . .	310
Index . . . . .	311