

Contents

PREFACE	iii
1. PROBABILISTIC MODELS	1
1. Probability	1
2. Probability Distribution Functions	10
3. Familiar Univariate Probability Distribution Functions	24
4. Properties of Random Variables	24
2. BASIC STATISTICAL INFERENCE	42
1. Introduction	42
2. Order Statistics	46
3. Descriptive Statistics	50
4. Sufficiency and Completeness	53
5. Sufficiency in the Presence of Nuisance Parameters	55
6. Invariance	55
7. Principles and Methods of Estimation	56
8. Principles of Hypothesis Testing and Interval Estimation	80
3. THE EXPONENTIAL DISTRIBUTION	90
1. Properties of the Exponential Distribution	90
2. Statistical Inferences for One-Parameter Exponential Distribution, $\chi \sim \text{EXP}(\theta)$	114
3. One-Parameter Exponential Distribution. Type II Censored Sampling	129
4. One-Parameter Exponential Distribution. Type I Censored Sampling	136
5. Censored Sampling with Replacement	147

6.	Two-Parameter Exponential Distribution. Type II Censored Sampling (Without Replacement)	155
7.	Two-Parameter Exponential Distribution. Type II Censored Sampling (With Replacement)	166
8.	Two-Parameter Exponential Distribution. Type I Censored Sampling (With Replacement)	167
9.	Two-Parameter Exponential Distribution. Type I Censored Sampling (Without Replacement)	171
10.	Multiple Type II Censoring or Missing Observations	176
11.	k-Sample Procedures	190
4.	THE WEIBULL DISTRIBUTION	207
1.	Maximum Likelihood Procedures: $\chi \sim \text{WEI}(\theta, \beta)$	211
2.	Inferences Based on Simple Estimators	253
3.	Multiple Sample Problems	270
4.	Three-Parameter Weibull Distribution	284
5.	THE GAMMA DISTRIBUTION	294
1.	Properties of the Gamma Distribution	295
2.	Point Estimation	296
3.	Asymptotic Results	306
4.	Inferences on κ	310
5.	Inferences on θ with κ Unknown	318
6.	Inferences on the Mean	326
6.	EXTREME-VALUE DISTRIBUTIONS	336
1.	Distributional Results	336
2.	Applications	345
7.	THE LOGISTIC AND OTHER DISTRIBUTIONS	347
1.	Logistic Distribution	347
2.	Cauchy Distribution	370
3.	Normal Distribution	375
4.	Polynomial HF Models	385
5.	Generalized Gamma Distribution	392
8.	GOODNESS-OF-FIT TESTS	396
1.	Probability Plots and Least Squares Fitting	397
2.	Chi-Square Goodness-of-Fit	398
3.	Cramer-von Mises Tests	401
4.	Likelihood-Ratio-Type Tests	404
9.	REPAIRABLE SYSTEMS	414
1.	The Weibull Process	415
2.	Testing for Trend in a Poisson Process	444

<i>Contents</i>	<i>vii</i>
3. Compound Weibull Processes	449
4. Renewal Processes	456
APPENDIXES	467
REFERENCES	479
INDEX	493