

Contents

Foreword to the English Translation	vii
Part 1	1
Preface to Part 1	3
Chapter 1. Samples from One-Dimensional Distributions	5
1.1. Empirical distribution function and its asymptotic behavior	5
1.2. Sample characteristics and their properties	8
1.3. Order statistics and their properties	13
1.4. The distributions of some functions of Gaussian random vectors	20
Chapter 2. Samples from Multidimensional Distributions	25
2.1. Empirical distribution function, sampling moments, and their properties	25
2.2. Sampling regression and its properties	31
Chapter 3. Estimation of Unknown Parameters of Distributions	39
3.1. Statistical estimators and their quality measures	39
3.2. Estimation of a location parameter	49
3.3. Estimation of a scale parameter	56
3.4. The Cramér–Rao inequality and efficient estimators	61
3.5. The Cramér–Rao inequality for a multidimensional parameter	80
3.6. Integral inequalities of Cramér–Rao type	88
Chapter 4. Sufficient Statistics	99
4.1. Sufficient statistics and a theorem on factorization	99
4.2. Sufficient statistics and optimal estimators	113
Chapter 5. General Methods for Constructing Estimators	131
5.1. Method of moments	131
5.2. The maximum likelihood method	133
5.3. Bayes and minimax methods	142
5.4. Confidence intervals and regions	147
References to Part 1	153

Part 2	155
Preface to Part 2	157
Chapter 1. General Theory of Hypotheses Testing	159
1.1. Testing two simple hypotheses	159
1.2. Distinguishing a finite number of simple hypotheses	173
1.3. Distinguishing composite hypotheses	182
Chapter 2. Asymptotic Distinguishability of Simple Hypotheses	203
2.1. Statistical hypotheses and tests	203
2.2. Types of the asymptotic distinguishability of families of hypotheses. The characterization of types	205
2.3. Complete asymptotic distinguishability under the strong law of large numbers	218
2.4. Complete asymptotic distinguishability under the weak convergence	238
2.5. Contiguous families of hypotheses	248
Chapter 3. Goodness-of-Fit Tests	263
3.1. The setting of the problem. Kolmogorov test	263
3.2. The Pearson test	266
3.3. Smirnov test	275
3.4. Other goodness-of-fit tests	282
Chapter 4. Sequential Tests	293
4.1. Bayes sequential tests of hypotheses	293
4.2. Wald sequential tests	300
4.3. The optimality of a sequential Wald test	310
References to Part 2	317
Index	319