

E. A. Nadaraya

Tbilisi State University, Tbilisi, U.S.S.R.

Nonparametric Estimation of Probability Densities and Regression Curves

Translated by
Samuel Kotz



Kluwer Academic Publishers

Dordrecht / Boston / London

TABLE OF CONTENTS

Series Editor's Preface	v
Preface to the English Edition	ix
Introduction	1
CHAPTER 1. ASYMPTOTIC PROPERTIES OF CERTAIN MEASURES OF DEVIATION FOR KERNEL-TYPE NONPARAMETRIC ESTIMATORS OF PROBABILITY DENSITIES	18
1. Integrated Mean Square Error of Nonparametric Kernel-Type Probability Density Estimators	18
2. The Mean Square Error of Nonparametric Kernel-Type Density Estimators	30
CHAPTER 2. STRONGLY CONSISTENT IN FUNCTIONAL METRICS ESTIMATORS OF PROBABILITY DENSITY	42
1. Strong Consistency of Kernel-Type Density Estimators in the Norm of the Space C	42
2. Convergence in the L_2 Norm of Kernel-Type Density Estimators	47
3. Convergence in Variation of Kernel-Type Density Estimators and its Application to a Nonparametric Estimator of Bayesian Risk in a Classification Problem	54
CHAPTER 3. LIMITING DISTRIBUTIONS OF DEVIATIONS OF KERNEL-TYPE DENSITY ESTIMATORS	62
1. Limiting Distribution of Maximal Deviation of Kernel-Type Estimators	62
2. Limiting Distribution of Quadratic Deviation of Two Nonparametric Kernel-Type Density Estimators	87
3. The Asymptotic Power of the $U_{n_1 n_2}$ -Test in the Case of 'Singular' Close Alternatives	99
4. Testing for Symmetry of a Distribution	103
5. Independence of Tests Based on Kernel-Type Density Estimators	109

CHAPTER 4. NONPARAMETRIC ESTIMATION OF THE REGRESSION CURVE AND COMPONENTS OF A CONVOLUTION	115
1. Some Asymptotic Properties of Nonparametric Estimators of Regression Curves	115
2. Strong Consistency of Regression Curve Estimators in the Norm of the Space $C(a, b)$	122
3. Limiting Distribution of the Maximal Deviation of Estimators of Regression Curves	125
4. Limiting Distribution of Quadratic Deviation of Estimators of Regression Curves	138
5. Nonparametric Estimators of Components of a Convolution (S.N. Bernstein's Problem)	152
CHAPTER 5. PROJECTION TYPE NONPARAMETRIC ESTIMATION OF PROBABILITY DENSITY	161
1. Consistency of Projection-Type Probability Density Estimator in the Norms of Spaces C and L_2	161
2. Limiting Distribution of the Squared Norm of a Projection-Type Density Estimator	164
Addendum LIMITING DISTRIBUTION OF QUADRATIC DEVIATION FOR A WIDE CLASS OF PROBABILITY DENSITY ESTIMATORS	177
1. Limiting Distribution of U_n	178
2. Kernel Density Estimators / Rosenblatt-Parzen Estimators	186
3. Projection Estimators of Probability Density / Chentsov Estimators	194
4. Histogram	199
5. Deviation of Kernel Estimators in the Sence of the Hellinger Distance	200
References	204
Author Index	210
Subject Index	212