

Bosq, D.

Nonparametric statistics for stochastic processes. (English) Zbl 0857.62081
[Lecture Notes in Statistics](#) (Springer). 110. New York, NY: Springer. 169 p. (1996).

The book contains a large number of known and recent results on nonparametric estimation of densities and regression functions for stochastic processes in discrete and continuous time. Kernel estimates for regression functions are applied to the nonparametric prediction problem. To describe the dependence structure in a stochastic process the author used different mixing concepts and applied coupling techniques.

The corresponding inequalities for mixing processes are presented in Chapter 1. Chapter 2 contains results on density estimation for discrete-time processes where the optimal asymptotics are obtained for quadratic errors. Furthermore conditions for uniform almost sure convergence and asymptotic normality of kernel estimators are established. Nonparametric estimators for the regression function in a model with random regressors are studied in Chapter 3. The optimal asymptotics are obtained for mean square error. The results are applied to the prediction of Markov processes of order k and other processes. Chapters 4 and 5 contain results on estimators of density and regression functions and applications to the prediction problem for continuous-time processes. In contrary to the discrete time case for continuous time processes with irregular paths the effect of superoptimality appears.

This book contains almost all important classical and a large number of new results for nonparametric estimation if the sample is a stochastic process. It can be recommended not only as a very clear introduction. One can find results and hints for many problems. Even specialists will find several new results.

Reviewer: [F.Liese \(Rostock\)](#)

MSC:

- [62M09](#) Non-Markovian processes: estimation
- [62G07](#) Density estimation
- [62-02](#) Research exposition (monographs, survey articles) pertaining to statistics
- [60-02](#) Research exposition (monographs, survey articles) pertaining to probability theory
- [62M10](#) Time series, auto-correlation, regression, etc. in statistics (GARCH)
- [62M20](#) Inference from stochastic processes and prediction

Cited in **2** Reviews
Cited in **98** Documents

Keywords:

[nonparametric prediction](#); [dependence structure](#); [coupling techniques](#); [inequalities](#); [mixing processes](#); [density estimation](#); [discrete-time processes](#); [quadratic errors](#); [uniform almost sure convergence](#); [asymptotic normality](#); [kernel estimators](#); [random regressors](#); [optimal asymptotics](#); [mean square error](#); [prediction of Markov processes](#); [regression functions](#); [continuous-time processes](#); [irregular paths](#); [superoptimality](#)