Dobrovidov, A. V.; **Koshkin, G. M.**

Nonparametric estimation of the logarithmic density derivative of sequences with strong mixing. (English. Russian original) Zbl 1074.93035

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The estimation of the logarithmic derivative of distribution densities from observation satisfying certain strong mixing conditions is considered in the paper. The choice of such a type of dependences for study is dictated by the fact that the observed process in systems described by dynamic autoregressive-type models has the strong mixing property under certain conditions. Furthermore, stable piecewise-smooth approximations are used for the estimates of the logarithmic derivatives of distribution densities. Based on the results obtained until now, it is possible to determine the principal part of the mean-square error of such approximations with an improved convergence rate. As in the case of independent observations, the principal part of them has the rate of convergence of the mean-square estimates of the first derivative of the distribution density. Since the density estimate can take values close or even equal to zero, the estimate of the logarithmic derivative becomes unstable. This difficulty can be overcome by constructing a new nonparametric estimate for the logarithmic derivative, i.e., an estimate that is stable to observation and based on piecewise smooth approximation. Its properties for depending observations generated by stationary processes satisfying the strong mixing condition are considered in the paper. The rate of convergence of the nonparametric estimate and the principal part of the expansion of the mean-square estimate error are determined.

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