RECENT TRENDS IN NONPARAMETRIC STATISTICS[1]

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Nonparametric statistical procedures mostly introduced in 1960s-80s are very popular nowadays. Here we consider three of these methods: the nonparametric density and regression estimation, the bootstrap and the empirical likelihood methods. In 1988 Owen [1] introduced the empirical likelihood method for statistical inference. It is based on the nonparametric likelihood function and is one of the most recent methods in statistics. T his function has been studied intensively by researchers nowadays. Let us mention some recent results: in 2008 it has been extended for the two-sample case (see [2]), i n 2009 the plug-in empirical likelihood method has been introduced in a very general form (see [3]). There are only few papers dealing with the empirical likelihood method for dependent data and combining it with the bootstrap resampling and nonparametric smoothing methods.The bootstrap resampling method introduced by Efron [4] in 1979 has obtained nowadays a large applicability. This is mainly due to the availability of inexpensive and fast computing resources. It can be shown that the approximation of some statistics such as the central limit statistic can be done more accurately by the bootstrap method in comparison to its asymptotical behavior. Especially this method is advantageous when the limiting distribution contains unknown parameters which have to be estimated. From the recent trends one can mention the block bootstrap method for dependent data which includes, for example, ARIMA processes, linear and nonlinear time series models and mixing sequences in general. different bootstrap methods for dependent data. Still there are a lot of scientific problems for research.The nonparametric regression estimator introduced by Nadaraya [5] and Watson [6] in 1964 basically follows from the kernel density estimation procedure. The goal is to estimate the regression function itself, not assuming some parametric form as, for example, in the case of linear regression. Later this approach has been extended to the local polynomial regression which improves the boundary bias. This is very important when doing forecasting, for example, for some time series models. Although the problem of bandwidth or smoothing parameter choice has been addressed intensively in 1990s, still it is very complicated when the data are dependent.

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