Politis, Dimitris N.; **Romano, Joseph P.**
The stationary bootstrap. (English) Zbl 0814.62023
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Summary: This article introduces a resampling procedure called the stationary bootstrap as a means of calculating standard errors of estimators and constructing confidence regions for parameters based on weakly dependent stationary observations. Previously, a technique based on resampling blocks of consecutive observations was introduced to construct confidence intervals for a parameter of the m-dimensional joint distribution of m consecutive observations, where m is fixed. This procedure has been generalized by constructing a "blocks of blocks" resampling scheme that yields asymptotically valid procedures even for a multivariate parameter of the whole (i.e., infinite-dimensional) joint distribution of the stationary sequence of observations. These methods share the construction of resampling blocks of observations to form a pseudo-time series, so that the statistic of interest may be recalculated based on the resampled data set. But in the context of applying this method to stationary data, it is natural to require the resampled pseudo-time series to be stationary (conditional on the original data) as well.

Although the aforementioned procedures lack this property, the stationary procedure developed here is indeed stationary and possesses other desirable properties. The stationary procedure is based on resampling blocks of random length, where the length of each block has a geometric distribution. Fundamental consistency and weak convergence properties of the stationary resampling scheme are developed.

MSC:

62G09 Nonparametric statistical resampling methods
62G15 Nonparametric tolerance and confidence regions
62M10 Time series, auto-correlation, regression, etc. in statistics (GARCH)
62G20 Asymptotic properties of nonparametric inference

Keywords:

approximate confidence limit; resampling procedure; stationary bootstrap; standard errors of estimators; confidence regions; weakly dependent stationary observations; pseudo-time series; consistency; weak convergence properties

Full Text: DOI