

A truncated estimation method with guaranteed accuracy

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Abstract This paper presents a truncated estimation method of ratio type functionals by dependent sample of finite size. This method makes it possible to obtain estimators with guaranteed accuracy in the sense of the L_m -norm, $m \geq 2$. As an illustration, the parametric and non-parametric estimation problems on a time interval of a fixed length are considered. In particular, parameters of linear (autoregressive) and non-linear discrete-time processes are estimated. Moreover, the parameter estimation problem of non-Gaussian Ornstein-Uhlenbeck process by discrete-time observations and the estimation problem of a multivariate logarithmic derivative of a noise density of an autoregressive process with guaranteed accuracy are solved. In addition to non-asymptotic properties, the limit behavior of presented estimators is investigated. It is shown that all the truncated estimators have asymptotic properties of basic estimators. In particular, the asymptotic efficiency in the mean square sense of the truncated estimator of the dynamic parameter of a stable autoregressive process is established.

Keywords Ratio estimation · Truncated estimation method · Fixed sample size · Multivariate autoregression · AR-ARCH model · Non-Gaussian Ornstein-Uhlenbeck process · Non-parametric multivariate logarithmic density derivative estimation