

ABSTRACT

Project Code : TRG5780031

Project Title : A Model-Free Bootstrap Predictor Based on Unit Root Test for Autoregressive Processes

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The Gaussian-based predictors for time series work reasonably well when the underlying distributional assumption holds. An alternative method is the bootstrap approach which does not assume a random error distribution. Recent work of Cai and Davies (2012) presented a simple and model-free bootstrap method for time series. Furthermore, there is significant simulation evidence that preliminary unit root tests can be used to improve the efficiency of a predictor and prediction interval. In this paper, we develop a new multi-step-ahead model-free bootstrap predictor based on a unit root testing by using the model-free bootstrap method for time series. The estimated absolute bias and prediction mean square error of the multi-step-ahead model-free bootstrap predictor and multi-step-ahead model-free bootstrap predictor based on unit root test are compared via Monte Carlo simulation studies. Simulation results show that the unit root test improves the accuracy of the multi-step-ahead model-free bootstrap predictor for autoregressive processes for near-non-stationary and non-stationary processes. The performance of these model-free bootstrap predictors is illustrated through an empirical application to a set of monthly closings of the Dow-Jones industrial index.

Keywords : Prediction; Bootstrap approach; Simulation study; Time series