



Covariance matrix estimation, linear prediction, and the Linear Process Bootstrap

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We address the problem of estimating a stationary process's autocovariance matrix under short range dependence assumptions (Wu and Pourahmadi, *Statistica Sinica*, 2009), along with two resulting applications. As a first application, we introduce a new approach for linear prediction which produces a consistent estimate for the theoretically optimal length n prediction coefficient vector (McMurry and Politis, submitted, 2014). As a second application, we introduce a new bootstrap for stationary processes termed the linear process bootstrap (LPB), (McMurry and Politis, *J. Time Ser. Anal.*, 2010). The LPB is shown to be asymptotically valid for the sample mean and related statistics. Both applications rely on the positiveness of the estimated autocovariance matrix. We introduce and compare several novel techniques which ensure this positivity.

Keywords: Autocovariance matrices; Linear prediction; Linear Process Bootstrap.