



Hidden AR process and adaptive Kalman filter

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Abstract

This work discusses a model of a partially observed linear system that depends on some unknown parameters. An approximation of the unobserved component is proposed, which involves three steps. First, a method of moment estimator of unknown parameters is constructed, and second, this estimator is used to define the one-step MLE-process. Finally, the last estimator is substituted into the equations of the Kalman filter. The solution of obtained equations provides us with the desired approximation (adaptive Kalman filter). The asymptotic properties of all the mentioned estimators and both maximum likelihood and Bayesian estimators of the unknown parameters are detailed. The asymptotic efficiency of adaptive filtering is discussed.

Keywords Partially observed linear system · Hidden Markov process · Kalman filter · Parameter estimation · Method of moments estimators · MLE and Bayesian estimators · One-step MLE-process · On-line approximation · Adaptive Kalman filter

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