ASYMPTOTICALLY EFFICIENT AUTOREGRESSIVE MODEL SELECTION FOR MULTISTEP PREDICTION

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Abstract. A direct method for multistep prediction of a stationary time series involves fitting, by linear regression, a different autoregression for each lead time, h, and to select the order to be fitted, $\tilde{k}_h$, from the data. By contrast, a more usual 'plug-in' method involves the least-squares fitting of an initial k-th order autoregression, with k itself selected by an order selection criterion. A bound for the mean squared error of prediction of the direct method is derived and employed for defining an asymptotically efficient order selection for h-step prediction, $h \geq 1$; the $S_h(k)$ criterion of Shibata (1980) is asymptotically efficient according to this definition. A bound for the mean squared error of prediction of the plug-in method is also derived and used for a comparison of these two alternative methods of multistep prediction. Examples illustrating the results are given.

Key words and phrases: AIC, FPE, order determination, time series.