Adaptive Order Selection in Autoregressive Models

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Abstract

Autoregressive model is a popular method for analyzing the time dependent data, where an appropriate model order is imperative. Two commonly used criteria are the Akaike information criterion and the Bayesian information criterion. However, the two criteria are known to suffer the overfit and underfit problems, respectively. In this talk, we focus on predicting the future values of an observed time series and propose an adaptive idea based on the concept of generalized degrees of freedom to select the model order. Instead of applying a fixed criterion to select the order parameter, we further propose an approximately unbiased estimator of mean squared prediction errors based on a data perturbation technique for selecting among some candidate criteria. Then, the selected criterion provides the final order parameter. Some numerical experiments are performed for illustrating the superiority of the proposed method and an application of our method is also presented.