INFORMATION COMPLEXITY CRITERION FOR ORDER DETERMINATION IN AUTOREGRESSIVE MODELS

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Abstract

Autoregressive models which include lags of the dependent variable are usually used in time series analysis. The corelogram of the series and some information criteria can be used in order to determine the order of these models. In this paper the information complexity criterion is considered for autoregressive time series models. A simulation study is performed in order to examine the performance of information complexity and compare it with some ordinary information criteria.

Keywords: Autoregressive models, Information complexity, Order determination, Simulation.


1. Introduction

The autoregressive (AR) models have been widely used as a valuable tool to fit a variety of practical data in several different areas, such as statistical time series, geophysics and signal processing. For a given set of observations \( \{y_t; t = 1, 2, \ldots, n\} \) of a zero-mean stationary stochastic process, the AR model is defined by

\[
y_t = \phi_1 y_{t-1} + \phi_2 y_{t-2} + \cdots + \phi_p y_{t-p} + \varepsilon_t,
\]

where \( \phi_i \) \((i = 1, 2, \ldots, p)\) denotes the unknown parameters, \( \varepsilon_t \) denotes the white noise error term with mean zero and variance \( \sigma^2 \), \( p \) is the number of parameters and also the model order [10].

There are various methods used in order to estimate the parameters of the model given in (1). The best known are estimating the parameters by using the well-known Yule-Walker equations, and Burg's [6] method. The steps are given below to estimate the parameters of the AR model by using the Yule-Walker equations [8,9]:

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