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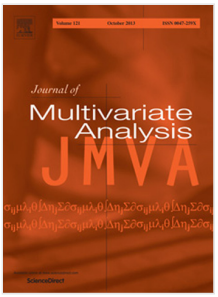

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On Local Asymptotic Normality For Functional Autoregressive Processes

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Abstract

We establish Local Asymptotic Normality (LAN) and Uniform Local Asymptotic Normality (ULAN) conditions for a class of function space valued autoregressive processes when the correlation operator depends on an unknown one-dimensional parameter. We then derive Hajek minimax bound, consistency, asymptotic normality and efficiency of the conditional maximum likelihood estimator yielding their optimality. A simulation studies illustrate the performance of the estimators.

Keywords: Functional Autoregressive Processes, Local Asymptotic Normality, Hajek bound, Maximum likelihood estimator, Efficiency.

1. Introduction

In many fields such as economy, finance, industry, biology, medicine etc., improvements in real data acquisition and processing techniques have lead to a continuous flow of data putting statisticians to consider them as "high dimensional" vectors. Such data can be quite conveniently described as realizations of random curves and then considered as a sample of a valued function space random variable. Their statistical analysis are carried out through the well-known Functional Data Analysis (FDA). This has become a central topic of modern statistics in many textbooks. This literature has focused on developing various generalizations of existing models and treating classical inference procedures, prediction problem, tests etc. in this functional data setting (we may refer to Bosq [1], Ferraty and Vieu [3], Ramsay and Silverman [13] and references therein).

Among functional models having recently received more attention, we may mention the class of Functional Autoregressive Processes. This class has been

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