Distribution Function Estimation by Wavelets for a ρ^*-mixing process

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Abstract

Let $\{X_n,\ n \geq 1\}$ be a stationary sequences of for a ρ^*-mixing process with distribution function $F(x) = P[X_1 \leq x]$. A wavelet linear distribution function $F_n(x)$ based on $X_1, X_2, ..., X_n$ is introduced. We establish that the strong consistency and pointwise as well as uniform convergence of $F_n(x)$ are the same as empirical distribution function. In contrast to easy computing of empirical distribution function, the estimation based on wavelets are smooth and could be differentiable which is more convenient for forecasting.

Key words and phrases: ρ^*-mixing; Distribution function estimation, Besov space, wavelets,

1 Introduction

Suppose that $\{X_n, n \geq 1\}$ is a stationary sequences of random variables with a common one-dimensional marginal probability density function f and distribution function $F(x) = P[X_1 \leq x]$. By itself, this is not a very interesting problem. However, it is the first step toward soving more important problems such as estimating statistical functionals, such as survival function and quantiles. A common estimator for distribution function is empirical distribution function(EDF) which enjoys not only for its strong consistency, GliVenko- Cantelli Theorem or Dvoretzky-Kiefer-Wolfowitz

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