Limit theorems for empirical processes of cluster functions

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Published on AoS (2010).

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Introduction

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Notations

- For some $d \in \mathbb{N}$, let E be a measurable subset of R^d containing 0.
- $(X_{n,i})_{1 \le i \le n}$ be a triangular array of row-wise stationary random variables, e.g. $X_{n,1} = (\frac{X_i - u_n}{a_n})_+$.
- $Y_{n,j}$ be the j th block of r_n consecutive values of the n th row of $(X_{n,i})$.
- Thus, there are $m_n = [n/r_n]$ blocks

$$Y_{n,j} := (X_{n,i})_{(j-1)r_n+1 \le i \le jr_n}, \quad 1 \le j \le m_n.$$

- Write Y_n for a "generic block" so that $Y_n \stackrel{d}{=} Y_{n,1}$.
- The block lengths $r_n \to \infty, r_n/n \to 0$.
- $v_n := P(X_{n,1} \neq 0) \to 0$.