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THE INVARIANCE PRINCIPLE FOR ASSOCIATED RANDOM FIELDS

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ABSTRACT. In this paper we prove the invariance principle for associated random fields satisfying the $2+\delta$ moment condition. No stationarity is required. Our investigations imply an extension to the nonstationary case of an invariance principle of Burton and Kim. Analogous results are also derived in the case of random measures.

1. Introduction. Let $\{X_{\underline{j}} : \underline{j} \in Z^d\}$ be a random field on some probability space $(\Omega, \mathcal{F}, P)$ with $EX_{\underline{j}} = 0$, $EX_{\underline{j}}^2 < \infty$. For $n \in N$, put

$$S_{n\underline{1}} = \sum_{\underline{1} \le \underline{j} \le n\underline{1}} X_{\underline{j}}, \tag{1.1}$$

assume

$$n^{-d} ES_{n\underline{1}}^2 \longrightarrow {}_n\sigma^2 \in (0, \infty), \tag{1.2}$$

and define

$$W_n(\underline{t}) = (\sigma n^{d/2})^{-1} \sum_{j_1=1}^{[nt_1]} \cdots \sum_{j_d=1}^{[nt_d]} X_{\underline{j}}, \tag{1.3}$$

where $W_n(\underline{t}) = 0$ for some $t_i = 0$. Then W_n is a measurable map from $(\Omega, \mathcal{F})$ into $(D_d, \mathcal{B}(D_d))$, where D_d is the set of all functions on $[0,1]^d$ which have left limits and are continuous from the right, and $\mathcal{B}(D_d)$ is the Borel σ-field induced by the Skorohod topology. $\{X_{\underline{j}} : \underline{j} \in Z^d\}$

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