

**STRONG LAW OF LARGE NUMBERS FOR RANDOM VARIABLES WITH
MULTIDIMENSIONAL INDICES**

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Abstract: Let $\{X_{\underline{n}}, \underline{n} \in V \subset \mathbb{N}^2\}$ be a two-dimensional random field of independent identically distributed random variables indexed by some subset V of lattice \mathbb{N}^2 . For some sets V the strong law of large numbers

$$\lim_{\underline{n} \rightarrow \infty, \underline{n} \in V} \frac{\sum_{k \in V, k \leq \underline{n}} X_k}{|\underline{n}|} = \mu \text{ a.s.}$$

is equivalent to

$$EX_{\underline{1}} = \mu \quad \text{and} \quad \sum_{\underline{n} \in V} P[|X_{\underline{1}}| > |\underline{n}|] < \infty.$$

In this paper we characterize such sets V .

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