PROBABILITY
AND
MATHEMATICAL STATISTICS
Vol. 4, Fasc. 1 (1984), pp. 1–12

LIMIT THEOREMS FOR EMPIRICAL PROCESSES INDEXED BY CLASSES OF SETS ALLOWING A FINITE-DIMENSIONAL PARAMETRIZATION

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Abstract: . Let $\xi_1, \xi_2, \ldots$ be independent identically distributed random variables defined on some probability space $(\Omega, \mathcal{A}, P)$ and taking their values in a measurable space $(X, \mathcal{B})$ according to the probability distribution μ on $\mathcal{B}$ defined by $\mu(B) := P(\xi_1 \in B)$, $B \in \mathcal{B}$. Let

$$\mu_n := n^{-1}(\epsilon_{\xi_1} + \ldots + \epsilon_{\xi_n})$$

be the empirical measure on $\mathcal{B}$ based on $\xi_1, \ldots \xi_n$ and, given a class $\mathcal{C} \subset \mathcal{B}$, let

$$\beta_n(C) := n^{1/2}(\mu_n(C) - \mu(C)), \quad C \in \mathcal{B},$$

be the empirical $\mathcal{C}$-process, considered as a stochastic process indexed by $\mathcal{C}$. Various properties of β_n as $n \to \infty$ are studied.

2000 AMS Mathematics Subject Classification: Primary: -; Secondary: -;

Key words and phrases: -

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