WEAK CONVERGENCE OF RANDOM VECTORS AND DISTRIBUTIONS IN BANACH SPACES

Ryszard Jajte
Adam Paszkiewicz

Abstract: Let \((\xi_n)\) be a sequence of random vectors with values in a Banach space \(X\) with distributions \(p_{\xi_n}\) weakly converging to a given distribution \(p\). We characterize a general form of a distribution of a weak limit of \(\xi_n\) in Banach space \(L_1(X)\) of Bochner integrable vectors. We show that the weak convergence of random vectors \((\xi_n)\) in \(L_1(X)\) implies that \(\|\xi_n(\omega) - \xi(\omega)\| \to 0\) stochastically. Moreover, the conditions \(\|\xi_n(\omega) - \xi(\omega)\| \to 0\) stochastically and \((\xi_n(\omega) - \xi(\omega), x^*) \to 0\) stochastically for any \(x^* \in X^*\) are equivalent.

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