

ON THE KOLMOGOROV QUASIMARTINGALE PROPERTY

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Abstract: Let (X_k) be a sequence of real-valued random variables (r.v.), which are centered, square integrable and independent. A well-known result, due to Kolmogorov, states that if

$$\sum_{k \geq 1} \frac{E(X_k^2)}{k^2} < +\infty, \quad (i)$$

then (S_n/n) converges almost surely (a.s.) to 0, where $S_n = X_1 + \dots + X_n$.

This paper is devoted to the interpretation of condition (i). For instance, it is shown that if the r.v. X_k are weighted Rademacher r.v., then (i) is equivalent to the fact that $((S_n/n)^2, \mathcal{G}_n)$ is a quasimartingale (\mathcal{G}_n being the natural filtration associated with the sequence (X_n)).

The problem of the interpretation of (i) for Banach space valued r.v. X_k is also studied.

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