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RATE OF CONVERGENCE IN THE STRONG LAW OF LARGE NUMBERS

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Abstract: Let $\{X_n, n \geq 1\}$ be a sequence of independent random variables such that $EX_n = 0, EX_n^2 = \sigma_n^2 < \infty, n \geq 1$. For each $n \geq 1$ let

$$S_n = \sum_{k=1}^{n} X_k, \quad \mathcal{S}_n^2 = \sum_{k=1}^{n} \sigma_k^2;$$

then, under some additional conditions, $S_n/\mathcal{S}_n^{1+\alpha} \to 0$ as $n \to \infty$ with probability 1 for any $\alpha > 0$.

The main purpose of this paper is to give the order of magnitude of

$$\sum_{n=1}^{\infty} P(|S_n| \geq t\mathcal{S}_n^{1+2\alpha})$$

as $t \to 0^+$. The rate of convergence in the random strong law of large numbers is established too.

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