ON THE CENTRAL LIMIT THEOREM WITH ALMOST SURE CONVERGENCE

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Abstract: Let S_n be the partial sums of i.i.d.r.v.'s with zero means and variance one and let $a(x)$ be a real function. In this paper, sufficient conditions are given under which $a(S_n/\sqrt{n})$ converges almost surely to $\int_{-\infty}^{\infty} a(x)d\Phi(x)$. Two variants of convergence are considered: limitation of $a(S_n/\sqrt{n})$ by logarithmic means and limitation of $a(S_{n_k}/\sqrt{n_k})$ by arithmetic means, where $n_k = c^{k^\alpha}$, $\alpha > 0$, $c > 1$. Under the same assumptions in the same sense, $a(\max_{1 \le m \le n} S_m/\sqrt{n})$ converges almost surely to $2\int_0^\infty a(x)d\Phi(x)$.

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

Key words and phrases: -

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