

Title: On normal approximations to strongly mixing random fields

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Let ξ_n be a strongly mixing sequence of real random variables such that $\mathbb{E}\xi_n = 0$. Write $S_n = \xi_1 + \dots + \xi_n$ and consider the normalized sums $Z_n = S_n/B_n$, where $B_n^2 = \mathbb{E}S_n^2$. Assume that a thrice differentiable function $h : \mathbb{R} \rightarrow \mathbb{R}$ satisfies $\sup_{x \in \mathbb{R}} |h'''(x)| < \infty$. We obtain optimal (in a sense) bounds for $\Delta_n = |\mathbb{E}h(Z_n) - \mathbb{E}h(N)|$, where N is a standard normal random variable. Namely, we show that $\Delta_n = O(n^{-1/2})$, provided that the random variables ξ_n are bounded by a constant, $B_n^2 \geq c_0 n$, where c_0 is a positive constant, and that the strong mixing coefficients $\alpha(r)$ satisfy $\sum_{r=1}^{\infty} r\alpha(r) < \infty$. The results extend to the case of random fields $\{\xi_a, a \in \mathbb{Z}^d\}$. To prove the results we apply a new method.

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