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# NOTE ON ASYMPTOTIC NORMALITY OF KERNEL DENSITY ESTIMATOR FOR LINEAR PROCESS UNDER SHORT-RANGE DEPENDENCE

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*Abstract:* We consider the problem of density estimation for a one-sided linear process $X_t = \sum_{r=0}^{\infty} a_r Z_{t-r}$ with i.i.d. square integrable innovations $(Z_i)_{i=-\infty}^{\infty}$. We prove that under weak conditions on $(a_i)_{i=0}^{\infty}$, which imply short-range dependence of the linear process, finite-dimensional distributions of kernel density estimate are asymptotically multivariate normal. In particular, the result holds for $|a_n| = \mathcal{O}(n^{-a})$ with $a > 2$, which is much weaker than previously known sufficient conditions for asymptotic normality. No conditions on bandwidths $b_n$ are assumed besides $b_n \to 0$ and $nb_n \to \infty$. The proof uses Chanda's [1], [2] conditioning technique as well as Bernstein's "large block-small block" argument.

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