

The Modulo 1 Central Limit Theorem

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Abstract

Let X_1, X_2, \dots be a sequence of independent, not necessarily identically distributed, continuous random variables, with zero mean and finite variance, and denote by $f^{(n)}(x)$ the convolution of density functions f_1, f_2, \dots, f_n of $X_1^*, X_2^*, \dots, X_n^*$ respectively, where X_i^* is a Modulo 1 random variable, $i = 1, 2, \dots, n$. We show, under certain conditions, $f^{(n)}(x)$ tends to the standard normal density function as n tends to infinity in $L^1([0, 1])$.

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