

Ergodic properties of sets defined by the frequencies of digits

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Abstract

Let ξ_1, ξ_2, \dots be a random sequence of r -ary digits, $r \in \mathbb{N} \setminus \{1\}$, connected into an ergodic Markov chain. Let $\beta > 1$ be an algebraic number such that the ratio $\log \beta / \log r$ is irrational. Then with probability one, the number $\xi = \sum_{j=1}^{\infty} \xi_j r^{-j}$ is normal with respect to the radix β . The proof is based on the Gelfand-Baker estimate for the absolute value of a linear form in the logarithms of algebraic numbers.

Keywords

Cassels-Schmidt theorem, Finite Markov chains, Gelfand-Baker's theory, Normal numbers, The estimates for the characteristic functions of singular distributions