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AVERAGE NUMBER OF LEVEL CROSSING OF RANDOM TRIGONOMETRIC CURVE

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Abstract

Let $a_1(\omega), a_2(\omega), a_3(\omega), \cdots, a_n(\omega)$ be a sequence of mutually independent, identically distributed random variables following semi-stable distribution with characteristic function $\exp(-(C+\cos\log|t|)|t|^\alpha), C>1, 0<\alpha\leq 2$. In this work, we obtain the average number of zeros in the interval $(0, 2\pi)$ of trigonometric polynomials of the form

$$a_1(\omega)\cos\theta + a_2(\omega)\cos 2\theta + a_3(\omega)\cos 3\theta + \cdots + a_n(\omega)\cos n\theta$$

for large n. Here the required average is $\left(\frac{4\sqrt{2}}{\sqrt{3}}\left(\frac{n^4}{2^{\alpha-2}n\sqrt{3\alpha}}\right)C\right)+0(1)$ as $n\to\infty$ and $0<\alpha\leq 2$.

Key Words : *Random variables, Joint distribution, Characteristic function, Semi-stable distribution, Multiple roots, Random trigonometric equations.*

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