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Aymone, Marco; **Frómeta, Susana**; **Misturini, Ricardo**
Law of the iterated logarithm for a random Dirichlet series. (English) Zbl 07252776
Electron. Commun. Probab. 25, Paper No. 56, 14 p. (2020).

Summary: Let $(X_n)_{n\in\mathbb{N}}$ be a sequence of *i.i.d.* random variables with distribution $\mathbb{P}(X_1 = 1) = \mathbb{P}(X_1 = -1) = 1/2$. Let $F(\sigma) = \sum_{n=1}^{\infty} X_n n^{-\sigma}$. We prove that the following holds almost surely

$$\limsup_{\sigma\to 1/2^+} \frac{F(\sigma)}{\sqrt{2\mathbb{E}F(\sigma)^2 \log\log \mathbb{E}F(\sigma)^2}} = 1.$$

MSC:

60G50 Sums of independent random variables; random walks
11M41 Other Dirichlet series and zeta functions
11R42 Zeta functions and L-functions of number fields
11R52 Quaternion and other division algebras: arithmetic, zeta functions
11S40 Zeta functions and L-functions
11S45 Algebras and orders, and their zeta functions
14G10 Zeta functions and related questions in algebraic geometry (e.g., Birch-Swinnerton-Dyer conjecture)
11E45 Analytic theory (Epstein zeta functions; relations with automorphic forms and functions)
11F66 Langlands L-functions; one variable Dirichlet series and functional equations
11F70 Representation-theoretic methods; automorphic representations over local and global fields
11F72 Spectral theory; trace formulas (e.g., that of Selberg)

Keywords:

random series; law of the iterated logarithm; Dirichlet series

Full Text: DOI Euclid

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