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Operator geometric stable laws. (English) Zbl 1069.60017

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Operator geometric stable laws (OGS) on a vector space $\mathbb{R}^d$ are limits of randomized affine normalized sums $A_p \sum_1^{N_p}(X_i + b_b)$, $p \to 0$, where X_i are iid and N_p is a geometrically distributed random variable (with mean $1/p$) which is independent from $X_i, i \in \mathbb{N}$. If Y is OGS, then the array X_i is said to belong to the domain of (geometric stable) attraction of Y. First the paper collects some general properties of OGS and operator stable laws which are partially known in more general situations as long as strict stability is assumed, i.e. if the shift terms b_p vanish. Section 4 is concerned in particular with geometric stable laws, i.e. with scalar normalisations $A_n = a_n I$, and their marginals and densities; in particular laws with Linnik and Laplace marginals. These distributions turn out to have interesting applications in mathematical finance. The proofs of the main results and some auxiliary results are found in an Appendix.

Reviewer: Wilfried Hazod (Dortmund)

MSC:

60E07 Infinitely divisible distributions; stable distributions

60F05 Central limit and other weak theorems

60G50 Sums of independent random variables; random walks

62H05 Characterization and structure theory for multivariate probability distributions; copulas

Cited in **3** Documents

Keywords:

(operator) geometric stability; geometric infinite divisibility; random limit theorems; Linnik distribution; Laplace distribution

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