LÉVY PROCESSES, GENERALIZED MOMENTS AND UNIFORM INTEGRABILITY

BY

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Abstract. We give new proofs of certain equivalent conditions for the existence of generalized moments of a Lévy process $(X_t)_{t \geqslant 0}$; in particular, the existence of a generalized g-moment is equivalent to the uniform integrability of $(g(X_t))_{t \in [0,1]}$. As a consequence, certain functions of a Lévy process which are integrable and local martingales are already true martingales. Our methods extend to moments of stochastically continuous additive processes, and we give new, short proofs for the characterization of lattice distributions and the transience of Lévy processes.

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Key words and phrases: Lévy process, additive process, Dynkin's formula, generalized moment, Gronwall's inequality, local martingale, condition D, condition DL.

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