SEVERAL FORMS OF STOCHASTIC INTEGRAL REPRESENTATIONS OF GAMMA RANDOM VARIABLES AND RELATED TOPICS

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Abstract: Gamma distributions can be characterized as the laws of stochastic integrals with respect to many different Lévy processes with different nonrandom integrands. A Lévy process corresponds to an infinitely divisible distribution. Therefore, many infinitely divisible distributions can yield a gamma distribution through stochastic integral mappings with different integrands. In this paper, we pick up several integrands which have appeared in characterizing well-studied classes of infinitely divisible distributions, and find inverse images of a gamma distribution through each stochastic integral mapping. As a by-product of our approach to stochastic integral representations of gamma random variables, we find a remarkable new general characterization of classes of infinitely divisible distributions, which were already considered by James et al. (2008) and Aoyama et al. (2010) in some special cases.

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