

DISTRIBUTIONAL PROPERTIES OF THE NEGATIVE BINOMIAL LÉVY PROCESS

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Abstract: The geometric distribution leads to a Lévy process parameterized by the probability of success. The resulting negative binomial process (NBP) is a purely jump and non-decreasing process with general negative binomial marginal distributions. We review various stochastic mechanisms leading to this process, and study its distributional structure. These results enable us to establish strong convergence of the NBP in the supremum norm to the gamma process, and lead to a straightforward algorithm for simulating sample paths. We also include a brief discussion of estimation of the NBP parameters, and present an example from hydrology illustrating possible applications of this model.

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