On the rate of convergence in limit theorems for geometric sums

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Abstract

Up to the present the estimation of ruin probabilities in classical risk models has been studied and has attracted much attention. The ruin probabilities have a very closed relations with geometric random sums of independent identically distributed random variables through Pollack-Khinchin formulae. The well-known Renyi type limit theorems are related to geometric sums and exponential approximations. In this note, some rates of convergence in Renyi type limit theorems for geometric random sums of row-wise arrays of positive independent identically distributed random variables are established. Moreover, some extended results are also provided for the cases of negative-binomial random sums and the Laplace approximations. A probability distance based on the Trotter operator provides a rich, flexible and elegant mathematical tool in this study.

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