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SUPERLARGE DEVIATIONS FOR SUMS OF RANDOM VARIABLES WITH ARITHMETICAL SUPER-EXPONENTIAL DISTRIBUTIONS

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Local limit theorems are obtained for superlarge deviations of sums $S(n) = \xi(1) + \cdots + \xi(n)$ of independent identically distributed random variables having an arithmetical distribution with the right-hand tail decreasing faster that that of a Gaussian law. The distribution of ξ has the form $\mathbb{P}(\xi = k) = e^{-k^\beta L(k)}$, where $\beta > 2$, $k \in \mathbb{Z}$ ($\mathbb{Z}$ is the set of all integers), and $L(t)$ is a slowly varying function as $t \to \infty$ which satisfies some regularity conditions. These theorems describing an asymptotic behavior of the probabilities $\mathbb{P}\big(S(n) = k\big)$ as $k/n \to \infty$, complement the results on superlarge deviations in [1,2].

Key words and phrases: arithmetical super-exponential distribution, integro-local and local theorems, superlarge deviations, deviation function, random walk, Gaussian approximation, Poissonian approximation.

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