

# THE LAW OF THE ITERATED LOGARITHM AND SMALL DEVIATIONS OF STABLE LÉVY PROCESSES

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Let  $X_\alpha$  be a symmetric  $\alpha$ -stable Lévy process with  $\alpha \in (1, 2)$ . We study the following small deviation problem  $P\{\|X_\alpha - \lambda f\| < r\}$  as  $r \rightarrow 0$ ,  $\lambda r^{\alpha-1} \rightarrow 0$ , where  $\|\cdot\|$  is the uniform norm,  $f$  is an arbitrary continuous function, which starts at 0. We obtain the small deviation rates for these probabilities.

Using these small ball estimates, we derive the functional Law of the Iterated Logarithm for  $X_\alpha$ . Namely, we obtain that under certain choice of scaling function  $\varphi$  the set of a.s. limit points of the family of scalings  $\left\{\frac{X_\alpha(T\cdot)}{\varphi(T)}\right\}_{T>0}$  is equal to the set of all continuous functions, which start at 0. We also describe the sets of scaling functions  $\varphi$ , for which the a.s. limit set is empty or consists just from the zero-function.

This is a result in the spirit of Baldi, Roynette (1992) about the cluster sets of the Wiener process under various scalings.