ON A FUNCTIONAL EQUATION GENERALIZING THE CLASS OF SEMISTABLE DISTRIBUTIONS

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Abstract. With $\varphi(p)$, $p \geq 0$ the Laplace-Stieltjes transform of some infinitely divisible probability distribution, we consider the solutions to the functional equation $\varphi(p) = e^{-p\beta} \prod_{i=1}^{m} \varphi^{\gamma_i}(c_i p)$ for some $m \geq 1$, $c_i > 0$, $\gamma_i > 0$, $i = 1, \ldots, m$, $\beta \in \mathbb{R}$. We supply its complete solutions in terms of semistable distributions (the ones obtained when $m = 1$). We then show how to obtain these solutions as limit laws ($r \uparrow \infty$) of normalized Poisson sums of iid samples when the Poisson intensity $\lambda(r)$ grows geometrically with r.

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