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**REMARKS ON THE PAPER
« ON A PROBLEM OF A KHINCHIN-TYPE
DECOMPOSITION THEOREM FOR EXTREME VALUES »
BY E. PANCHEVA**

(Theory of Probability and its Application, 1994, vol. 39, № 2, p. 329–336)

1. The paper contains an elegant approach for eliminating the problems caused by idempotents in the arithmetics of probability distribution functions over $\mathbb{R}^d$ where the operation is the coordinatewise maximum of the corresponding random vectors. This method is in fact an application of the general approach in Ruzsa and Székely [1]. In this book the notion of «hair» = «maximal idempotent divisor» $H(s)$ for any element s in abstract semigroups S was introduced and a new semigroup $H(s)S$ was considered to settle several problems much easier than directly in S , e.g. the characterization of the class

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$\max-I_0$ (Zemplén [3] proves that F is in $\max-I_0$ if and only if $\text{supp } F$ is a coordinatewise monotone increasing curve.)

2. Pancheva claims in Example 1 that $F_a = (1-a)F + aG$ is indecomposable for any indecomposable G with support in $\{x: \sum x_i = c\}$ but it is easy to construct a counterexample: put $a = \frac{1}{2}$, $F = G^2$ and G be an arbitrary probability distribution satisfying the above mentioned conditions. Then we have the following decomposition: $G(\delta_q + G)/2 = G/2 + G^2/2$ where δ_q is the degenerate distribution at the point q (δ_q is the unity in $\mathcal{F}_q$, the subsemigroup of distributions supported on the quadrant whose origin is q). In Zemplén [2] the stated lemma has an additional condition on the nonboundedness of $\text{supp}(G)$. This condition, however, cannot be achieved in $\mathcal{F}_q$. The theorem on the denseness of the set of indecomposable distribution functions remains true, one only has to consider a continuous G supported by a max-indecomposable curve (a hyperbola for example) and to cut another small empty strip around it into the support of the arbitrary F .

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