GENERALIZED INDEPENDENT INCREMENTS PROCESSES[*]

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Dedicated to Professor K. Urbanik on his 60th birthday

We study a class of Markov processes which arise in the theory of general-ized convolutions and stand for a generalization of processes with independent in-crements.

1. Notation and preliminaries

Let P be the set of all probability measures (p.m.'s) on the positive half-line $R_+ = [0, \infty)$ with the weak convergence $\xrightarrow{w}$. We write δ_x for the unit mass at point x and write T_x for the map given by

$$T_x\mu(B) = \mu(x^{-1}B)$$

for $x > 0$, $\mu \in P$ and $B \in \mathfrak{B}$, the σ-field of Borel subsets of R_+. We define $T_0\mu = \delta_0$. We denote by Q the class of all sub-probability measures (sub-p.m.'s) on R_+. Let C_b be the Banach space of all real bounded continuous functions on R_+ with supremum norm $\| \cdot \|$ and C_0 its subspace consisting of functions vanishing at infinity.

A commutative and associative P-valued binary operation $\circ$ on P with δ_0 as the unit element is called a *generalized convolution*, if it is continuous in each vari-able separately and distributive with respect to convex combinations and maps T_x, and if it satisfies the following law of large numbers: