

**Publicacions més rellevants de la línia de recerca:  
Processos de Lévy**

**Referència:** Sole, J.Ll., Utzet, F. and Vives, J., Malliavin Calculus for canonical Lévy processes, *Stochastic processes and their applications* (2007) **117** 165–187

**Abstract:** A suitable canonical Lévy process is constructed in order to study a Malliavin calculus based on a chaotic representation property of Lévy processes proved by Itô using multiple two-parameter integrals. In this setup, the two-parameter derivative  $D_{t,x}$  is studied, depending on whether  $x = 0$  or  $x \neq 0$ ; in the first case, we prove a chain rule; in the second case, a formula by trajectories.

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**Referència:** Solé, J. L. and Utzet, F., Time–space harmonic polynomials relative to a Lévy process, *Bernoulli*, **14** (2008) pp. 1-13.

**Abstract:** In this work we give a closed form and a recurrence relation for a family of time–space harmonic polynomials relative to a Lévy process. We also state the relationship with the Kailath-Segall (orthogonal) polynomials associated to the process.

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**Referència:** Solé, J. L. and Utzet, F., On the orthogonal polynomials associated with a Lévy process, *Annals of Probability*, **36** (2008) pp. 765–795.

**Abstract:** Let  $X = \{X_t, t \geq 0\}$  be a cadlag Lévy process, centered, with moments of all orders. There are two families of orthogonal polynomials associated with  $X$ . On one hand, the Kailath–Segall formula gives the relationship between the iterated integrals and the variations of order  $n$  of  $X$ , and defines a family of polynomials  $P_1(x_1), P_2(x_1, x_2), \dots$ , that are orthogonal with respect to the joint law of the variations of  $X$ . On the other hand, we can construct a sequence of orthogonal polynomials  $p_n^\sigma(x)$  with respect to the measure  $\sigma^2 \delta_0(dx) + x^2 \nu(dx)$ , where  $\sigma^2$  is the variance of the Gaussian part of  $X$  and  $\nu$  its Lévy measure. These polynomials are the building blocks of a kind of chaotic representation for square functionals of the Lévy process proved by Nualart and Schoutens. The main objective of this work is to study the probabilistic properties and the relationship of both families of polynomials. In particular, the Lévy processes such that the associated polynomials

$P_n(x_1, \dots, x_n)$  depend on a fixed number of variables are characterized. Also, we give a sequence of Lévy processes that converge in the Skorohod topology to  $X$ , such that all variations and iterated integrals of the sequence converge to the variations and iterated integrals of  $X$ .