Publicacions més rellevants de la línia de recerca:

Anàlisi estocàstica

Referència: Dalang, R. C. and Sanz-Solé, M. Hölder-Sobolev Regularity of the Solution to the Stochastic Wave Equation in Dimension Three. *Memoirs of the American Mathematical Society*, **199(231)** (2009), pp. 1–76.

Abstract: We study the sample path regularity of the solution of a stochastic wave equation in spatial dimension $d = 3$. The driving noise is white in time and with a spatially homogeneous covariance defined as a product of a Riesz kernel and a smooth function. We prove that at any fixed time, a.s. the sample paths in the spatial variable belong to certain fractional Sobolev spaces. In addition, for any fixed $x \in \mathbb{R}^3$, the sample paths in time are Hölder continuous functions. Hence, we obtain joint Hölder continuity in the time and space variables. Our results rely on a detailed analysis of properties of the stochastic integral used in the rigorous formulation of the spde, as introduced by Dalang and Mueller (2003). Sharp results on one and two dimensional space and time increments of generalized Riesz potentials are a crucial ingredient in the analysis of the problem. For spatial covariances given by Riesz kernels, we show that the H?older exponents that we obtain are optimal.

Referència: Sanz-Solé, M. Properties of the density for a three dimensional stochastic wave equation. *J. Funct. Anal.*, **255** (2008), pp. 255–281.

Abstract: We consider a stochastic wave equation in space dimension three driven by a noise white in time and with an absolutely continuous correlation measure given by the product of a smooth function and a Riesz kernel. Let $p_{t,x}(y)$ be the density of the law of the solution $u(t,x)$ of such an equation at points $(t,x) \in]0,T] \times \mathbb{R}^3$. We prove that the mapping $(t,x) \mapsto p_{t,x}(y)$ owns the same regularity as the sample paths of the process $\{u(t,x), (t,x) \in]0,T] \times \mathbb{R}^3\}$ established in [R.C. Dalang, M. Sanz-Solé, Hölder–Sobolev regularity of the solution to the stochastic wave equation in dimension three, Mem. Amer. Math. Soc.]. The proof relies on Malliavin calculus and more explicitely, the integration by parts formula of [S. Watanabe, Lectures on Stochastic Differential Equations and Malliavin Calculus, Tata Inst. Fund. Res./Springer-Verlag, Bombay, 1984] and

estimates derived form it.

Referència: Marquez-Carreras, D. and Rovira, C. An iterated logarithm law for anticipating stochastic differential equations. *Journal of Theoretical Probability*, 21(3) (2008), pp. 650–659.

Abstract: We prove a functional law of iterated logarith for the following kind of anticipating stochastic differential equations

$$\xi_t^u = X_0^u + \frac{1}{\sqrt{\mathrm{loglog} u}} \sum_{j=1}^{k} \int_0^t A_j^u\left(\xi_s^u\right) \circ dW_s^j + \int_0^t A_0^u\left(\xi_s\right)^u \, ds$$

where $u > e$, $W = \{\left(W_t^1, \dots, W_t^k\right), 0 \leq t \leq 1\}$ is a standard k?dimensional Wiener process, $A_0^u, A_1^u, \dots, A_k^u : \mathbb{R}^d \longrightarrow \mathbb{R}^d$ are functions of class $\mathcal{C}^2$ with bounded derivatives up to order 2, X_0^u is a random vector not necessarily adapted and the first integral is a generalized Stratonovich integral.