Global existence for stochastic waves with super-linear coefficients

Marta Sanz-Solé, Universitat de Barcelona and BGSMath

We consider a stochastic wave equation on $\mathbb{R}^d$, $d \in \{1, 2, 3\}$, driven by a Gaussian noise in (t, x), white in time. We assume that the free terms b and σ are such that, for $|x| \to \infty$,

$$|\sigma(x)| \leq \sigma_1 + \sigma_2|x|\big(\ln_+(|x|)\big)^a, \quad |b(x)| \leq \theta_1 + \theta_2|x|\big(\ln_+(|x|)\big)^\delta, \qquad (1)$$

where $\theta_2, \sigma_2 > 0$, $\delta, a > 0$, with b *dominating* over σ. For any fixed time horizon $T > 0$ and with a suitable constraints on the parameters a, δ, σ_2 and θ_2, we prove existence of a random field solution to the equation and that this solution is unique, and bounded in time and in space a.s.
The research is motivated by the article [R. Dalang, D. Khoshnevisan, T. Zhang, *AoP, 2019*] on a 1-d reaction-diffusion equation with coefficients satisfying conditions similar to (1). We see that the L^∞- method used by these authors can be successfully implemented in the case of wave equations. This is joint work with A. Millet (U. Paris 1, Panthéon-Sorbonne).