Well-posedness for a class of stochastic wave equations 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 noise in (t, x) white in time. We assume that the coefficients b and σ are such that, for $|x| \to \infty$,

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

where $\theta_i, \sigma_i \in \mathbb{R}_+$, $i = 1, 2$, $\sigma_2 \neq 0$, $\delta, a > 0$, with b *dominating* over σ. We prove that for any fixed time horizon $T > 0$, there exists a random field solution to the equation, this solution is unique and is bounded in time and in space a.s.
The research is motivated by the recent work [R. Dalang, D. Khoshnevisan, T. Zhang, *AoP, 2019*] concerning a one-dimensional reaction-diffusion equation with super-linear coefficients satisfying (1). We see that the L^∞ method used by these authors can be successfully implemented in the case of wave equations. This is ongoing joint work with A. Millet (U. Paris 1, Panthéon-Sorbonne).