

On a nonlocal Stochastic PDE

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SUMMARY

Let $(\Omega, \mathbb{P}, \mathcal{F}, \{\mathcal{F}_t\}_{t \geq 0})$ be a filtered probability space satisfying the usual hypothesis i.e., $\{\mathcal{F}_t\}_{t \geq 0}$ is a right-continuous filtration such that \mathcal{F}_0 contains all the \mathbb{P} -null subsets of (Ω, \mathcal{F}) . We are interested in the existence and uniqueness of an entropy $L^2(\mathbb{R}^d)$ -valued predictable process $u(t, \cdot)$ which satisfies the Cauchy problem

$$du + \mathcal{L}_\lambda \phi(u) - \operatorname{div} \vec{f}(u) dt = h(u) dW(t) \quad \text{in } Q, \quad u(t=0) = u_0 \quad \text{in } \mathbb{R}^d,$$

where $Q = \mathbb{R}^d \times (0, T)$ with $T > 0$ fixed, $u_0(x)$ is the given initial function, \mathcal{L}_λ is the λ -fractional Laplace operator, $\vec{f} : \mathbb{R} \mapsto \mathbb{R}^d$, $\phi, h : \mathbb{R} \mapsto \mathbb{R}$ are a given (sufficiently smooth) functions and $W(t)$ is a real valued Brownian noise.

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¹LMAP

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