

META-STABILITY OF SOME REACTION-DIFFUSION EQUATIONS WITH LÉVY NOISE

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Motivated by studies from climate physics, we investigate a class of reaction-diffusion equations with additive α -stable Lévy noise, stochastic perturbations of the Chafee-Infante equation. We study exit and transition between meta-stable states of their solutions. Due to the heavy-tail nature of an α -stable noise component, the results differ strongly from the well known case of purely Gaussian perturbations. As opposed to the Gaussian picture, where a potential diffusion has to climb to the nearest saddle of the underlying potential landscape for which it takes a time depending exponentially on the noise amplitude, α -stable exits occur as big enough jumps of the noise process and are polynomial in its amplitude. In the scale of these transition times, the diffusion reduces to a pure jump Markov chain between the stable equilibria of the Chafee-Infante equation.