Reflected diffusions with local time-dependent noise

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In this talk, we consider a one-dimensional diffusion reflecting above zero whose noise is a function of its reflection local time. When the noise function decreases and attains zero there are cases where the noise disappears at an almost surely finite random time, which we call the time of determinacy. However, it may be the case that the noise will never disappear. In the first half of the talk, we categorize these two cases and ascertain the distribution of the time of determinacy. For the second half, we consider systems of one-dimensional diffusions whose (common) noise depends on the collection of reflection local times. That is, the diffusions interact through their local time and influence their common diffusivity. We discuss the propagation of chaos and convergence of the empirical measures to a nonlinear PDE whose existence and uniqueness results are shown by stochastic methods. The PDE essentially is a Neumann problem in the half-line with a diffusivity depending on the past temperature.
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