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A nonlinear stochastic convection-diffusion equation with reflection

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SUMMARY

We show existence and uniqueness of a stochastic parabolic obstacle problem with obstacle $\psi = 0$ under homogeneous Dirichlet boundary conditions. In the penalized equation, the penalization term converges to a random Radon measure η only. Since the solution u of the obstacle problem is not continuous in space-time in general, this causes problems to give a proper definition of the minimalization condition of η. We show that η does not charge sets of zero capacity and the solution is nonnegative quasi everywhere. Uniqueness may be obtained for quasi continuous solutions.

Keywords: obstacle problem, SPDE, penalization

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