FREE BOUNDARY PROPAGATION UNDER THE IMPACT OF NOISE: A NUMERICAL STUDY BASED ON CONVERGENT FINITE-ELEMENT SCHEMES

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Abstract. Finite speed of propagation is one of the most interesting features of degenerate parabolic partial differential equations – like the porous-medium equation or the thin-film equation. Recently, stochastic versions of such equations have been studied as well.

In this talk, we contribute to the question how noise influences the propagation of the support of solutions. To this scope, we propose fully discrete, convergent finite-element schemes for stochastic porous-medium equations and p-Laplace equations with multiplicative noise. Approximating the noise by bounded stochastic increments, we guarantee nonnegativity of discrete solutions. Finally, we present some first results on the quantitative impact of noise on the speed of propagation.

Keywords: Stochastic partial differential equations, degenerate parabolic equations, nonnegativity-preserving scheme, stochastic free-boundary problem, martingale solution.

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