A Boundary Value Problem for a Class of Anisotropic Stochastic Degenerate Parabolic-Hyperbolic Equations

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We establish the well-posedness of an initial-boundary value problem of mixed type for a stochastic nonlinear parabolic-hyperbolic equation on a space domain $\mathcal{O} = \mathcal{O}' \times \mathcal{O}''$ where a Neumann boundary condition is imposed on $\partial\mathcal{O}' \times \mathcal{O}''$, the hyperbolic boundary, and a Dirichlet condition is imposed on $\mathcal{O}' \times \partial\mathcal{O}''$, the parabolic boundary. Among other points to be highlighted in our analysis of this problem we mention the new strong trace theorem for the special class of stochastic nonlinear parabolic-hyperbolic equations studied here, which is decisive for the uniqueness of the kinetic solution, and the new averaging lemma for the referred class of equations which is a vital part of the proof of the strong trace property. We also provide a detailed analysis of the approximate nondegenerate problems, which is also made here for the first time, as far as the authors know, whose solutions we prove to converge to the solution of our initial-boundary value problem. This a joint work with Yachun Li, Daniel Marroquin, João F.C. Nariyoshi and Zirong Zeng.

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