

# Convergence of a finite-volume scheme for a heat equation with a multiplicative Lipschitz noise

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We study the approximation by a finite-volume scheme of a heat equation forced by a Lipschitz continuous multiplicative noise in the sense of Itô. More precisely, we consider a discretization which is semi-implicit in time and a two-point flux approximation scheme (TPFA) in space. Since the nonlinearity in the stochastic integral is not compatible with the weak convergence obtained by the *a priori* estimates, we adapt the method based on the theorem of Prokhorov and on Skorokhod's representation theorem in order to show stochastically strong convergence of the scheme towards the unique variational solution of our parabolic problem.

Keywords: Stochastic heat equation, multiplicative Lipschitz noise finite-volume method, stochastic compactness method, variational approach, convergence analysis.