

Alòs, E.; Nualart, D.; Viens, F.

Stochastic heat equation with white-noise drift. (English) Zbl 0970.60068
Ann. Inst. Henri Poincaré, Probab. Stat. 36, No. 2, 181-218 (2000).

The authors study the existence and uniqueness of solutions for a one-dimensional anticipative stochastic evolution equation on the real line

$$u(t, x) = \int_{\mathbb{R}} p(0, t, y, x) u_0(y) dy + \int_{\mathbb{R}} \int_0^t p(s, t, y, x) F(s, y, u(s, y)) dW_{s, y}$$

driven by a two-parameter Wiener process $W_{t, x}$ and based on a stochastic semigroup defined by the kernel $p(s, t, y, x)$. This kernel is supposed to be measurable w.r.t. the increments of the Wiener process on $[s, t] \times \mathbb{R}$. The results are based on L^p -estimates for the Skorokhod integral. As an application they establish the existence of a weak solution for the following heat equation on the real line subject to white noise drift,

$$\partial_t u(t, x) = \partial_x^2 u(t, x) + \dot{v}(t, x) \partial_x u(t, x) + F(t, x, u) \partial_t \partial_x W(t, x),$$

where \dot{v} is a white noise in time.

Reviewer: [Dirk Blömker \(Augsburg\)](#)

MSC:

[60H15](#) Stochastic partial differential equations (aspects of stochastic analysis)
[35K05](#) Heat equation
[60H25](#) Random operators and equations (aspects of stochastic analysis)
[60H05](#) Stochastic integrals

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Keywords:

[anticipative stochastic evolution equation](#); [Skorokhod integral](#); [stochastic semigroup](#); [white noise drift](#); [real line](#); [backward heat kernel](#)

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