

Korteweg-de Vries equation perturbed by a random force

Elżbieta Motyl

The well-known Korteweg-de Vries equation describes propagation of shallow water waves that are weakly and nonlinearly interacting. The deterministic KdV equation without external forcing, i.e.

$$\frac{\partial u}{\partial t} + \frac{\partial^3 u}{\partial x^3} + 6u \frac{\partial u}{\partial x} = 0, \quad x \in \mathbb{R}, \quad t > 0,$$

has been studied by many authors. In many situations, for example, while studying flow over a flat horizontal bottom with localized inhomogeneities or response in a channel to a surface disturbance, a forcing term has to be taken into account. Besides, KdV equation with random forcing has arisen in plasma physics. In the present talk we consider the initial-value problem for KdV equation perturbed by a Poisson random measure and prove the existence of a weak solution. The construction of the solution is based on the parabolic regularization technique, compactness method and the martingale representation theorem.

Author: Elżbieta, Motyl

Affiliation: *Faculty of Mathematics and Computer Science, University of Lodz
ul. Banacha 22, Lodz, Poland*

e-mail: elzbieta.motyl@wmii.uni.lodz.pl