Maximum principle for solutions of quasilinear SPDE's

L.Denis
Département de Mathématiques
Equipe "Analyse et Probabilités"
Boulevard F. Mitterrand
91 025 EVRY Cedex - FRANCE
ldenis@univ-evry.fr

Abstract

In this talk, we consider the following spde:

$$du_t(x) + Au_t(x) + f\left(t, x, u_t(x), \nabla u_t(x)\right) + \sum_{i=1}^{d} \partial_i g_i\left(t, x, u_t(x), \nabla u_t(x)\right) = \sum_{j=1}^{d_1} h_j\left(t, x, u_t(x), \nabla u_t(x)\right)\, dB_t^j,$$

where A is a second order symmetric differential operator defined in some domain $\mathcal{O} \subset \mathbb{R}^d$. We give L^p estimates ($p \geq 2$) for the uniform norm of the paths of solutions of this equation.

We first consider the case where f, g and h are Lipschitz. Then, we consider a more general case, the one of Burger type equations (i.e. g may have polynomial growth) and in a last part we consider a local version of these estimates. Our methods are based on a version of Moser's iteration scheme developed by Aronson and Serrin in the context of non-linear parabolic PDE.

References

[1] Denis L. (2004) : Solutions of SPDE considered as Dirichlet Processes, Bernoulli Journal of Probability, Vol. 10 (5) .

[2] Denis L. and Stoica, I. L. (2004) : A general analytical result for non-linear s.p.d.e.'s and applications, Electronic Journal of Probability, Vol. 9, p. 674-709.

[3] Denis L., Matoussi A. and Stoica, I. L. (2005) : L^p estimates for the uniform norm of solutions of quasilinear SPDE's, Proba. Theory and Related Fields 133, pp437-463.