Universidade Estadual de Campinas

Workshop in Stochastic Analysis and Applications

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Path-by-path regularization by noise for scalar conservation laws

Abstract

In this talk we will revisit regularizing effects of noise for nonlinear SPDE. In this regard we are interested in phenomena where the inclusion of stochastic perturbations leads to increased regularity of solutions as compared to the unperturbed, deterministic case. Closely related, we study effects of production of uniqueness of solutions by noise, i.e. instances of SPDE having a unique solution, while non-uniqueness holds for the deterministic counterparts. The talk will concentrate on a path-by-path regularization by noise result in the case of nonlinear scalar conservation laws. In particular, this proves regularizing properties for scalar conservation laws driven by fractional Brownian motion and generalizes the respective results obtained in [G., Souganidis; Comm. Pure Appl. Math. (2017)]. We show that (ρ, γ)-irregularity is a sufficient path-by-path condition implying improved regularity. In addition, we introduce a new path-by-path scaling property which is also shown to be sufficient to imply regularizing effects.