

Feng-Yu Wang (Swansea)

Hypercontractivity for degenerate diffusion semigroups

Abstract

The hypercontractivity is proved for a class of finite and infinite dimensional diffusion semigroups associated to degenerate SDEs and SPDEs. As applications, the compactness and exponential convergence in entropy of the semigroups are proved. It is well known that in the symmetric case the hypercontractivity is equivalent to the existence of the log-Sobolev inequality. We provide a number of hypercontractive diffusion semigroups for which the log-Sobolev inequality does not hold, which emphasize the essential difference of symmetric and non-symmetric Markov semigroups. Functional stochastic differential equations are also discussed.