SEMINARIO DI MATEMATICA

lunedì 29 aprile 2019
ore 11:00

Scuola Normale Superiore
Pisa
Aula Tonelli

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Terrà un seminario dal titolo:

"The evolution to equilibrium of solutions to nonlinear Fokker-Planck equations"

Abstract:
The talk is about the so-called H -Theorem for a class of nonlinear Fokker-Planck equations which are of porous media type on the whole Euclidean space perturbed by a transport term. We first construct a solution in the sense of mild solutions on L^1 through a nonlinear semigroup of contractions. Then we study the asymptotic behavior of the solutions when time tends to infinity. For a large class M of initial conditions we show their relative compactness with respect to local L^1 convergence, while all limit points belong to L^1. Under an additional assumption we obtain that we in fact have convergence in L^1, if the initial condition is a probability density. The limit is then identified as the unique stationary solution in M to the nonlinear Fokker-Planck equation. This solution is thus an invariant measure of the solution to the corresponding distribution dependent SDE whose time marginals converge to it in L^1. It turns out that under our conditions the underlying nonlinear Kolmogorov operator is a (both in the second and first order part) nonlinear analog of the generator of a distorted Brownian motion. The solution of the above mentioned distribution dependent SDE can thus be interpreted as a "nonlinear distorted Brownian motion". Our main technique for the proofs is to construct a suitable Lyapunov function acting nonlinearly on the path in L^1, which is given by the nonlinear contraction semigroup applied to the initial condition, and then adapt a classical technique of Pazy to our situation. This Lyapunov function is given by a generalized entropy function (which in the linear case specializes to the usual Boltzmann-Gibbs entropy) plus a mean energy part

Tutti gli interessati sono invitati a partecipare.

Classe di Scienze