BOSTON UNIVERSITY MATHEMATICS COLLOQUIUM

Long time effects of small perturbations and a motion on the simplex of invariant measures

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Abstract: Let $(X^e)_t$ be the result of perturbations, deterministic or stochastic, of a dynamical system (semiflow, stochastic process) X_t. The parameter $e \ll 1$ characterizes the size of perturbations in an appropriate metric; $(X^e)_t$ converges to X_t as $e \to 0$.

Long time behavior of $(X^e)_t$ is of interest in many problems. But there are two large parameters here: t and $1/e$. The limit, in general, depends on how the point $(t, 1/e)$ approaches infinity. Under natural assumptions, one can consider fast and slow components of the perturbed system. The slow component, in an appropriate time scale, approaches a motion on the simplex of probability invariant measures of the non-perturbed system. The fast component can be characterized by a corresponding invariant measure. There are some general results of this type. But I will consider from this point of view various concrete perturbation theory problems like perturbations of finite Markov chains, of various dynamical systems, second order PDEs with a small parameter, homogenization, wave fronts in Reaction-Diffusion equations.

At 3:00 pm, tea will be served in MCS 144.