Berlin Leipzig Seminar
Analysis/probability theory
Third Meeting Winter Term 2007/08

Organized by the DFG Research Group *Analysis and Stochastics in Complex Physical Systems*

DATE: Friday, 8 February 2008

VENUE: Technical University Berlin, Institute for Mathematics, Str. des 17. Juni 136, 10623 Berlin, Room MA313/314

PROGRAMME:

9:40–10:30: **Michael Röckner (University of Bielefeld and Purdue University)**

Self-organized criticality via SPDE

Abstract: The phenomenon of self-organized criticality is widely studied in Physics from different perspectives. The purpose of this talk is to present an approach to analyze this phenomenon in the framework of SPDE, more precisely via a class of stochastic evolution equations of a type analogous to the classical porous media equation with multiplicative noise, but with discontinuous diffusivity function. We shall present results on existence and uniqueness of strong solutions and prove that positivity of initial data is preserved. We also confirm extinction results from the Physics literature, obtained for one-dimensional underlying domains by numerical simulations, and prove finite time convergence to the critical state with high probability.

(joint work with Viorel Barbu, Philippe Blanchard and Giuseppe Da Prato)

10:40–11:30: **Michael Scheutzow (Technical University Berlin)**

Global properties of stochastic flows on Euclidean spaces

Abstract: We present results about the long-term behaviour of the image of a bounded set under a stochastic flow on a Euclidean space. In the first part, we ask whether a flow which is generated by a stochastic differential equation (sde) with linearly bounded and locally Lipschitz coefficients is *strictly complete*, i.e. the image of a bounded set remains bounded for all times with probability one (this is work in progress with Xue-Mei Li, Warwick). In the second part, we will provide conditions on the flow or its generating sde which guarantees the existence of a global random attractor, which means that the image of a bounded set will eventually move like a stationary process taking values in the space of compact subsets of the ambient Euclidean space (this part is joint work with Georgi Dimitroff).

11:40–12:30: **Elisabetta Scoppola (University of Rome Tre)**

Some spin glass ideas applied to the clique problem

Abstract: I will recall some optimization problems in graph theory like the clique problem, the vertex covering and the balanced complete bipartite subgraph. I will review and discuss some algorithms for their study; in particular a Markov chain Monte Carlo can be defined inspired by the cavity method developed in the study of spin glass. Numerical results will be also presented to compare the different algorithms.

Everybody is welcome to attend.   Wolfgang König, University of Leipzig