East Midland Stochastic Analysis Seminar

sponsored by London Mathematical Society

Organisers: Z. Brzezniak (Hull), K. D. Elworthy (Warwick), X.-M. Li (Nottingham-Trent), H.Z. Zhao (Loughborough)

28 April 2004
Stochastic Analysis Day at Nottingham Trent

2:30 A. Stuart (Warwick) Homogenization For Inertial Particles

3:30 Tea

4:00 M. Scheutzow (TU Berlin) Small ball probabilities and the quantization problem for Gaussian measures

5:00 N.O'Connell (Warwick) Some reflections on Brownian motion

Dinner at New Ocean city restaurant, inexpensive Chinese buffet, costs around 10 pounds per head.

Venue: Lectures will be in room 614, Newton Building, Burton street. Tea will be served in room 124 in Goldsmith house (annexe to Newton building).

For more information, please contact Xue-Mei Li (xuemei.li@ntu.ac.uk, Tel. 0115 848 2118).

Abstracts of talks:

O'Conneell:
Pitman (1975) showed that, if $(B_t, t\ge 0)$ is a one-dimensional Brownian motion

and I_t is the infimum up to time t, then $B-2I$ is a three-dimensional Bessel process, that is, it has the same law as the norm of a three-dimensional Brownian motion. I will describe a multi-dimensional generalisation of this result which gives a representation for Brownian motion in a Weyl chamber as a certain path-transformation applied to the corresponding Euclidean Brownian motion. This is joint work with Ph. Biane and Ph. Bougerol and builds on earlier work of Bougerol and Jeulin (2002) and O'Connell and Yor (2002). I will also describe some connections with random matrices and longest increasing subsequence problems.

M. Scheutzow
Small ball probabilities and the quantization problem for Gaussian measures
Let mu be a probability measure on a metric space (E, d) and N a positive integer. The quantization error eN of mu is defined as the infimum over all subsets \varepsilon of E of cardinality N of the average distance w. r. t. mu to the closest point in the set \varepsilon. We study the asymptotics of eN for large N. We concentrate on the case of a Gaussian measure mu on a Banach space. The asymptotics of eN is closely related to small ball probabilities which have received considerable interest in the past decade. The quantization problem is motivated by the problem of encoding a continuous signal by a specified number of bits with minimal distortion. This is joint work with Steffen Dereich, Franz Fehringer, Anis Matoussi and Michail Lifschitz.

Stuart: Joint work with Jochen Voss and Petter Wiberg.
We describe a method for sampling from paths of SDEs,
conditional on observations, possibly noisy. The method
is based on the Langevin MCMC method for sampling from
finite dimensional distributions. By passing to a suitable
continuum limit in this method, a stochastic PDE is derived.
The method can be rigorously justified for Gaussian problems,
when it includes the Kalman filter/smoother as a special case;
this analysis is presented. Numerical evidence is shown
to justify the method for nonlinear problems.