Speaker:
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Date: Wednesday 5th December, 2007 Time: 2 - 3pm
Venue: E4A 523 (Level 5 seminar room)

Title: 'On the Moments and some Functionals of Wishart Processes'

Abstract:
The Wishart law appears in multivariate statistics as the law of the empirical variance-covariance matrix in Gaussian models. It is one of the reasons why it plays a very important role in multivariate statistics. Consequently, the moments of the Wishart laws are involved in some approximation procedures related to the computation of tolerance factors of a population distributed according to a Gaussian multivariate law. The knowledge of the moments is necessary in order to evaluate the power of correlation between the variables. Some moments of Wishart laws appear also in the recent theory of graphical Markov models. Wishart laws are useful in finances, namely in modelling of stochastic volatility.

The computation of moments of a centered Wishart matrix and of multilinear functionals of centered Wishart matrices (involving products of traces) has been studied by many authors for a long time using methods based on the Laplace transform and the representation theory of the symmetric group. The case of non-centered real Wishart matrices is more difficult and has not been studied sufficiently up to now. We consider the Wishart processes $(X_t)_{t>=0}$ and we pass from the "statical" point of view to the "dynamical" one. The link between the two cases is simple: just fix t, for example t = 1, in Wishart process and we obtain Wishart matrix. But the difference between the two cases is fundamental: while introducing stochastic processes we can benefit from the powerful tools of Ito calculus. We give formulas for the moments and the expectation of some functionals of Wishart process $X = (X_t)_{t>=0}$. These formulas are obtained via Ito calculus for matrix processes. Taking t = 1 we can derive immediately the same results for centered and non-centered Wishart matrices.