Three lectures on Stochastic Processes

Universiteit van Amsterdam
Korteweg-de Vries Instituut voor Wiskunde
Room P.016

23 October 2001

Programme

14.30–15.15	Jean Mémin (Université de Rennes 1)
15.15–16.00	Harry van Zanten (Vrije Universiteit)
16.00–16.15	Coffee break
16.15–17.00	Marc Yor (Université Paris VI & Paris VII)

Abstracts

Jean Mémin: *On the robustness of backward stochastic differential equations*

In this talk we study the robustness of backward stochastic differential equations (BSDE in short) with respect to the Brownian motion; more precisely we will show that if W^n is a martingale approximation of a Brownian motion W then the solution of the BSDE driven by the martingale W^n converges to the solution of the classical BSDE, namely the BSDE driven by W. Here we will not assume that W^n has the predictable representation property. As a byproduct of the result we obtain the convergence of the "Euler scheme" for BSDEs corresponding to the case where W^n is a time discretization of W.

Harry van Zanten: *On Donsker Theorems for Additive Functionals of Ergodic Diffusion Processes*

In this talk we discuss the uniform central limit problem for additive functionals of an ergodic, 1-dimensional diffusion process. We consider a regular diffusion X on an open interval I, with finite speed measure m and diffusion local time $(l_t(x) : t \geq 0, x \in I)$. If Λ is a collection of signed measure on I and the total variations of these signed measures are uniformly bounded, we give a sufficient condition on Λ under which the random map

$$\lambda \mapsto \sqrt{t} \int_I \left(\frac{1}{t} l_t(x) - \frac{1}{m(I)} \right) \lambda(dx)$$

converges weakly, as $t \to \infty$, to a tight weak limit in the space $\ell^\infty(\Lambda)$ of bounded functions on Λ. The condition on Λ is formulated in terms of the metric entropy of the class with respect to a suitable metric. We also discuss a number of applications of the abstract result.

Marc Yor: *On subordinators, self-similar Markov processes and some factorizations of the exponential variable*

In this lecture, I shall prove that if $I = \int_0^\infty ds \, \exp(-\xi_s)$ is the 'exponential functional' associated to $(\xi_s, s \geq 0)$, a subordinator, then it is always a factor in a multiplicative decomposition of the exponential variable. I shall illustrate this result with several examples.

This afternoon is jointly organized by CWI (Spatial Stochastics Seminar) and the Universiteit van Amsterdam (Colloquium on Probability, Statistics and Financial Mathematics)