Applied Mathematics

McGill & CRM Applied Mathematics Seminar

2:35 pm Monday 26th April 2004
At McGill, Burnside Hall 1205

"Efficiency considerations for the numerical integration of stochastic differential equations"

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Coffee and refreshments will be served after the seminar

Abstract: In recent years there has been an explosion of interest in the modelling of stochastic phenomena, and stochastic differential equations (SDEs) are now routinely used to describe systems throughout the physical and social sciences. However, from a numerical point of view, there is a distinct lack of both theoretical results and sophisticated, general-purpose, numerical integration software that can safely be used by 'non-experts'. This is especially apparent when the current state of affairs is compared with the vast and highly successful body of knowledge that exists for ODEs.

This seminar, which assumes no prior knowledge of SDEs or stochastic calculus, will compare and contrast the fundamental problems inherent in the efficient and reliable numerical integration of SDEs versus those of ODEs. Of particular interest is the idea of adaptive timestepping, a strategy that has been very successful for ODEs where it is capable of impressive efficiency gains, but which is both more difficult to implement and less rewarding in the SDE case. Some recent approaches to this problem will be described, together with a brief discussion of other related issues such as numerical stability.