ADVANCED MONTE CARLO METHODS
MATH5805
SEMESTER 2 2014

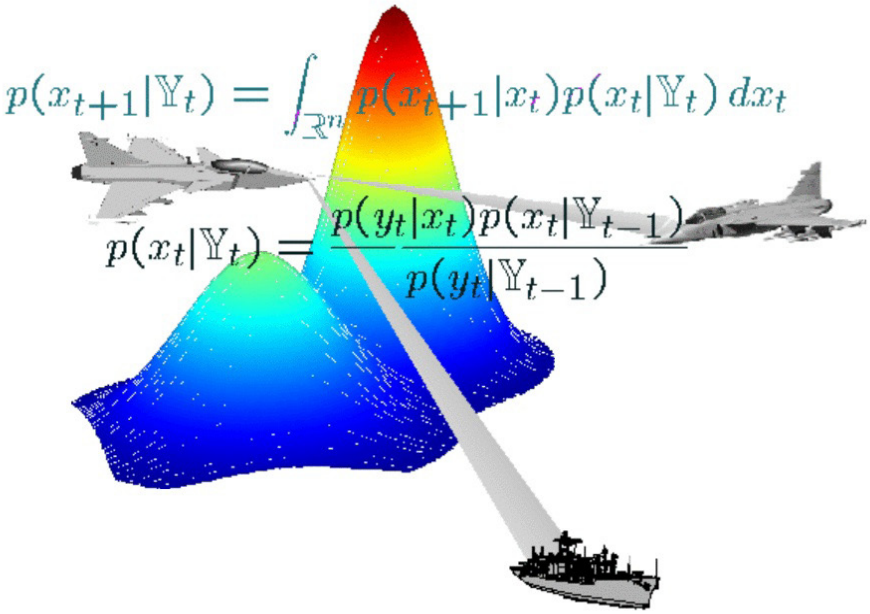
Never Stand Still | Faculty of Science | School of Mathematics & Statistics

This Statistics Special Topics course will cover topics in the general area of Monte Carlo methods and their application domains. The topics include Markov chain Monte Carlo and Sequential Monte Carlo methods, Quantum and Diffusion Monte Carlo techniques, as well as branching and interacting particle methodologies.

The lectures cover discrete and continuous time stochastic models, starting from traditional sampling techniques (perfect simulation, Metropolis-Hasting, and Gibbs-Glauber models) to more refined methodologies such as gradient flows diffusions on constraint state space and Riemannian manifolds, ending with the more recent and rapidly developing Branching and mean field type Interacting Particle Systems techniques.

The course has been designed so that there are no fixed prerequisites. It will be assumed that participants will have a good knowledge of probability theory and basic Markov chain models. In particular, a good knowledge of undergraduate mathematics and of undergraduate probability at the level of MATH2801/MATH2901 is required. This means familiarity with basic probability models, random variables and their probability distributions, independence, expectations and conditional probabilities, as well as the law of large numbers. Exposure to classical differential calculus, and basic vector and matrix algebra will also be assumed.

Day and Time: Thursday 17:00 - 20:00
Dates 31st July - 23rd October (Weeks 1-12)
Location: Red Centre, Central Wing,
School of Mathematics and Statistics,
Level 4, Room 4082
Lecturer: Professor Pierre Del Moral



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