UNIVERSITÀ DEGLI STUDI DI PADOVA
DIPARTIMENTO DI SCIENZE STATISTICHE

PhD School in Statistics – XXV cycle

Specialist Course

joint with the PhD Schools

Metodi Statistici per l'Economia e l'impresa, Università di Roma Tre
Statistica Applicata, Università di Firenze
Statistica Metodologica, Università "La Sapienza" di Roma

and the sponsorship of

Società Italiana di Statistica

MONTE CARLO STATISTICAL METHODS

by

George Casella

University of Florida,USA

June 16, 2010 – 15.00-18.00
June 17, 2010 – 15.00-18.00
June 18, 2010 – 11.30-13.30

Aula SC 60

Maximum 50 students are admitted

Prof. Alessandra Salvan
School Director

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Outline of Monte Carlo Short Course

The course will be based on material from two textbooks

(1) *Monte Carlo Statistical Methods*, *Second Edit*ion, Robert and Casella, Springer-Verlag 2004
(2) *Introducing Monte Carlo Methods with* R, Robert and Casella, Springer-Verlag 2009

There is no need to purchase either book. Copies of all slides will be provided, as well as all R code. There is already an R package on CRAN, mcsm, which contains all of the R code from the second book. An older version of this course, as well as R code, can be found at http://www.stat.ufl.edu/_casella/ShortCourse08/

Topics that will be covered include:

Topic	Description
Introduction	Review of Basic Methodology
Random Variable Generation	Generating uniform random variables, transformation methods, accept-rej
Monte Carlo Integration	Classical, importance sampling, and others
Monte Carlo Optimization	EM and related algorithms
Markov Chains	Basic theory needed for the next topics
The Metropolis Hastings Algorithm	The basic M-H algorithm and many variations
The Two-Stage Gibbs Sampler	The basic Gibbs sampler and many variations
The Multi-Stage Gibbs Sampler	The workhorse; hierarchical models, etc.
Diagnosing Convergence	Methods for detecting convergence of a Markov chain