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Schedule for Computational Finance (623)

Lecture	Content
#1, Jan 21st	Introduction to MC Simulation, confidence intervals, and integral transform
#2, Jan 28th	Antithetic variables, simulation of multi-dimensional normals, and principal component analysis (PCA)
#3, Feb 4th	Acceptance/rejection algorithm, computation of the normal characteristic function using Itô's lemma and martingales
#4, Feb 11th	Basic properties of characteristic functions, the inversion formula, and the Cauchy distribution
#5, Feb 18th	Examples of how to compute characteristic functions and Euler's schemes for simulating SDEs
#6, Feb 25th	Projects' discussion, Milstein's scheme for simulating SDEs, the Brownian bridge (see notes on Canvas), and risk measures
#7, Mar 4th	Sensitivity simulation (Broadie and Glasserman, 1996), Cox processes, and CDS contracts (see notes on Canvas)
#8, Mar 11th	Heston's model, Stein and Stein's model, Copulas and NtD contracts (see notes on Canvas)
Mar 18th	No class (Spring break)
#9, Mar 25th	Finish copulas and start numerical methods for ODEs
#10, April 1st	More on numerical methods for ODEs and PDEs (heat equation), Richardson extrapolation, and stability You can find teaching notes here: (i) https://personal.math.vt.edu/daymv/class_homepages/5726/BSPDEbk.pdf (ii) https://www.dropbox.com/s/fxd7o12eqmardny/PDEnote_English.pdf?dl=0 (iii) https://homepage.divms.uiowa.edu/~atkinson/papers/NAODE_Book.pdf
#11, April 8th	Finish numerical methods for PDEs
#12, April 15th	Problem sheets (see Canvas) related to stopping times
#13, April 22nd	American options and Brennan-Schwartz algorithm
#14, April 29th	MC simulation and Longstaff-Schwartz (2001)