Applied Probability and Statistics

Algebra and numerical simulation of stochastic differential equations driven by Levy processes

Charles CURRY
NTNU, Trondheim

Thursday, May 21, 2015
11h30, *ICMAT, Aula Gris II*

Solutions of continuous stochastic differential equations with sufficiently smooth driving co-efficients permit an expansion in terms of multiple iterated integrals. There exist a number of numerical integration schemes for such equations making use of the algebraic structure of iterated integrals as studied by Chen and others. In this talk we will discuss possible generalizations of such methods to discontinuous equations driven by Levy processes. Such equations are closely related to the jump stochastic differential equations of Ito. We will examine the extent to which the available solution expansions are amenable to the above methods, before considering the impact of the discontinuities on the algebraic structure of multiple iterated integrals appearing in the solution expansions. We will conclude with the presentation of a new class of numerical integration schemes for discontinuous Levy-driven equations that naturally generalize the aforementioned schemes from the continuous case, and discuss the extent to which they inherit the optimality properties of the analogous schemes.