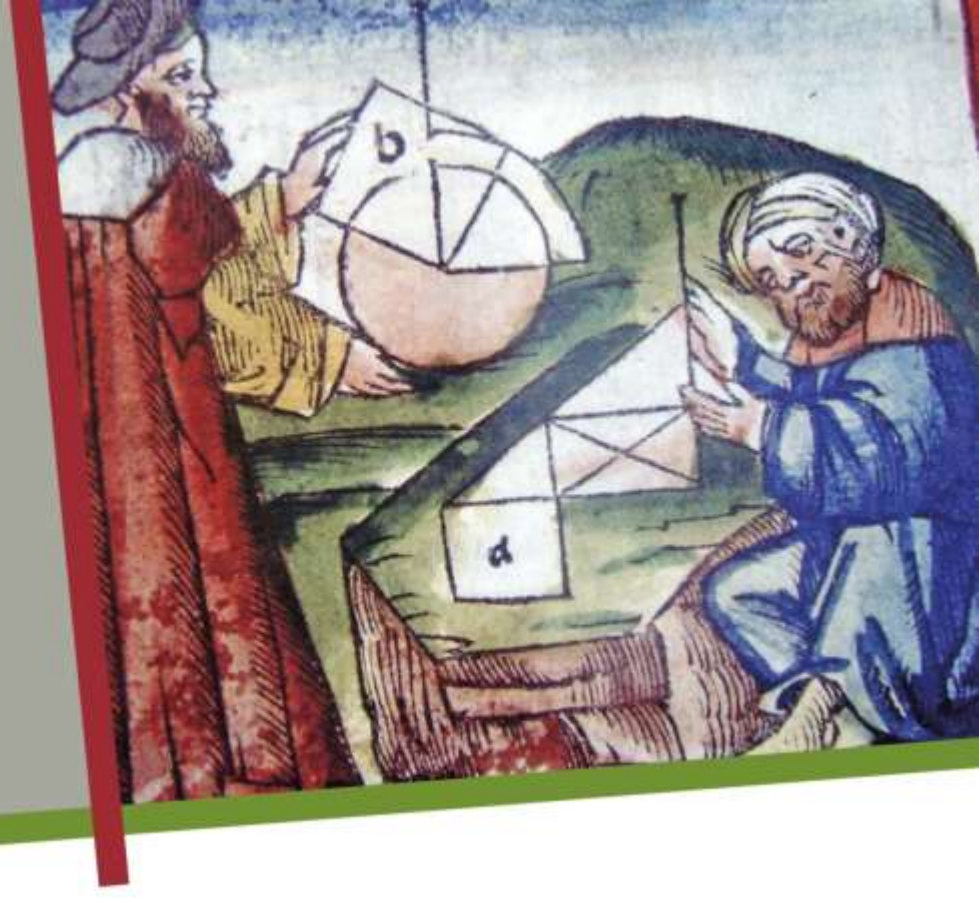
UNIVERSITÀ DEGLI STUDI
DI TRENTO

Dipartimento di Matematica



SEMINARI

Wednesday, November 8 – at 5.00 p.m.

Seminar Room "1" – Povo0, Via Sommarive 14
and online through the ZOOM platform:
please contact dept.math@unitn.it to get the code

Ole Cañadas
(Dublin City University)

Comparison Principles for Stochastic Volterra Equations

Abstract

Motivated by rough volatility models in mathematical finance, stochastic Volterra equations (SVEs)

$$X_t = g(t) + \int_0^t \frac{(t-s)^{\alpha-1}}{\Gamma(\alpha)} b(X_s)\, ds + \int_0^t \frac{(t-s)^{\alpha 1}}{\Gamma(\alpha)} \sigma(X_s^i)\, dB_s$$

with $\alpha \in (1/2, 1)$ and σ Hölder continuous of order $\eta \in [1/2, 1]$ have received a great deal of study in recent years. However, they fall neither into the class of semimartingales nor into the class of Markov processes. Therefore, the classical framework as the Itô formula and classical semigroup theory is not applicable. In this talk, we are concerned with Comparison Principles for stochastic Volterra equations. That is, suppose

$$X_t^i = g_i(t) + \int_0^t K(t-s) b_i(X_s^i)\, ds + \int_0^t K(t-s)\sigma(X_s^i)\, dB_s, \quad i = 1, 2,$$

with $g_1 \leq g_2$ then $\mathbb{P}(X_t^1 \leq X_t^2,\, t \geq 0) = 1$. However, in general, SVEs with non-Lipschitz diffusion coefficients suffer from the lack of pathwise uniqueness and a desired comparison principle is out of reach (since comparison principles imply pathwise uniqueness). To address this problem, we construct a coupling satisfying a comparison principle. We prove this under different assumptions on the initial data (g_i, K, b_i, σ) and discuss an example. This is joint work with Martin Friesen (Dublin City University).

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CONTATTI
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