

Branching diffusion representation for nonlinear Cauchy problems and Monte Carlo approximation

Professor Nizar Touzi
Ecole Polytechnique
France

Date: 28 February 2018 (Wednesday)
Time: Refreshments
12.45pm to 1.30pm
Colloquium
1.30pm to 2.30pm
Venue: Refreshments → Empty Space near LT 5
(Undergraduate Notice board Area)
Colloquium → Lecture Theatre 4 (SPMS-03-09)
School of Physical and Mathematical Sciences

Abstract

We provide a probabilistic representations of the solution of some semilinear hyperbolic and high-order PDEs based on branching diffusions. These representations pave the way for a Monte-Carlo approximation of the solution, thus bypassing the curse of dimensionality. We illustrate the numerical implications in the context of some popular PDEs such as the Burger's equation, the nonlinear Klein-Gordon equation, a simplified scalar version of the Yang-Mills equation, a fourth-order nonlinear beam equation and the Gross-Pitaevskii PDE as an example of nonlinear Schrödinger equations.

Speaker Biography

Nizar Touzi is Professor of Applied Mathematics at Ecole Polytechnique (France) since 2006. He was previously Chair Professor at Imperial College London. He was an invited session speaker at the International Congress of Mathematicians (Hyderabad 2010). He received the Louis Bachelier prize of the French Academy of Sciences in 2012, the Paris Europlace prize of Best Young Researcher in Finance in 2007, and is presently holding an Advanced ERC grant 2013-2018. He is Co-editor and Associate Editor in various international journals in the fields of financial mathematics, applied probability, and control theory.

Host: Associate Professor Nicolas Privault

Division of Mathematical Sciences, School of Physical and Mathematical Sciences