Mercoledì 16 ottobre 2013
ore 15.00
Sala Azzurra
Palazzo della Carovana
Piazza dei Cavalieri

SCUOLA
NORMALE
SUPERIORE

Colloqui della Classe di Scienze

Anno Accademico 2012/2013

DAMIANO BRIGO

Imperial College, London, UK

The ongoing revolution in financial modeling and the possible end of platonic pricing: a stochastic analysis approach to credit and funding liquidity risk

ABSTRACT

The market for financial products and derivatives reached an outstanding notional size of 708 USD Trillions in 2011, amounting to ten times the planet gross domestic product. Even discounting double counting, derivatives appear to be an important part of the world economy and have played a key role in the onset of the financial crisis in 2007. We introduce the Nobel-awarded option pricing paradigm by Black Scholes and Merton, hinting at precursors such as Thales, Bachelier and De Finetti. We explain how the self financing condition coupled with Ito's formula lead to the Black Scholes Partial Differential Equation (PDE) for basic option payoffs. We hint at the Feynman Kac theorem that allows to interpret the Black Scholes PDE solution as the expected value under a risk neutral probability of the discounted future cash flows, presenting the detailed solution for Call Options on equity, and highlighting the fundamental fact that the option price does not depend on the expected rate of return of the related underlying asset. Finally, we embed this theory in the recent financial landscape, re-discuss its assumptions and present a high level view of current issues in financial modeling, especially funding liquidity costs and credit risk, leading to an intuitive description of Nonlinear PDEs, recursive equations and Backward Stochastic Differential Equations (BSDEs). In a provocative conclusion, the challenges of recursive, holistic and aggregation-dependent nonlinear pricing algorithms are highlighted, and we explain how this may finally relegate Platonic pricing to history books, an awareness that, ironically, industries different from the financial one have shown for a long time.

Info: Area Didattica – adi.sd@sns.it