Abstract

The Black-Scholes paradigm for option pricing and hedging is at the origin of significant developments in a field now known as financial mathematics. Models of increasing complexity have been introduced to accommodate markets growing in size and sophistication. Relevant to the talk is the example of the HJM models for the dynamics of the yield curve which have motivated studies in infinite dimensional stochastic analysis. In contrast, technical difficulties have hampered the introduction of dynamic models for the time evolution of the so-called implied volatility surface which plays a crucial role in the valuation and the hedging of equity derivatives. In this talk, we tackle this problem via the time evolution of a random parabolic partial differential equation. The thrust of our contribution is the derivation of a no-arbitrage condition for the dynamics of the local volatility surface, in the form of a “HJM drift condition”. We discuss the connection with stochastic volatility models, and we review the mathematical challenges highlighted by our approach.

Thursday, April 19
4:15 p.m.
Room 380-W