BSDEs, càdlàg martingale problems and Föllmer-Schweizer decomposition

Francesco Russo, ENSTA, Paris Tech.

The aim of this talk consists in introducing a new formalism for the deterministic analysis associated with backward stochastic differential equations driven by general càdlàg martingales. When the martingale is a standard Brownian motion, the natural deterministic analysis is provided by the solution of a semilinear PDE of parabolic type. A significant financial application concerns the hedging problem under basis risk of a contingent claim $g(X_T, S_T)$, where S (resp. X) is an underlying price of a traded (resp. non-traded but observable) asset, via the celebrated Föllmer-Schweizer decomposition. We revisit the case when the couple of price processes (X, S) is a diffusion and we provide explicit expressions when (X, S) is an exponential of additive processes.