

SÉMINAIRE DE MATHÉMATIQUES ACTUARIELLES ET FINANCIÈRES

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Equilibria in Incomplete Continuous-Time Financial Markets and Systems of BSDEs

The problem of existence of equilibrium prices in incomplete continuous-time financial markets has proved to be one of the most stubborn open problems in financial economics and mathematical finance. While the complete case was settled 30 years ago in the work of Duffie, Zame, Karatzas, Shreve and Lehoczky and others, very little is known about what happens when no completeness assumptions are made.

A new approach to this problem - and its positive resolution - in the special case when all agents have exponential utility functions will be presented. It is based on systems of quadratic backward stochastic differential equations (BSDEs) and provides a general existence result for a class of such equations under structural conditions. It is interesting that very similar conditions appear in completely different contexts - e.g., when one tries to construct martingales on Riemannian manifolds or find Nash points of non-zero-sum stochastic games.

Joint work with Hao Xing (London School of Economics)