



CUHK Distinguished Lectures in Quantitative Finance

A Model-free Approach to Continuous-time Finance

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Abstract

We present a pathwise approach to continuous-time finance based on causal functional calculus. Our framework does not rely on any probabilistic concept. We introduce a definition of continuous-time self-financing portfolios, which does not rely on any integration concept and show that the value of a self-financing portfolio belongs to a class of nonanticipative functionals, which are pathwise analogs of martingales. We show that if the set of market scenarios is generic in the sense of being stable under certain operations, such self-financing strategies do not give rise to arbitrage. We then consider the problem of hedging a path-dependent payoff across a generic set of scenarios. Applying the transition principle of Rufus Isaacs in differential games, we obtain a pathwise dynamic programming principle for the superhedging cost. We show that the superhedging cost is characterized as the solution of a path-dependent equation. For the Asian option, we obtain an explicit solution.

Biography

Rama Cont is Professor of Mathematics and Chair of Mathematical Finance at Oxford University. He has held previous positions at Columbia University, Imperial College London, Ecole Polytechnique and Sorbonne University, and has served as advisor to IMF, ECB, CME, ICE Clear, Norges Bank, Bovespa and the US Office of Financial Research. His research focuses on stochastic processes and mathematical modeling in finance, with a focus on market instabilities and systemic risk. He is a recipient of the Louis Bachelier Prize (2010) and the Royal Society Award for Excellence in Interdisciplinary Research (2017), and was elected Fellow of the Society for Industrial and Applied Mathematics (SIAM) in 2017 for his 'contributions to stochastic analysis and mathematical modeling in finance.'

Date: 17 Feb 2023 (Friday)

Time: 9:00am - 10:00am (London Time)

5:00pm - 6:00 pm (Hong Kong Time)

LIVE

Zoom

Meeting ID: 922 0689 6799

Passcode: 156866



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