

COLLOQUIUM

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Functional Ito Formula

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Abstract

The Ito formula was extended recently by Bruno Dupire (Bloomberg 2009) in the case of semimartingales with continuous sample paths. Dupire's extension deals with functionals of the history of the process. This is in contrast to the traditional formula that deals with a function of the current value of the process. We modify slightly Dupire's setup and that allows us to produce a simple proof of the result. Furthermore, we extend the result without much difficulty to the case of general semimartingales. In order to show how to use the formula we present three examples. The examples deal with (i) the maximum functional (ii) the Martingale representation Theorem (iii) Stochastic control. This is a joint work with Professor Park Schroder from the Finance Department at MSU and with Sumit Sinha, Statistics and Probability, MSU.

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