

Workshop in Stochastic Analysis and Applications

IMECC - UNICAMP

May 2-4th, 2022

Semimartingales with jumps, weak Dirichlet processes and path-dependent martingale problems

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Abstract

This talk is based on a joint work with Elena Bandini (Bologna). We revisit the notion of weak Dirichlet process which is the natural extension of semimartingale with jumps. If X is such a process, then it is the sum of a local martingale M and a martingale orthogonal process A in the sense that $[A, N] = 0$ for every continuous local martingale N . We remark that if $[A] = 0$ then X is a Dirichlet process. The notion of Dirichlet process is not very suitable in the jump case since in this case A is forced to be continuous. The talk will discuss the following points.

- (1) To provide a (unique) decomposition which is also new for semimartingales with jumps.
- (2) To discuss some new stability theorem for weak Dirichlet processes through $C^{0,1}$ transformations.
- (3) To discuss various examples of such processes arising from path-dependent martingale problems. This includes path-dependent stochastic differential equations with involving a distributional drift and with jumps.