



## PROBABILITY SEMINAR

# Recent developments in stochastic calculus via regularizations with jumps and applications to BSDEs.

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MAT Auditorium

**Abstract.** The aim of this talk consists in mentioning recent developments about stochastic calculus via regularizations. We recall that a *weak Dirichlet process*  $X$  with respect to a given underlying filtration is the sum of a local martingale and a process  $A$  such that  $[A, N] = 0$  for every continuous local martingale. We introduce the notion of special weak Dirichlet process; whenever such a process is a semimartingale, then it is a special semimartingale. We will provide conditions on a function  $u : [0, T] \times \mathbb{R}^d \rightarrow \mathbb{R}$  and on an adapted cadlag process  $S$  such that  $u(t, S_t)$  is a special weak Dirichlet process. Two applications will be discussed.

1. The existence of a solution to a (strong) solution of a BSDEs with distributional driver, with underlying Brownian filtration (with Elena Issoglio, Leeds).
2. Consider the case a BSDE driven by a random measure: a solution is a triplet  $(Y, Z, K)$  where  $K$  is a random field. The function  $u(s, x) := Y_s^{s,x}$  is deterministic. If  $u$  has some minimal regularity, the calculus will allow to link  $Z, K$  to  $u$  (with Elena Bandini, Milano Bicocca).