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L^p-variational, $p \geq 1$, solutions of BSDEs driven by subdifferential operators

The talk is concerned on the multivalued backward stochastic differential equation governed by a subdifferential operator:

$$\begin{cases} Y_t + \int_t^T dK_s = \eta + \int_t^T F(s, Y_s, Z_s)\, ds - \int_t^T Z_s dB_s\,,\ t \in [0,T]\,, \\ dK_t \in \partial\varphi(Y_t)\, dt\,,\ \text{on}\ [0,T]\,. \end{cases}$$

We emphasize that, unlike the case $p \geq 2$, in the case $1 \leq p < 2$ it is not possible to obtain the boundedness of the Maureau-Yosida approximation $\mathbb{E}\Big(\int_0^T |\nabla\varphi_\varepsilon(Y_r^\varepsilon)|^2 dr\Big)^{p/2}$ of subdifferential operator, which is essential to obtain a strong solution. Therefore the notion of L^{p}-variational solution, $p \geq 1$, is introduced; existence and uniqueness results are given. We show that in the class of continuous semimartingales, the notions of strong solutions and variational solutions are equivalent.