Weak Solvability Theorem for Forward-Backward SDEs.

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Abstract

We aim to establish the existence and uniqueness of weak solutions to a suitable class of non-degenerate deterministic FBSDEs with a one-dimensional backward component. The classical Lipschitz framework is partially weakened: the diffusion matrix and the final condition are assumed to be space Hölder continuous whereas the drift and the backward driver may be discontinuous in x. The growth of the backward driver is allowed to be at most quadratic with respect to the gradient term.

The strategy holds in three different steps. We first build a well controlled solution to the associated PDE and as a bypass product a weak solution to the forward-backward system. We then adapt the "decoupling strategy" introduced in the *four step scheme* of Ma, Protter and Yong to prove uniqueness.

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