Abstract: "Towards a robustness result for BSDEs with jumps"

Motivated by the robustness of BSDEs with respect to the Brownian motion, see [1], we want to prove that the same holds when the BSDE is taken with respect to a square integrable, quasi-left-continuous martingale M. The robustness of a BSDE stands for the following property: having a suitable martingale approximation M^n of M, then the solutions of the BSDEs driven by M^n solution of the BSDE driven by M. In order to obtain the result, we need to overcome two intermediate problems. The first is to guarantee the existence and uniqueness of solutions of BSDEs driven by M^n. In this case, the predictable quadratic covariation of M^n may have jumps, hence the Lebesgue-Stieltjes integral is not necessarily a continuous process. In this work we improve a general result of existence and uniqueness for BSDEs, see [2], where the Lebesgue-Stieltjes integral is with respect to a continuous, predictable and increasing process. Our improvement consists in allowing the integrator of the Lebesgue-Stieltjes integral having (suitably small) jumps, i.e. being a càdlàg, predictable and increasing process. The second problem consists in proving that the corresponding stochastic and Lebesgue-Stieltjes integrals with respect to M^n and the predictable quadratic covariations M^n Lebesgue-Stieltjes integral with respect to M and the predictable quadratic covariation M respectively. Once this second obstacle is overcome, we could proceed to proving the desired result. As a byproduct of this result, the convergence of the Euler scheme for BSDEs is obtained, where M^n of M.

References

[1] P. Briand, B. Delyon, J. Memin, On the robustness of backward stochastic differential equations, Stochastic Processes and Applications 97 (2002) 229-253

[2] N. El Karoui, S-J Huang, A general result of existence and uniqueness of backward stochastic differential equations, Backward stochastic differential equations (Paris, 19951996), 2736, Pitman Res. Notes Math. Ser., 364, Longman, Harlow, 1997