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Optimal Liquidation in Target Zone Models and Neumann Problem with Singular Terminal Condition

We shall study the optimal liquidation problems in target zone models using dynamic programming methods. Such control problems allow for stochastic differential equations with reflections and random coefficients. The value function is characterized by a Neumann problem of backward stochastic partial differential equations (BSPDEs) with singular terminal conditions. The existence and the uniqueness of strong solution to such BSPDEs are addressed, which in turn yields the optimal feedback control. In addition, the unique existence of strong solution to Neumann problem of general semilinear BSPDEs in finer functions space, a comparison theorem, and a new link between forward-backward stochastic differential equations and BSPDE are proved as well. This is based on joint work with Dr. Robert Elliott and Dr. Wenning Wei.