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On Approximation of the Backward Stochastic Differential Equation

We present a review of some recently obtained results on estimation of the solution of backward stochastic differential equation (BSDE) in the Markovian case. We suppose that the forward equation depends on some finite dimensional unknown parameter. We consider the problem of estimation of this parameter and then we use the proposed estimator for the estimation of the solution of BSDE. This last estimator is constructed with the help of the solution of the corresponding partial differential equation. We are interested by three models of observation admitting a consistent estimation of the unknown parameter: small noise, large samples and unknown volatility. In the first two cases we have continuous time observation and the unknown parameter is in the trend coefficient and in the third case the volatility of the forward equation depends on the unknown parameter and we have discrete time observations. The presented estimators of the solution of the BSDE in the mentioned three cases are asymptotically efficient.