Optimality conditions of controlled backward doubly stochastic differential equations

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Abstract

In this paper, we introduce and study the optimality conditions for stochastic control problems of nonlinear backward doubly stochastic differential equations. Necessary and sufficient optimality conditions, where the control domain is convex and the coefficients depend explicitly on the variable control, are proved. The results are stated in the form of weak stochastic maximum principle, and under additional hypotheses, we give these results in the global form. This is the first version of the stochastic maximum principle that covers the backward-doubly systems.

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