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Reflected Backward Stochastic Difference Equations with Finite State and their applications

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In this paper, we first establish the reflected backward stochastic difference equations with finite state (FS-RBSDEs for short). Then we explore the Existence and Uniqueness Theorem as well as the Comparison Theorem by "one step" method. The connections between FS-RBSDEs and optimal stopping time problems are investigated and we also show that the optimal stopping problems with multiple priors under Knightian uncertainty is a special case of our FS-RBSDEs. As a byproduct we develop the general theory of g-martingales in discrete time with finite state including Doob-Mayer Decomposition Theorem and Optional Sampling Theorem. Finally, we consider the pricing models of American Option in both complete and incomplete markets.

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