

A PROBABILITY CRITERION FOR ZERO-SUM STOCHASTIC GAMES

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Abstract: In this paper we introduce a probability criterion for two-person zero-sum stochastic games, and focus on the probability that the payoff before the first passage time to some target state set exceeds a level formulated by both players, which shows the security for player 1, and the risk for player 2. For the game model based on discrete-time Markov chains, under a suitable condition on the game's primitive data, we establish the Shapley equation, from which the existence of the value of the game and a pair of optimal policies with the maximum security for player 1 and the minimum risk for player 2 is ensured. We also provide a recursive way of computing (or at least approximating) the value of the game. At last, the application of our main result is exhibited via an inventory system.