

Game Theory

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ABSTRACT

In this work we consider two approaches. In the first one, zero-sum constrained stochastic game is considered. The control objective of each participant is to optimize his limiting average payoff. A finite ergodic controlled Markov chain models the behavior of each player. The saddle point is shown to be the stationary strategies representing the solutions of two related Linear Programming Problems given in an efficient form.

In the second approach a game of N-learning automata with constraints is considered. In the complete information case we introduce the joint payoff function according to Rosen's approach to obtain Nash equilibrium using slack variables. A Lagrange function is introduced in order to deal with this optimization problem. We develop a recurrent min-max procedure. For the case when only the payoff and constraints realizations are available, we introduce payoff regularization and we construct a learning procedure. We show the convergence to Nash Equilibrium and we estimate the convergence rate.