AN ADJUSTMENT SCHEME FOR A BUYER-SELLER GAME

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Abstract. In this paper we develop an on-line method for reaching an optimal solution for interacting agents in a market situation. Specifically we study a buyer-seller game with a monopolistic seller and many buyers. At each round of the repeated game the seller adjusts a piecewise linear tariff the limit of which defines the Bayesian Nash equilibrium of the stage game with one seller and one buyer with several types. Our scheme will require only a small part of the buyers' preferences to be elicited; and hence requires only a small amount of computation and communication.

Usually the Bayesian Nash equilibrium of the stage game of one seller and one buyer with different types is solved assuming that there is only a single parameter in the buyer's utility function describing the different types. This parameter is unknown to the seller, but he knows its distribution which enables him to compute the solution to the game once and for all. In our paper the seller does not even know the type distribution but instead he faces the different types of one buyer, or equivalently different unknown buyers, repeatedly and gathers gradually the information needed to calculate the solution.

The tariffs presented in this paper are especially suitable for various E-market applications, e.g., for those dealing with price discrimination of different customers. So far the focus on E-market models has been mainly on E-auctions where the goods are sold only once, and the pricing scheme is obtained iteratively by making offers before the actual game is played; see, e.g., de Vries and Vohra, 2003.

References:

Salanie, B., 2002: "The Economics of Contracts", The MIT Press, Cambridge, MA.

de Vries, S., and R. V. Vohra, 2003: "Combinatorial auctions: A survey", INFORMS Journal on Computing, Vol. 15, No. 3, pp. 284-309.