Internet Auctions with Traffic Congestion

Abdel-Hameed H. Nawar
Economics Department,
SUNY at Stony Brook,
NY 11794-4384, U.S.A.
e-mail: anawar@ic.sunysb.edu

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Abstract

This paper addresses the issue of timing of bids in a model of internet auction with traffic congestion. In a recent paper, Roth and Ockenfels (2002) have proposed a model of internet auction and have shown that there is an equilibrium where every player acts only in the last period of the game. In their model, time is a continuous interval $[0, 1)$ with a distinct last period $t = 1$. There are two players and valuation of each player can take two values: high or low. In the model of Roth and Ockenfels, there is traffic congestion *only* in the last period, i.e., a bid submitted in the last period is transmitted successfully with probability p, where $0 < p < 1$, while in any other period, all bids are transmitted with probability one. The result of Roth and Ockenfels rely on two key aspects: (i) time before the last period is continuous, so that there is always time to react to any bid, and (ii) other players punish a deviating player by taking the effort of bidding their valuations even though they have zero probability of earning a positive payoff. In this paper, we develop a model of internet auction where time is discrete. Further, we propose a realistic mechanism of bid transfer by making it dependent on the number of submitted bids. First, we show that under suitable assumptions on the bid transfer mechanism, there is a symmetric subgame-perfect equilibrium where every player bids his true valuation unless his bid is transmitted or the current highest bid exceeds his valuation. Then, we make the following reasonable assumption on the behavior of the players: no player acts at a node where he has zero probability of earning a positive payoff. Under this assumption, it is shown that the equilibrium described above is in fact the unique symmetric subgame-perfect equilibrium. Thus, the "last minute bidding" phenomenon of Roth and Ockenfels is not sustained when we consider a discrete-time internet auction.

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Key Words and Phrases: Subgame Perfect Equilibrium, Independent Private Value.