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Microeconomic Theory (521b)

Problem Set 3. Dynamic Auctions

4/10/08

This problem set is due Thursday, 4/24/08.

1. Consider the model of ((Eso and Szentes 2007)) as discussed in class with a single buyer and a valuation

$$v(\theta_0, \theta_1) = \alpha\theta_0 + (1-\alpha)\theta_1$$

where $\theta_t \sim \mathcal{U}[0,1]$.

   (a) Following the discussion in class derive the optimal option contract, price and strike price, for a given $\alpha \in [0,1]$.

   (b) How does the contract depend on α?

2. Consider now the extension of the single allocation problem to a sequential allocation problem. The value of consumption of the object to agent i after k previous consumptions is given by:

$$v(\theta_0, ..., \theta_k) = \sum_{l=0}^{k} \theta_l$$

where each $\theta_l \sim \mathcal{U}[0,1]$ and l and l' are independent random variables. The seller and the buyer discount the future with $\delta \in (0,1)$. Derive the revenue maximizing pricing policy of the seller over time. (As in the multi-armed bandit problem, the new information in period t is only revealed if the agent is consuming the object in period $t-1$.) The relevant reading here is (Segal and Toikka 2007) and (Pavan 2007).

References

Eso, P., and B. Szentes (2007): "Optimal Information Disclosure in Auctions," *Review of Economic Studies*, 74, 705–731.

Pavan, A. (2007): "Long-Term Contracting in a Changing World," Discussion paper, Northwestern University.

Segal, I., and J. Toikka (2007): "Revenue Equivalence, Profit Maximization and Transparency in Dynamic Mechanism," Discussion paper, Stanford University.