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AUCTION AND BARTER MODELS FOR ELECTRONIC MARKETS

Abstract

We propose three auction and barter based electronic market models. Our first model is a direct barter model for the course add/drop process in the universities. We model the course add/drop process as a direct barter problem in which add/drop requests can be placed as barter bids. We also introduce a two-level weighting system that enables students to express priorities among their requests while providing fairness among the students. Our second model is the multi-unit differential auction-barter model which augments the double auction model with barter bids so that besides the usual purchase and sale activities, bidders can also carry out direct bartering of items. Our model also provides a mechanism for making or receiving a differential Money payment as part of the direct bartering of items, hence, allowing bartering of different valued items. Furthermore, a powerful and flexible bidding language is designed which allows bidders to express their complex preferences of purchase, sell and Exchange requests. Our third model is the double auction with limited cover money model. In this model, we propose the use of discrete time double auction institution for the trading of used goods as well as new ones. Our model allows declaration of an amount of cover money so that what is spent on purchased items minus the proceeds of sold items does not exceed this cover money amount. We also introduce a mechanism so that bidders may place multiple item requests in a single bid and limit the maximum number of items to be purchased. We formally define these three models and formulate the corresponding optimization problems. We propose fast polynomial-time network flow based algorithms for optimizing the first and the second models and show that the decision version of the optimization problem for the third model is NP-complete. The performances of our algorithms are also demonstrated on various test cases.

PUBLICATIONS

Journals

1. Özer, A.H. and Özturan, C. A Direct Barter Model for Course Add/Drop Process. *Discrete Applied Mathematics*, 159(8):812_825, 2011. doi:10.1016/j.dam.2011.01.004
2. Özer, A.H. and Özturan, C. Multi-Unit Differential Auction-Barter Model for Electronic Marketplaces. *Electronic Commerce Research and Applications*, 10(2):132_143, 2011. doi:10.1016/j.el-erap.2010.03.002

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