Competitive Algorithms for Online Conversion Problem with Interrelated Prices

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Abstract

The classical uni-directional conversion algorithms are based on the assumption that prices are arbitrarily chosen from the fixed price interval [m, M] where m and M represent the estimated lower and upper bounds of possible prices 0 < m <= M. The estimated interval is erroneous and no attempts are made by the algorithms to update the erroneous estimates. We consider a real world setting where prices are interrelated, i.e., each price depends on its preceding price. Under this assumption, we derive a lower bound on the competitive ratio of randomized non-preemptive algorithms. Motivated by the fixed and erroneous price bounds, we present an update model that progressively improves the bounds. Based on the update model, we propose a non-preemptive reservation price algorithm RP* and analyze it under competitive analysis. Finally, we report the findings of an experimental study that is conducted over the real world stock index data. We observe that RP* consistently outperforms the classical algorithm.

Keywords

Author Keywords: Time series search; one-way trading; online algorithms; update model
KeyWords Plus: TIME-SERIES SEARCH

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