Online-Algorithms for Optimal Discount Search in Supply Chain Finance

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Abstract

After the 2007 credit crunch liquidity crisis, we have been living in a turbulent macro-economic times, where returns on short term investments continue at historic lows. On the other hand, factoring and loan costs are still high for small enterprises. As a result of this, (big or small) enterprises aim to optimize their working capital and liquidity within their supply chain's business. For this purpose, supply chain finance is a business process whereby suppliers (sellers) can opt to have their invoices paid early by their customers (buyers) in exchange for a percent of the invoice amount.

However, this process involves uncertainties such as volatile discount rate, which makes the situation more attractive for researchers. An online algorithm is an algorithm that process its input piece by piece, without having the entire input available from the start. Many problems in disciplines such as computer science, economics or operations research are intrinsically online in that they require immediate decisions to be made in real time (for instance, trading). From a broader perspective, online algorithms fall into the field of decision-making in the absence of complete information.

This thesis deals with Online Algorithms for Optimal Discount Search in Supply Chain Finance. First, the optimization problem is illustrated by a scenario, then the required theory is briefly explained. Finally, after the optimal discount search problem is mathematically designed, the optimal discount search online algorithm, Reservation Discount Policy (RDP) is introduced. Furthermore, the competitiveness of the algorithm is analyzed from a worst case point of view.