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Title: "Dynamic Inventory Management with Mean-Field Competition"

Abstract

Agents attempt to maximize expected profits earned by selling multiple units of a perishable product where their revenue streams are affected by the prices they quote as well as the distribution of other prices quoted in the market by other agents. We propose a model which captures this competitive effect and directly analyze the model in the mean-field limit as the number of agents is very large. We classify mean-field Nash equilibrium in terms of the solution to a Hamilton-Jacobi-Bellman equation and a consistency condition and use this to motivate an iterative numerical algorithm to compute equilibrium. Properties of the equilibrium pricing strategies and overall market dynamics are then investigated, in particular how they depend on the strength of the competitive interaction and the ability to oversell the product.