

Time-stamping Predictive Strategy for Multi-echelon Inventory Control with Uncertain Lead Time

Jie Li, Yi Chai and Mian Peng

Chongqing Institute of Green and Intelligent Technology, Chongqing University
and Chengdu University of Information Technology

Abstract

This paper proposed a time-stamping predictive control for inventory management where multi-echelon supply chain model is formulated as a discrete time-varying system. Generally, fixed production time is considered in most researches and order transmittal time is ignored. But lead time is one of most significant factors to induce bullwhip effect. Thus uncertain order delay and uncertain production delay are both taken into account while constructing supply chain model. For steady inventory, coefficient matrixes are renovated in the optimal iterations to overcome the storage perturbation under unsure lead time and stochastic customer demands. Simulations are compared with standard model predictive control and order-up-to strategy and computational results show the robustness on inventory control and validity on bullwhip effect.

Keywords: Multi-echelon inventory, supply chain, time-stamping predictive strategy, uncertain order delay, uncertain production delay.