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INTEGRATED LOGISTICS FOR SMOOTHING SUPPLY-CHAIN VARIATIONS

Abstract: The presented study is motivated by a fast-moving consumer goods company, whose supply chain is managed with a decentralized pull approach based on a reorder-point policy. A significant bullwhip effect is observed, which can be caused by the following elements: (1) each ordered quantity is rounded up to an Economic Batch Quantity (e.g., round up to pallets or layers); (2) the demand is overestimated; (3) there are uncertain lead times in the supply chain. A 4-echelon supply chain is considered, composed by a single plant (without storage capacity), one or to two distribution centers DCA (belonging to the manufacturer), one to three distribution centers DCB associated with each DCA (belonging to the distributor, for cross-docking only), and finally several (ranging from 20 to 50) shops associated with each DCB. The proposed integrated approach, centered at the manufacturer level, aims at minimizing shortage at the shops, production volatility and inventory levels. The innovation here is that the production volatility and the inventory levels are penalized only when they are out of predefined ranges (an ideal range, being out of which is slightly penalized, and a tolerance range, being out of which is strongly penalized). The goal is to adjust the production closer to the ideal range, such that when the items are pushed down to the shops, the inventory levels stay within their desired ranges. The considered realistic instances cover three months of operations. As the demand is non-deterministic, simulation involving a rolling planning window is used.

Note: [Nicolas Zufferey](#) is a full professor of operations management at the University of Geneva in Switzerland, since 2008. His research activity focuses on designing solution methods for difficult and large optimization problems, with applications mainly in transportation, scheduling, production, inventory management, network design, supply chain management and telecommunications. He is member of the CIRRELT transportation and logistics research center (www.cirrelt.ca) and of the GERAD decision analysis research center (www.gerad.ca). He received his BSc and MSc degrees in Mathematics at EPFL (Swiss Federal Institute of Technology at Lausanne), as well as his PhD degree in operations research (2002). He was then successively a post-doctoral trainee at the University of Calgary (2003 – 2004) and an assistant professor at Laval University (2004 – 2007). He is the (co)author of more than 110 publications (papers in professional journals, proceedings of conferences, and book chapters) and has reviewed papers for 45 international journals. With 55 coauthors, he has had research activities with 22 Universities in Europe and America, as well as with 21 private companies.

JEUDI / THURSDAY

8 août 2019 /
August 8th, 2019
10h30

Salle / Room 5441
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