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APPROXIMATE ANALYSIS AND OPTIMIZATION OF BATCH ORDERING POLICIES IN CAPACITATED SUPPLY CHAINS

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Devising manufacturing/distribution strategies for supply chains and determining their parameter values have been challenging problems. Linking production management to stock keeping processes improves the planning of the supply chain activities, including material management, culminating in improved customer service levels. In this study, we investigate a multi-echelon supply chain consisting of a supplier, a plant, a distribution center and a retailer. Material flow between stages is driven by reorder point/order quantity inventory control policies. We develop a model to analyze supply chain behavior using some key performance metrics such as the time averages of inventory and backorder levels, as well as customer service levels at each echelon. The model is validated against simulation, yielding good agreement of robust performance metrics. The metrics are then used within an optimization framework to design the supply chain so as to minimize expected total system costs. The outcome of the optimization framework specifies how to move inventory throughout the supply chain and how to set inventory control parameters, i.e., reorder levels and replenishment batch sizes.

BIO:

Dr. Karaman received his B.S. degree from Koç University Mathematics Department in 1999 and his M.S degree from Bilkent University Industrial Engineering Department in 2001. He received his Ph.D. from Rutgers University Industrial Engineering Department in 2007. After graduation he started working for Cognizant as a consultant where he provided strategic insights into sales operations and marketing activities for top 10 pharmaceutical companies.