IIE Transactions ›
Volume 37, 2005 - Issue 8

Original Articles

Backorder minimization in multiproduct assemble-to-order systems

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Pages 763-774 | Received 01 Nov 2002, Accepted 01 Dec 2004, Published online: 23 Feb 2007

Cite this article https://doi.org/10.1080/07408170590961139

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Abstract

We consider a multiproduct assemble-to-order system. Components are built to stock with inventory controlled by base-stock rules, but the final products are assembled to order. Customer orders of each product follow a batch Poisson process. The leadtimes for replenishing component inventory are stochastic. We study the optimal allocation of a given budget among component inventories so as to minimize a weighted average of backorders over product types. We derive easy-to-compute bounds and approximations for the expected number of backorders and use them to formulate surrogate optimization problems. Efficient algorithms are developed to solve these problems, and numerical examples illustrate the effectiveness of the bounds and approximations.

Contributed by the Supply Chains/Production-Inventory Systems Department

Notes

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Related Research Data

Order Fill Rate, Leadtime Variability, and Advance Demand Information in an Assemble-to-Order System
Source: Operations Research
Order-Based Backorders and Their Implications in Multi-Item Inventory Systems
Source: Management Science
Maximally dependent random variables
Source: Unknown Repository
Dependent random variables
Source: Unknown Repository
Stochastic convexity and its applications
Source: Advances in Applied Probability
Strong stochastic convexity: closure properties and applications
Source: Journal of Applied Probability
Supply Chain Operations: Assemble-to-Order Systems
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