

# **Replenish-Up-To Inventory Control Policy With Random Replenishment Intervals**

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**ELSEVIER SCIENCE BV, INTERNATIONAL JOURNAL OF PRODUCTION**

**ECONOMICS; pp: 399-405; Vol: ##**

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## **Summary**

The multi period inventory problems have been studied under two main assumptions. Continuous review assumption where an order can be made at any time depending on inventory position and periodic review assumption where an order can be initiated only at discrete time epochs. In this study, we analyze a multi period inventory problem that falls under neither of these two assumptions. In the case we consider, there are periodic replenishments but the replenishment intervals are taken to be i.i.d. random variables. This setting represents the real life cases where a supplier visits a retailer with random inter arrival times and the retailer replenishes his inventories based on a replenish-up-to-level inventory control policy. We also assume that only a certain fraction of unmet demand is backordered and the rest of it is lost. In this setting under general distribution between replenishment epochs, we show the concavity of the expected profit function and give the condition that must hold for the optimal replenish-up-to-level. We also present the specific solutions and analysis under two different distributions, namely, uniform and exponential distributions, together with some numerical examples. (C) 2004 Elsevier B.V. All rights reserved.

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