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多站報童決策問題之最佳存貨水準比較

The Comparison of Optimizing Inventory Levels in a Multi-location Newsboy Problem

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摘要：Eppen構建了單一貨品、單期、多個銷售站之多站報童決策模式，在最佳存貨水準下，比較最佳分散及最佳集中存貨政策總期望成本之大小。然而，最佳分散及最佳集中存貨水準之大小，又如何呢？是值得探討的問題。因此，本文假設：(1)銷售站數 n 個；(2)各銷售站之隨機需求量具有相同的常態分配 $N(\mu, \sigma^2)$；(3)各銷售站均具有相同的線性持有成本函數 h 及線性缺貨成本函數 p。針對參數 n，p，h，μ 與 σ，應用 MathCAD 數值軟體，對 Eppen 所建構的分散及集中存貨模式之最佳分散存貨水準 S^* 及最佳集中存貨水準 S_0^* 作一比較，經 4,000 次模擬，得到主要結果是：最佳分散存貨水準 S^* 大於最佳集中存貨水準 S_0^* 成立之充要條件爲，單位缺貨成本 p 大於單位持有成本 h。這個重要性質，可以做爲決策者設計存貨政策之參考。

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關鍵詞：報童問題、存貨模式

Abstract：Eppen constructed a decision model of Multi-location newsboy problem to investigate a single-product, single-period, multi-location inventory ploicy selection problem. To minimize the expected total cost, inventory levels in different policies will be considered. The assumptions are：(1) the munber of the locations is n；(2) demand of each location has an independent and identical normal distribution $N(\mu\ ,\ \sigma^2)$；(3) the linear holding and penalty cost functions h 、 p at each location are assumed to be identical. Under the conditions that n, p, h, μ and σ are fixed, the MathCAD numerical software was applied to compare the optimizing inventory levels of Eppen's models. Through 4,000 trials of experimental simulation, the result obtained is：Let S^* and S_0^* be the optimal inventory levels of decentralized system and centralized system, respectively. Then $S^* > S_0^*$ if and only if p>h. Which can be valuable reference for inventory policy makers.

Key words: newsboy problem, inventory model.