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An EOQ Model for Deteriorating Items with Power-Form Stock-Dependent Demand

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Abstract

Datta and Pal [4] established an EOQ model in which the demand rate is a power function of the on-hand inventory until down to a certain stock level, at which the demand rate becomes a constant. In this paper, we extend their EOQ model to allow for not only deteriorating items but also non-zero ending inventory. Due to the complexity of the demand function, the inventory problem here has three possible cases. We then establish the necessary and sufficient conditions for each case. Moreover, we propose an algorithm to determine the optimal replenishment cycle time and ordering quantity such that the total profit per unit time is maximized. Finally, we provide some numerical examples to illustrate the proposed algorithm, and obtain the effects of the parameters on the replenishment time and ordering quantity.

Keywords: Inventory, Deteriorating Items, Stock-Dependent Demand.