A three layer supply chain model with multiple suppliers, manufacturers and retailers for multiple ítems

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Abstract

The replenishment size/production lot size problem both for perfect and imperfect quality products studied in this paper is motivated by the optimal strategy in a three layer supply chain consisting of multiple suppliers, manufacturers and retailers. In this model, each manufacturer produces each product with a combination of several raw materials which are supplied by each supplier. The defective products at suppliers and manufacturers are sent back to the respective upstream members at lower price than the respective purchasing price. Finally, the expected average profits of suppliers, manufacturers and retailers are formulated by trading off set up costs, purchasing costs, screening costs, production costs, inventory costs and selling prices. The objective of this chain is to compare between the collaborating system and Stakelberg game structure so that the expected average profit of the chain is maximized. In a numerical illustration, the optimal solution of the collaborating system shows a better optimal solution than the approach by Stakelberg.

Keywords

Defective, Inventory, Supply chain.