سامية محمد مصطفى

شبكة المعلومات الجامعية

بسم اللّه الرحمن الرحيم

شبكة المعلومات الجامعية

سامية محمد مصطفى

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شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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صفحات بالرسالة

لم ترد بالأصل

"CONSTRAINED MULTI-ITEM INVENTORY MODELS GEOMETRIC PROGRAMMING APPROACH"

A THESIS SUBMITTED TO

The Department of Mathematics,
Faculty of Science, Monoufia University
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In

"Statistics and Probability Theory"

By

FATHY RAGAB MOUSA EL-MEZAIN
Assistant Lecturer Of Mathematics,
Faculty Of Engineering, Shoubra,
Zagazig University.

SUPERVISED BY

Prof. Dr.
METWALLY OSMAN ABOU-EL-ATA
Professor of Mathematics,
Faculty of Engineering, Shoubra,
Zagazig University.

Abou-El-Ata, M. O.

Dr.
RAMADAN ABD EL-ATY MAHMOUD
Assistant Professor of Mathematics,
Department of Mathematics,
Faculty of Science, Monoufia University.

R. A. Mahmoud

1998

B

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CURRICULUM VITAE

Name	: Fathy Ragab Mousa El-Mezian.
Date of Birth	: 7/1/1961 Gharbia.
Locality	: Ibshaway , Kutor , Gharbia.
Nationality	: Egyptian.
Qualifications	: B.-Sc. in Mathematics (1983) , Tanta , University
	: M. Sc. in Statistics and Probability Theory (1992), Tanta , University
Social Status	: Married .
Present Work	: Assistant Lecturer, Faculty of Engineering, Zagazig University.
Permanent Address	: Kohafa , Tanta.

Head of Mathematics Department

(Prof. Dr. M. S. Abd Elshakoor)

SUPERVISORS

Prof. Dr. METWALLY OSMAN ABOU-EL-ATA
Professor of Mathematics,
Faculty of Engineering, Shoubra,
Zagazig University.

Dr. RAMADAN ABD EL-ATY MAHMOUD
Assistant Professor of Mathematics,
Department of Mathematics,
Faculty of Science, Monoufia University.

Head of Mathematics Department

(Prof. Dr. M. S. Abd Elshakoor)

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F. R. Mousa

CONTENTS

Summary

Most real world Inventory systems stock many items, and not merely a single item. As a matter of fact it could be permissible to study each item individually as long as there is no interaction among these different items. But really there could be many sorts of interactions between the items such as in the case of partial substitutions of one kind of items to other kinds as in case of manufacturing cars.

Many researchers have studied constrained multi-item inventory models under one constraint while others study them under two constraints using lagrangian approach, algorithmic or heuristic approaches, but in fact they got only numerical results. The main objective of this thesis is to achieve an explicit theoretical results by extending of the geometric programming approach due to the pioneering work of Cheng [4] who studied an EOQ inventory model with demand-dependent unit cost without constraints and he got a closed form solution. In this extension we add Duffin and Peterson theorem of geometric programming that enables us to evaluate the optimal T^*_{cr} and Q^*_r explicitly. The geometric programming technique changes the primal programming problem that minimizes the total annual cost into a dual programming problem that maximizes an objective function called the posynomial function formed of the product of the terms of both the total annual cost and the constraints bounded by unity. This function depends on the relation between both the arithmetic and the geometric means. In fact this is an easier and much better approach compared with all other familiar approaches.

The author aims to demonstrate through this analytic approach of geometric programming the power and efficiency which is an easy mathematical tool for inventory control model.

The thesis consists of six chapters, the first chapter is an introduction and a survey of the researches applied the geometric programming techniques.

Chapter II discusses four constrained multi-item EOQ inventory models under type I constraints (which are of the same kind). The demand rate is uniform while shortage is not allowed. The author evaluated the optimal values Q_r^*, T_{cr}^* and then deduced TC_{min}.

Chapter III is devoted to develop two constrained multi-item EOQ inventory models under two and three constraints of type II (which are of different kinds). The author calculated the optimal values Q_r^*, T_{cr}^* and then he deduced TC_{min}.

In chapter IV, the author treats two constrained multi-item production lot-size inventory models with varying order cost under two constraints of type II. The optimal values Q_r^*, T_{cr}^* are evaluated and TC_{min} are derived. Also two graphs for TC_{min} and Q_r^* are drawn.

In chapter V is aimed to treat two multi-item models with demand-dependent unit cost. The first model without any constraints while the second model under two constraints of type I. The optimal values Q_r^*, D_r^*, T_{cr}^* are calculated and the author deduced TC_{min}. Also he drawed two curves for TC_{min} and D_r^* against b and Q_r^* respectively.

The last chapter VI developed a constrained production lot-size inventory model with trade credit policy (permissible delay in payment) under two constraints of type II introducing the decision variable T_{cr} instead of Q_r in three cases. Also the author calculated the optimal values T^*_{cr}, Q^*_r and TC_{min}.