بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

EXACT TESTS IN RANDOM AND MIXED LINEAR MODELS

A THESIS

Submitted to Mathematics Department,
Faculty of Science, Tanta University,
In Partial Fulfillment of the
Requirements for the Degree
of Master of Science

IN

(Mathematical Statistics)

BY

Mohamed Mohamed Ezzat
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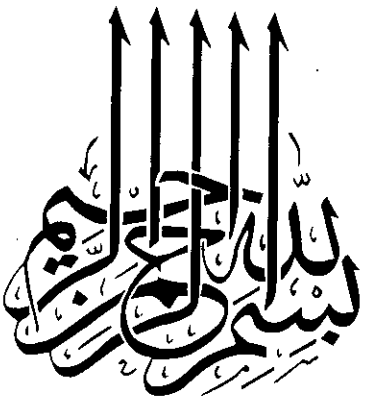
2001



وَقُلْ رَبِّ زِدْنِي عِلْمًا

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بسم الله الرحمن الرحيم

" رب أوزعنى أن أشكر نعمتك التى أنعمت علىّ وعلى والدى وأن أعمل صالحا ترضاه وأصلح لى فى ذريتى إنى تبت إليك وإنى من المسلمين"

صدق الله العظيم

Before I begin the acknowledgment, I must kneel thanking my God who inspired me, took my hand and provided me with power, patience and energy.

ACKNOWLEDGMENT

I wish to express my deep gratitude and hearty thankfulness to my dear parents who are always patient during the many hours of daily work devoted to my Thesis, in what seemed like an endless process of revisions and finalizing it, and for their sympathy, valuable advice, continuous encouragement and help.

It gives me honor and privilege to express my deep gratitude to *Prof. Dr. Entesar M. El-Kholy*, Head of Mathematics Department, Faculty of Science, Tanta University for her supervision and kindhearted help.

I'd like to say that words are not enough and incapable to express exactly my own inner feelings to my supervisor *Prof. Dr. El-Houssainy A. Rady*, professor of Statistics, I.S.S.R., Cairo University. In fact, he suggested the topics, and provided me with all possible help over a period of about two years.

My hearty thankfulness is due to *Dr. Hala A. Fergany*, lecturer of Mathematical Statistics, Faculty of Science, Tanta University for her kind help and guidance.

To my dear professors and colleagues at the Mathematics department, Tanta University and the I.S.S.R., Cairo University, I offer my thanks and gratitude.

May God bestow on them His blessings for all favors they render those who are in bad need to their fruitful and desirable help.

M. M. E. Abd El-Monsef

NOTE

The present Thesis is submitted to Tanta University in partial fulfillment of the requirements of the degree of Master of Science in Mathematical Statistics.

Beside the research work introduced in this Thesis, the candidate has attended four graduate courses within two years including

1. ***Probability Theory***
2. ***Stochastic Process***
3. ***Queuing Theory***
4. ***Distribution Theory***

The applicant *Mohamed Mohamed Ezzat Abd El-Monsef* has successfully passed the final examination (1999 – 2000) of these courses.

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PREFACE

Experiments are performed by people in nearly all aspects of life. The basic reason for running an experiment is to find out something that is not known. By their very nature, experiments are designed to draw inferences about an entire population based on few observations.

If experiments were perfectly repeatable and the important factors were perfectly separable, it would be easy to analyze and interpret the results. However, experiments are often run so that the effect of one factor may unknowingly be confounded with the effect of a factor not considered in the experiment. Even with the best of the experimental control, results vary from trial to trial. These reasons, and many others, add to the difficulty in analyzing the data derived from an experiment.

The role of statistics in experimental design is to separate the observed differences into those caused by various factors and those due to random fluctuation. The classical method used to separate these differences is analysis of variance, or ANOVA. In general, the method consists of looking at the total variation in the data, breaking it into its various components, and running statistical tests in an attempt to find out which components influence the experiment.

The analysis of balanced data, *data with equal numbers of observations in the subclasses*, is fairly straightforward since the ANOVA decomposition of the total sum of squares is unique and the different sums of squares in such decomposition provide tests for various hypotheses of interest, even in some cases we can't perform exact tests for some effects. In contrast to balanced data, the analysis of unbalanced data, *data with unequal numbers*

The Thesis consists of **five chapters**. In the introductory ***Chapter I*** we recall most of the definitions and preliminaries to be used throughout this Thesis. Moreover, we introduce some propositions and results concerning fundamental concepts of this work.

The aim of ***Chapter II*** covers exact tests for the unbalanced one-way, random two-way with interaction, mixed two-way models. Also, random two-stage nested model and the general random nested models were covered.

Chapter III presents the *Error Contrasts Technique*. Its properties and its uses for constructing exact tests will be introduced.

The purpose of ***Chapter IV*** is to introduce exact tests for some random and mixed balanced models using the proposed technique. We derived also an exact test for the main effects in the three-way random model, which can't be made using ANOVA procedure.

Chapter V deals with the case of unbalanced random and mixed models. An exact test for testing the hypothesis in ***Khuri***'s (1990) model, which he failed to find an exact test for it, will be made using the *Error Contrasts Technique*.

The last chapter followed by references. Both ***Chapters II & III*** comprised a section of some useful remarks.

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