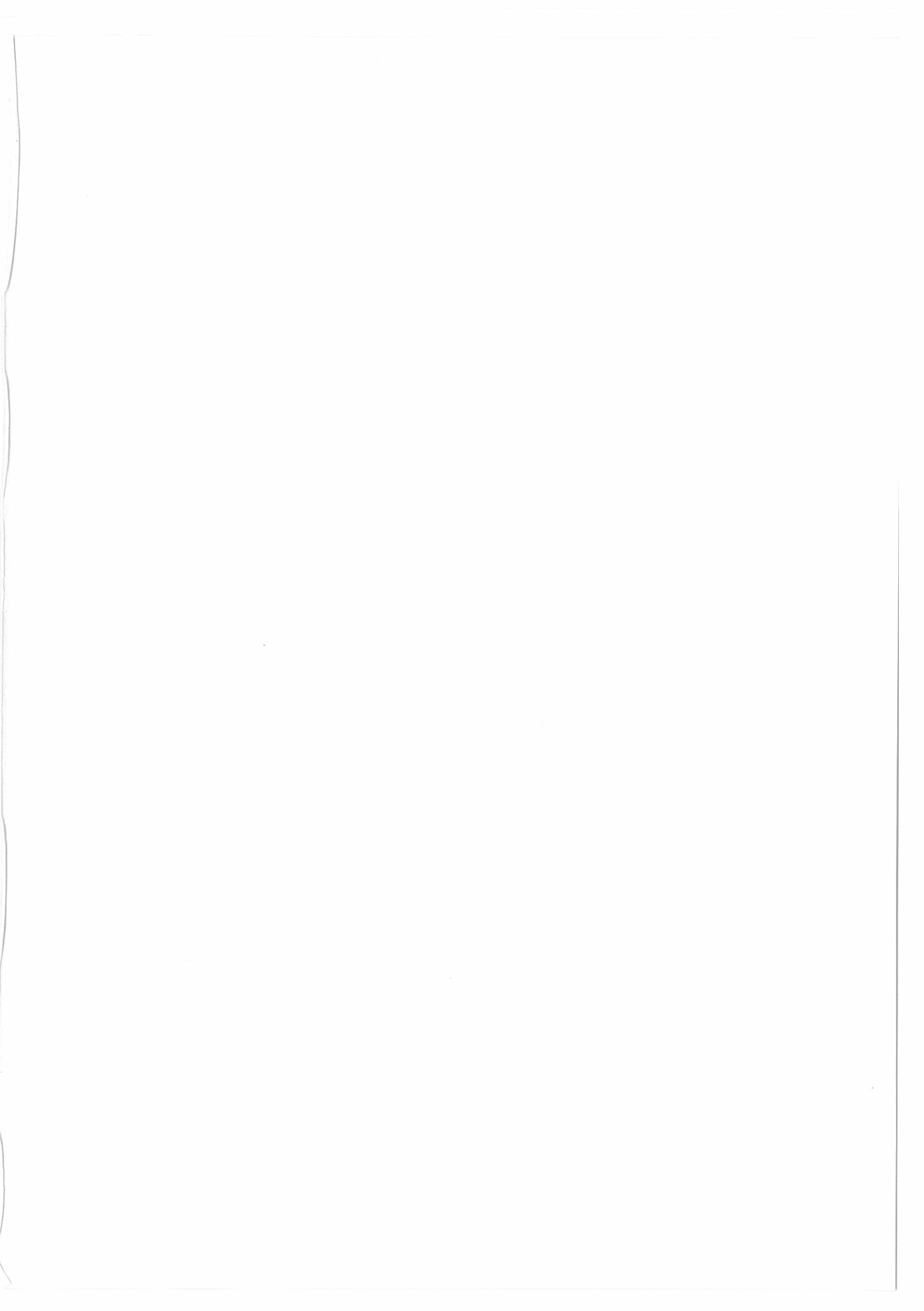


|    |  |  |       |
|----|--|--|-------|
| 1. | A. Batsidis and K. Zografos                              | Multivariate Linear Regression Model with Elliptically Contoured Distributed Errors and Monotone Missing Dependent Variables | 1-30  |
| 2. | M.K.Grammatikopoulos, P.S.Kelevedjiev and N.I.Popivanov: | On the solvability of a singular boundary value problem for the equation $f(t, x, x')=0$                                     | 31-46 |
| 3. | A. K. Katsaras:  | Completely Regular Fuzzifying Topological Spaces   | 47-64 |
| 4. | Y. Şahiner and I. P. Stavrulakis                         | Oscillations of First Order Linear Delay Dynamic Equations   | 65-78 |
| 5. | P. Ch. Tsamatos  | On some Second Order Nonlocal Functional and Ordinary Boundary Value Problems  | 79-93 |



# Multivariate Linear Regression Model with Elliptically Contoured Distributed Errors and Monotone Missing Dependent Variables

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## Abstract

In this paper, the multivariate linear regression model is studied under the assumptions that the error term of this model is described by the elliptically contoured distribution and the observations on the response variables are of a monotone missing pattern. It is primarily concerned with estimation of the model parameters, as well as, with the development of the likelihood ratio test in order to examine the existence of linear constraints on the regression coefficients. In this context, the multivariate linear regression model with the constant term as a sole explanatory variable is also studied and leads to estimators of the location and scale of elliptically contoured distributions with monotone missing data. A numerical example is presented for the explanation of the results.

MSC: 62J12, 62H12, 62H15.

*Keywords:* Monotone missing data; Elliptically contoured distributions; Multivariate linear regression analysis; Estimation; Consistency of Estimators; Hypothesis Testing; Generalized Wilk's distribution;

## 1 Introduction

Multivariate linear regression analysis is a well known statistical technique which helps to predict values of responses, dependent variables, from a set of explanatory, independent, variables. It is a popular statistical tool used in almost every branch of science and engineering. The classic linear multivariate regression model is analyzed assuming the error matrix has a multivariate normal distribution with zero mean matrix and a positive definite dispersion matrix. The role of the multivariate normal distribution is seminal in probability theory and statistics. However, many statistical papers and empirical studies show that the normal distribution is not capable of exhibiting important properties encountered in finance and economics, among other research areas. A well known insufficiency of the normal distributions are their light tails which fail to formulate for instance, observations of rates of return on common stock, according to Fama (1965) and Blatberg and Gonedes (1974). In this respect, there has been intense research in the use of

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