



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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شبكة المعلومات الجامعية

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شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغييرات



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تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

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15-25- c and relative humidity 20-40%

بعض الوثائق الأصلية تالفة



بالرسالة صفحات نم ترد بالاصل

CHEW
Cairo University
Faculty of Economics and Political Science
Department of Statistics

ON FINANCIAL TIME SERIES DATA MINING

By

Mona Nazih Ali Abdal Bary

A Dissertation Submitted to the Faculty of Economics and Political Science,
Cairo University, in Partial Fulfillment of the Requirements
for the degree of Doctor of Philosophy in Statistics

Supervised by

Prof. Dr. Nadia M. Girgis

Professor of Statistics,
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The American University, Egypt, and
Professor Emeritus, Cornell University, USA.

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Faculty of Economics and Political Science
Cairo University

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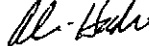
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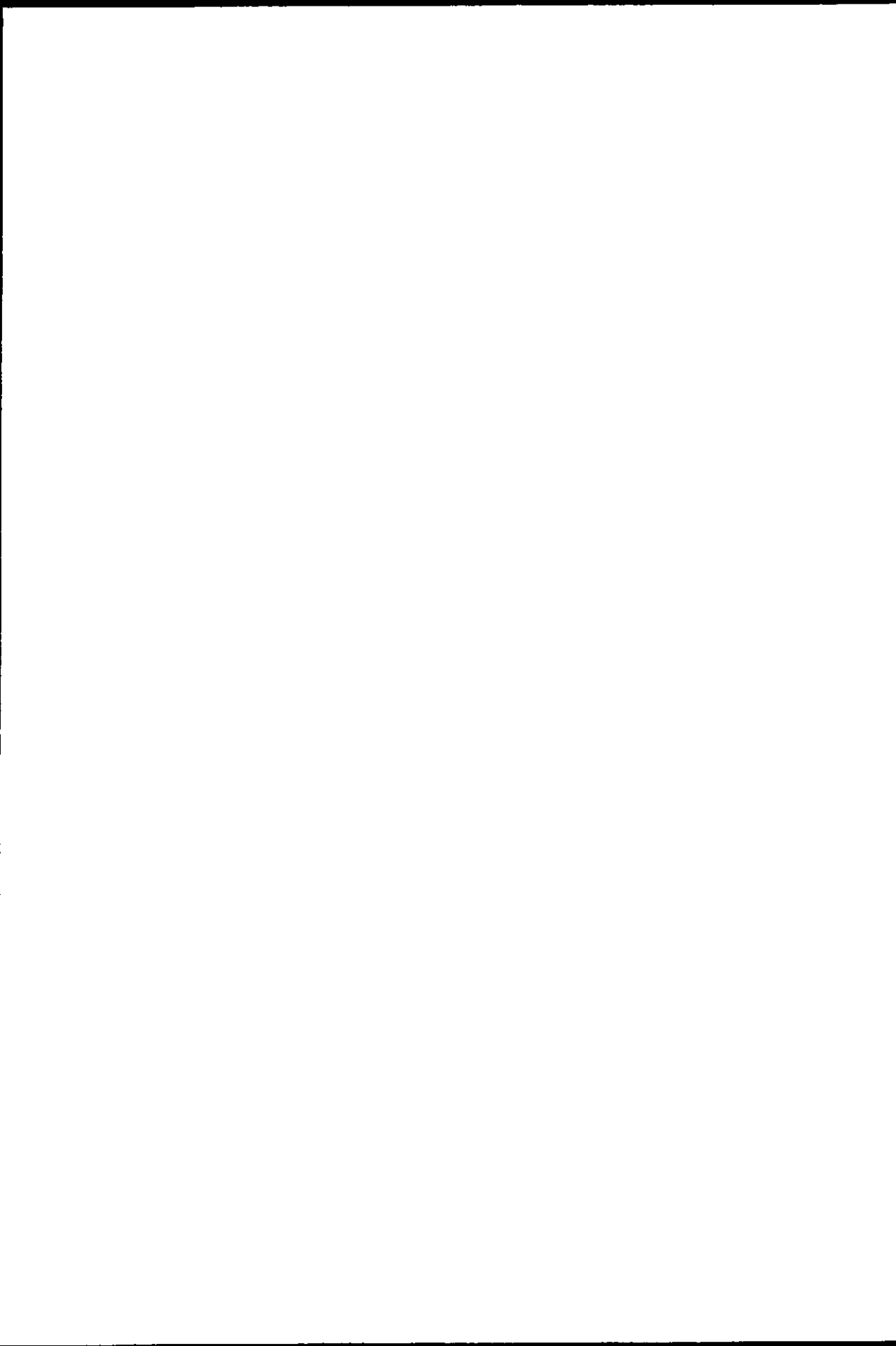


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Dr. Azza A. El Naggar



Assistant Professor of Statistics
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To my father, my sisters, and the memory of my mother.



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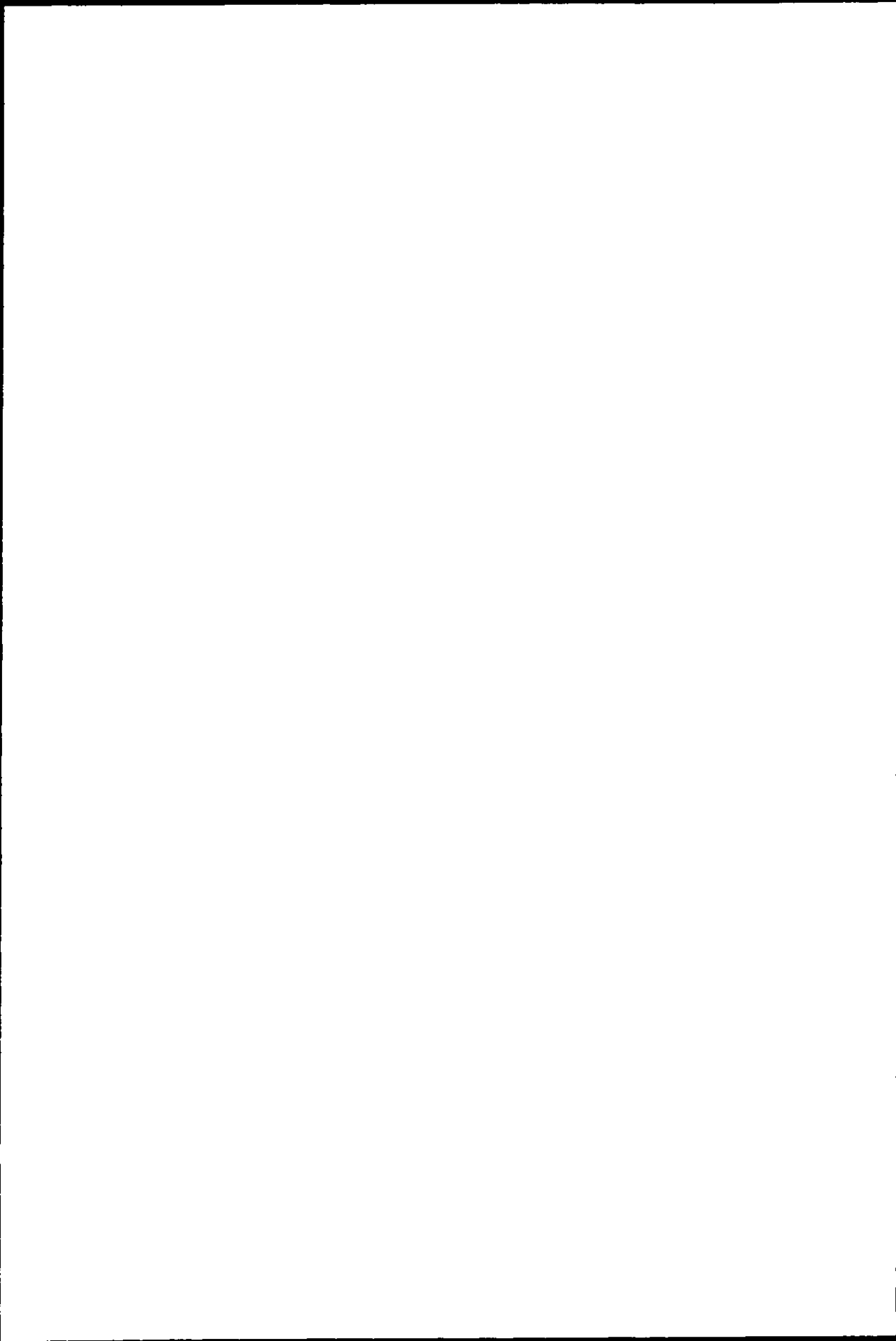
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On Financial Time Series Data Mining

Abstract

The portfolio selection problem has a venerable history. Markowitz (1952), one of the creators of the modern portfolio theory, formulates the problem as a trade-off between the expected return and the expected risk of a portfolio. For his path breaking work that has revolutionized investment practice, he won the Nobel Prize in 1990. In this Dissertation we propose two enhancements to the traditional portfolio selection problem. First we enhance the formulation of the problem by introducing four additional constraints that take into account the following: (a) the collinearity problem to decrease the portfolio risk, (b) the special preference to active stocks to increase the expected return and decrease the systematic risk, (c) the special preference to stocks with outstanding performance to increase the un-expected return, and (d) control the overall risk of the portfolio.

Second, one of the common algorithms for solving the portfolio selection optimization problem is the Genetic Algorithm (GA), which is a stochastic search that starts with an initial solution and then allocates increasing trials to regions of the search space found to improve the objective function. This algorithm can run into problems when the optimal solution is in a small region surrounded on all directions by regions of low value of the objective function. We propose an enhancement to the GA that avoids this problem.

Time series techniques such as ARIMA and GARCH models can be used to predict the return and risk for each stock. This predictions can be used as input to the model.

The forecast of financial time series is a fundamental problem due to its importance in risk management of the stocks. There are three major difficulties about

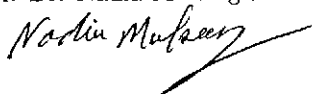


accurate forecast of financial time series, (a) the patterns of financial time series are dynamic, i.e., there is no single model that works all the time, (b) an efficient model must be able to adjust its sensitivity as time goes by, (c) misleading information must be identified and eliminated. A Hidden Markov Model (HMM) aims to solve these problems. We propose trading rules using HMM to answer the question of how and when do investors trade the stock?

Keywords: Modern portfolio theory, Optimal Portfolio, Stock Selection, Genetic Algorithm, Quadratic Programming, Nonlinear Programming, Financial Time Series, Hidden Markov Model, Portfolio Rotating and Stock Exchanging .

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