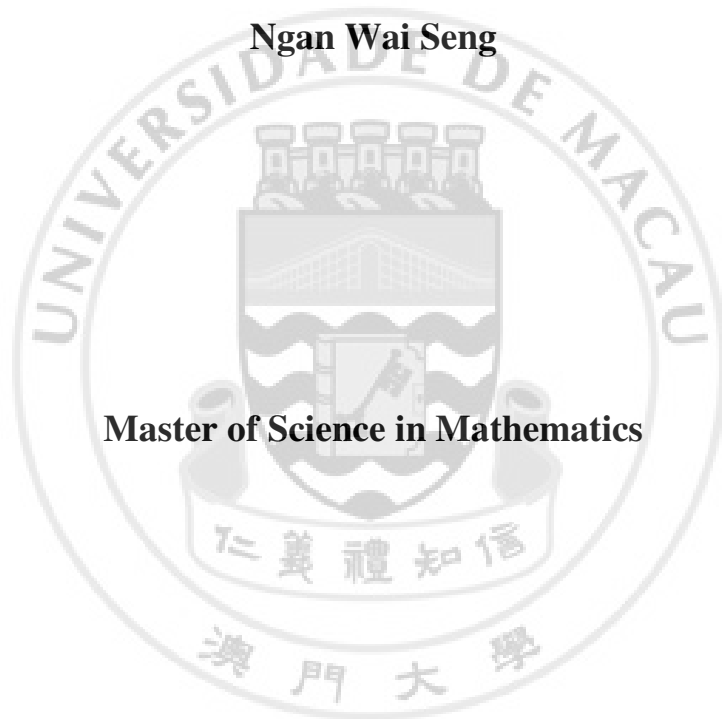


**THE APPLICATION OF BOX-JENKINS
MODELS TO THE FORECAST OF TIME
SERIES OF MAINLAND CHINA TOURISTS IN
MACAO**

by

Ngan Wai Seng



Master of Science in Mathematics

2011



**Faculty of Science and Technology
University of Macau**

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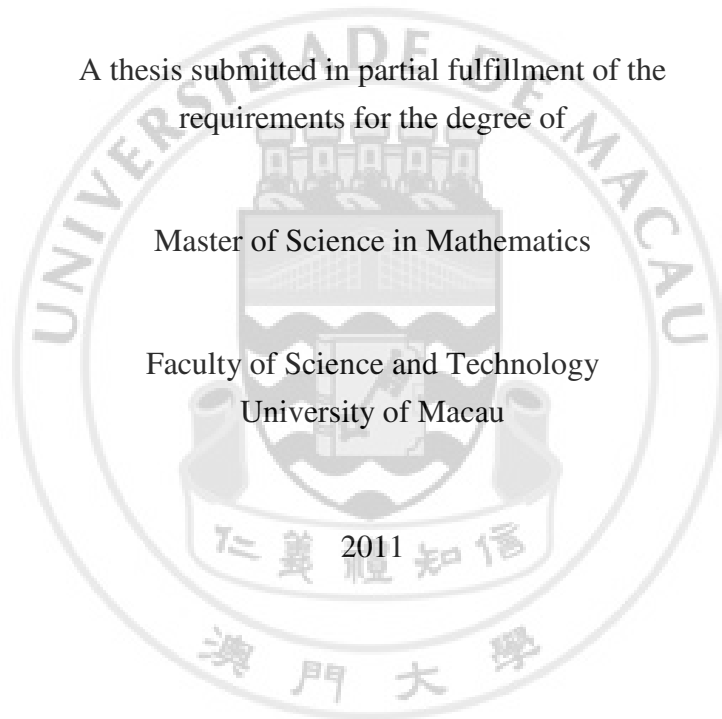
by

Ngan Wai Seng

A thesis submitted in partial fulfillment of the
requirements for the degree of

Master of Science in Mathematics

Faculty of Science and Technology
University of Macau



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Supervisor

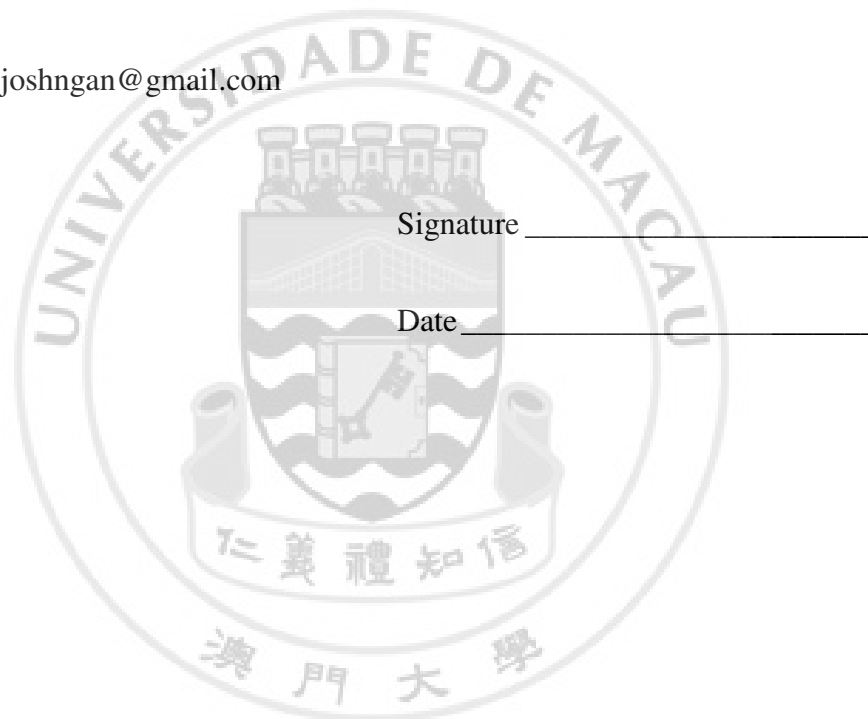
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**THE APPLICATION OF BOX-JENKINS MODELS TO
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CHINA TOURISTS IN MACAO**

Abstract

by Ngan Wai Seng

Thesis Supervisor: Prof. Ding Deng
Master of Science in Mathematics

The rapid growth and occasional factors cause fluctuations to time series of number of tourists from mainland China to Macao, especially after the year of 2000, and make it more difficult to model and forecast.

The purpose of this thesis is to develop an appropriate Box-Jenkins model to forecast the number of tourists from mainland China to Macao, and attempts to interpret the effects of exceptional external events in order to manage future development when such events happen again in the future. Pre-differencing transformation as well as differencing, together with intervention modeling are applied in this thesis.

Box-Jenkins models with pre-differencing transformations are firstly compared. The result shows that models with pre-differencing transformations provide better values of standard error estimate and Ljung-Box statistic than that with original data. In other words, pre-differencing transformation is necessary to stabilize a non-stationary time series with respect to its variance, such as the one analyzed in this thesis, during the process of finding an adequate model.

Intervention modeling is then applied to handle exceptional events existing in the time series. Modeling results are compared with those without intervention modeling. The result shows that models with intervention modeling are more adequate in modeling the number of tourists from mainland China to Macao in terms of forecasting accuracy due to obviously improved values not only in standard error estimate and Ljung-Box statistic in general, but also in mean absolute percentage

error between forecasting and original data.

Application of Box-Jenkins methodology together with intervention modeling is suggested to Macao government for analyzing and forecasting the mainland Chinese tourist arrivals in Macao. Application of intervention modeling technique together with advanced and innovative forecasting methodology is suggested in further study of tourist arrivals in Macao.



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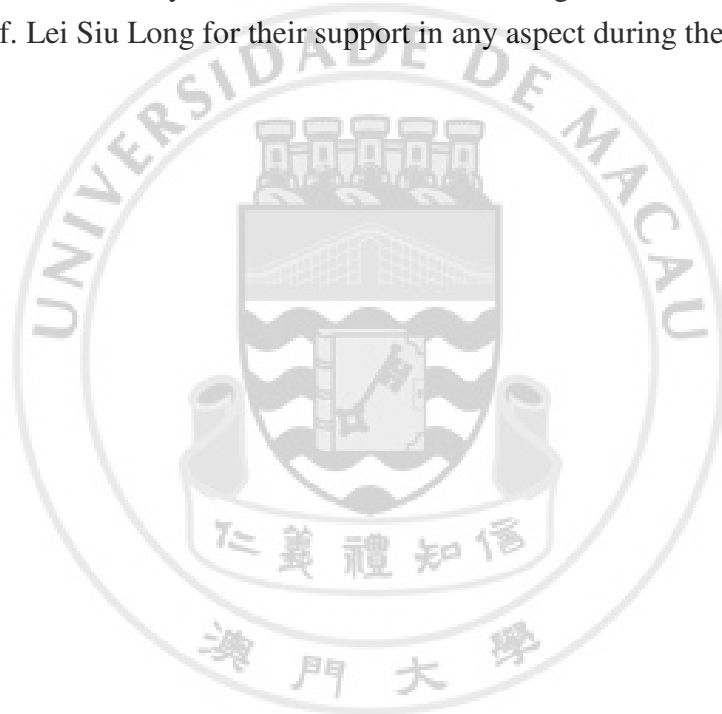
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DECLARATION

The author declares that this thesis represents his work based on the ideas suggested by Prof. Ding Deng, the author's supervisor. All the work is done under the supervision of Prof. Ding Deng during the period of 2006 to 2011 for the degree of Master of Science in Mathematics at the University of Macau. The work submitted has not been previously included in any thesis or report submitted to any institution for a degree, diploma or other qualification.

