

Independent Study (Fall 2017) **Analysis of Time Series**

Objectives: Many experiments and observational studies involve datasets in which the observations are made sequentially over time. The purpose of this study is to introduce the student to the basic concepts and ideas behind the analysis of time series data and how to develop plausible stochastic models for use in forecasting future data values. The main emphasis will be on applications along with adequate understanding on some of the theoretical aspects. In this study, we will look at trend and seasonal analysis of time series data, and then study ARMA processes used in the modeling and forecasting of stationary time series. In addition, we will study another type of time series analysis like ARCH/GARCH model, which attracted substantial attention in econometric/financial applications. Throughout the course, we will learn R package to analyze data sets and to generate time series data. Finally, the student is to be able to build time series models for real life datasets.

Textbook and Reference:

Jonathan Cryer and Kung-Sik Chan, *Time Series Analysis: with applications in R*, Springer.

Ruey S. Tsay, *Analysis of Financial Time Series*, Wiley

Topics: We will cover the following topics: Fundamental concepts, Trends, Stationary time series models, Non-stationary time series models, Model identification, Parameter estimation, diagnostic checking and model selection, Seasonal time series, Intervention analysis models, Time series regression models and ARCH/GARCH models, and Threshold Models (if time is permitted).

Requirement: Summary of Textbook (50%) and Final term project* (50%).

* *The final term project could be a data analysis, a simulation study, methodological or theoretical research of your interest. A concise written report has to be submitted by the end of semester.*

Supervisor: Dr. Jin-Hong Park

Ph.D. in Statistics from the University of Georgia

The research interests include Dimension Reduction Methods, Applied Time Series Modeling, Intervention Analysis, and Financial/Econometric Applications in Statistics.

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