

STAT5210: Time Series Analysis

Lecture: Monday M234 (16 weeks)

Instructor: Nan-Jung Hsu [njhsu@stat.nthu.edu.tw]

office: General Building III 801

phone number: 03-5742646

Textbook:

1. Shumway and Stoffer, Time Series Analysis and its Applications with R Examples.

2nd edition (2006); 3rd edition (2011); 4th edition (2016) (e-Book).

<https://www.stat.pitt.edu/stoffer/tsa4/>

2. Tsay, Ruey S. (2012), An Introduction to Analysis of Financial Data with R.

<https://faculty.chicagobooth.edu/ruey-s-tsay/research/an-introduction-to-analysis>

3. Tsay, Ruey S. (2014), Multivariate Time Series Analysis.

<https://faculty.chicagobooth.edu/ruey-s-tsay/research/multivariate-time-series-analysis>

Pre-requirement:

Students taking this course must be familiar with regression and have at least one year of learning experience in statistics (or mathematical statistics), regression (or linear models) or equivalent courses.

Grading: Homework (50%), Midterm (20%), Project (30%).

Course Materials: <https://eeclass.nthu.edu.tw/>

TA Hours: TBA

Topics:

Time series data patterns and dependence

Stationary process and autocorrelation

Linear process, ARMA models

Estimation and best linear prediction (forecasting)

Model building and selection

Financial time series and volatility model

Multivariate time series

State-space model and Kalman filter

Neural network for time series (if time allowed)

Frequency domain analysis: spectral density and its inference (if time allowed)

Software:

R: <http://www.r-project.org>

RStudio: <https://posit.co/>