Time Series Analysis

UC Berkeley, School of Information: MIDS w271

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Contents

Problem Set 11

This is the final problem set that you will have to work on for this class. Congratulations! (Although there is still a group lab that will be the final assignment in the course.)

You will start with some guided work, and then proceed into less structured work that will let you stretch and demonstrate what you have learned to date.

Notice, in particular, that the last few questions are asking you essentially to "produce a model" using a method. At this point in the course, you should be familiar with many of the model forms that you *might* fit; and, you are familiar with methods that you can use to evaluate models' performances. In these questions, we are asking you to, essentially, fit a good model with a method and then to evaluate how a good model with "this" method is doing compared to another good model with "that" method.

In several of these questions, there isn't a correct answer, *per se*. Instead, there is the process that you will undertake and record as you are producing your argument for the model that you think is best meeting your objectives. This is a **very** applied task that we anticipate you will see many times in your work.

```
knitr::opts_chunk$set(echo=TRUE)
```

We are providing you with an additional challenge, but one that is also very evocative of work that you're likely to come across. This is a well-built repository, that uses a well-documented framework to produce reports, namely `bookdown`.

Once you have done your work, you can render the entire book using the following call in your console:

```
> bookdown::render_book()
```

This will ingest each of the files `01-time_series_...`, `02-cross_validation.Rmd`, `03-ARIMA_model.Rmd` and so on ... and produce a PDF that is stored in `./_book/_main.pdf`. If you would like to read more about this framework, you can do so at the following website: https://bookdown.org/yihui/bookdown/ .

Chapter 1

(10 points) ARIMA model

Placeholder

1.1 Time series plot

1.2 Fit a model

1.2.1 Model type

1.2.2 Back to the future

1.3 Is this model appropriate?

1.4 Forecasts, by hand!

1.5 Interpret roots

Chapter 2

(10 points) Seasonal ARIMA model

Placeholder

2.1 Time series plot

2.2 Check for Stationary

2.3 Model identification and estimation

2.4 Model diagnostic

2.5 Forcasting

Chapter 3

(10 points) Time Series Linear Model and Cointegration

Placeholder

3.1 Plot electricity

3.2 Cointegration test

3.3 Fit Model

3.4 Residuals Plot

3.5 Forcasting model

Chapter 4

(12 points) Vector autoregression

Placeholder

4.1 Time series plot

4.2 Check for the unit root

4.3 Determine VAR model

4.4 Estimation

4.5 Model diagnostic

4.6 Forecasting