UNSW ECON2209 Assessment
Problem Set 1

2021

At the start of an R session for this course, remember to type `library(fpp3)` *in the R Studio Console. This will then load (most of) the R packages you will need, including some data sets.*

Details:

- Total value: 10 marks.
- Submission is due on **Friday of Week 3 (5 March), 5pm**.
- A submission link is on the Moodle site under Assessments.
- Submit your documents in PDF format.
- Your submitted answers should include the R code that you used and any figures produced. Note that in the bottom right quadrant of RStudio, under the Plots tab there is an export button. This can be used to export figures for inserting into your answer document; e.g. select "Copy to Clipboard" and paste into a Word document. (Other methods are also possible.)
- Problems are not all of equal value.

Problem 1 [2 marks]:

The `USgas` package contains data on the demand for natural gas in the US.

a. Install the `USgas` package: `install.packages("USgas")`
b. Create a tsibble from `us_total` with year as the index and state as the key.
c. Plot (in one figure) the annual natural gas consumption by state for the New England area (comprising the states of Maine, Vermont, New Hampshire, Massachusetts, Connecticut and Rhode Island).

Submit your code, figure and any observations on the plotted series.

Problem 2 [4 marks]:

Explore features of "Total Private" `Employed` from `us_employment` (i.e. Total Private Employment in the US) using the following graphics functions: `autoplot()`, `gg_season()`, `gg_subseries()`, `gg_lag()`, `ACF()`.

- Can you spot any seasonality, cyclicity and trend?
- What do you learn about the series?
- What can you say about the seasonal patterns?
- Can you identify any unusual years?

Problem 3 [4 marks]:

For the following series, find an appropriate Box-Cox transformation in order to stabilise the variance, if required. Report your observations on each series and the transformations you tried.

- Tobacco from `aus_production`
- Economy class passengers between Melbourne and Sydney from `ansett`
- Pedestrian counts at Southern Cross Station from `pedestrian`.