

MATH1307 – Forecasting Instruction Sheet

Assignment 2

In this assignment, you have two tasks. **You will work independently on this assignment.**

Task 1:

In the first task, you will analyse and forecast the amount of horizontal solar radiation reaching the ground at a particular location over the globe. For this aim, you will work on the monthly average horizontal solar radiation and the monthly precipitation series measured at the same points between January 1960 and December 2014. Both series are given in “data1.csv” file under the Bb shell via “Course webpage → Assignments → Assignment 2.”

Your task is to give best 2 years ahead forecasts in terms of MASE for the solar radiation series by using the time series regression methods (distributed lag models (dLagM package)), dynamic linear models (dynlm package), and exponential smoothing and corresponding state space models covered in the Modules 3 - 7 of our course in this semester. While working with exponential smoothing and state space model, you will only use solar radiation series. **Hint:** Use MASE() function from the 0.0.8 version of dLagM package to compute MASE for time series regression methods for model comparisons.

For the solar radiation forecasts, the required precipitation measurements (predictor series) for the months from January 2015 to December 2016 at the exact same locations are given in “data.x.csv” file under the Bb shell via “Course webpage → Assignments → Assignment 2.” You will use this data for the calculation of 2 years ahead forecasts.

Task 2:

In the second task, you will analyse the correlation between quarterly Residential Property Price Index (PPI) in Melbourne and quarterly population change over previous quarter in Victoria between September 2003 and December 2016. The quarterly PPI and population change series are available in “data2.csv” file under the Bb shell via “Course webpage → Assignments → Assignment 2.”

In this task, main goal of your analysis is to **demonstrate** that whether the correlation between these two series is spurious or not.

In both tasks, it is expected that you ask yourself what are the elements of a suitable and successful data analysis, and how you might go about presenting your results in a written report format. Please review the contents of the relevant modules and apply suitable approaches here. The rubric given below will guide you through my expectations in terms of reporting, R codes, descriptive analysis, modelling, and diagnostic checking.

Submission Instructions:

- All reports must be submitted via the Turnitin link on the course Blackboard prior to the due date (24/09/2017 11:59pm).

- Your report should be uploaded as a **PDF** or Microsoft Word file. Please do not submit your source files like .R and .Rmd files. Please include all your R codes in the appendix of your report.
- Your report should meet with English language requirements.
- **Late submissions** will be marked in accordance with the late submission policy explained under “Assessment” title of the course information sheet.

Collaboration vs. Collusion and Plagiarism:

You are free to discuss main aspects of the assignment with your classmates. However, keep in mind that this is an individual assignment and you should demonstrate your own effort and understanding. Because assignments will be submitted through Turnitin, all the material you submitted will be **checked for plagiarism. Please make sure that similarity of your report is under 35% after submitting your file through the Turnitin.** If plagiarism is detected, both the copier and the student copied from will be responsible. Therefore, it is your responsibility to ensure you do not copy or do not allow other classmates to copy your work. You should ensure you understand your responsibilities by reading the [RMIT University website on academic integrity](#).

Alignment with CLO's:

This assessment task supports CLO 1, 2, 3, 4 and 5.

Marking Rubric:

Criteria	Not acceptable (0)	Needs Improvement (2)	Meets Expectation (3)	Creates Distinction (4)
Reporting (15%)	Lacks the basic elements of a precise report. Some of the outputs have not been associated with inferences or there are inferences without supporting evidence.	All inferences are clearly addressed by relevant outputs and given under relevant sections. Some of the output remain without being inferred. There are major language and formatting issues.	All inferences are clearly addressed by relevant outputs and given under relevant sections. All bits of the presented output are used for the inferences. There are minor language and formatting issues.	All inferences are clearly addressed by relevant outputs and given under relevant sections. All bits of the presented output are used for the inferences. There are minor language and formatting issues.
R codes (15%)	Some of the scripts to run analyses are generating error messages. It is unclear what does each line do in the R codes.	All scripts to run analyses are working properly. However, it is hard to follow codes to identify what each line does.	All scripts to run analyses are working properly and suitable explanations are given.	Scripts to run analyses are working properly and suitable explanations are given. Also, the scripts include functions to implement all analyses in a dynamical way.
Descriptive analysis (%30)	Nearly no descriptive analysis has done and/or the descriptive analysis is in sufficient.	Some descriptive plots/statistics are used and/or all presented plots/statistics have interpretations.	Uses all suitable plots and descriptive statistics and each plot and descriptive statistic has a suitable interpretation.	Uses all suitable plots and descriptive statistics are displayed. All plots and descriptive statistic are interpreted in a way to shed a light on further analyses.
Research questions (40%)	Some of the research questions are answered using available tests and methods.	Most of the research questions are answered correctly using appropriate tests and methods.	All research questions are answered correctly using appropriate tests and methods.	All research questions are answered correctly in a creative way using appropriate tests, methods and their combinations.