

Data Analysis Exam 1 (STA 3001)  
March 30, 2021

### Instructions

- This exam aims to perform time series data analysis using computer and worth 40% of your course grade. For a given set of data, you are required to submit a report on preliminary analysis and discussion etc. **Including your discussions and reasonings** will be an important part of your credit.
- You are allowed to use any resources on your own, however, you are not permitted to discuss with anyone. The report should be your own work. Otherwise, it may subject to serious violation of the student code of conduct. By submitting your report online, it is assumed that you agree with the following pledge;

**Pledge:** *I have neither given nor received any unauthorized aid during this exam.*

- The report should be written in **English**, and keep in mind that the clarity of your report is also a part of the credit. Also note that you can submit your report over icampus with pdf file format ONLY.
1. We will consider the (mysterious) weekly time series observed from Jan 10, 2010 to Aug 11, 2019, hence it contains total 500 weekly data. Perform the following analysis:
    - (a) Time plot, correlograms (ACF) and discuss key features of the data.
    - (b) Remove any trend or seasonality or both to make the series as stationary if necessary. It is not limited to three methods we covered in class. That is, you can apply any methods you have learned, but make sure that you properly and clearly write down models/methods you have applied.
    - (c) Include reasoning why the residuals from the selected model in (b) is stationary. Also, can you claim that the removed series is an IID sequence? Note that if you have decided not to remove any trend/seasonality, your model will be the raw data itself in step (b).
    - (d) Write one paragraph summary on your findings about (a)-(c).
    - (e) Attach R (or other softwares you used) code you have used in this analysis. Reduce font size/margin for the shortness sake. If the result cannot be reproduced with the attached code, the result cannot be trusted.

**Don't forget to write down your NAME, STUDENT ID in your report!**