STATS 326
Applied Time Series
ASSIGNMENT THREE
Due: 29 January 2019, 9.00 am

(Worth 6% of your final grade)

Hand-in to the appropriate STATS 326 Hand-in box in the Student Resource Centre

This assignment will be marked out of 100. Please follow the instructions carefully. Marks will be deducted if you include **R** output, plots etc that are not asked for. Only include what is requested in each question in your answers. You are encouraged to print your assignment "2-up" to save paper.

The data for this assignment is the same as the data used in Assignment Two.

NOTE: Given what was found in Assignment Two with respect to the variables needed for the best predicting Seasonally Adjusted model of the CO2 Concentration data, you should be able to fit appropriate final models (without going through any model building steps) for Questions One and Two.

Question One: [20 marks]

Build a Seasonal Factor model of the data (2000 to 2016). See pages 90 – 96 of the Course Notes. Calculate predictions for the 4 quarters of 2017 using your final model. Compare the model's forecasts with the actual values for 2017.

In your assignment only include the following for the **best predicting Seasonal Factor model**: the **R** summary output for the best predicting model, the **R** commands and output used to do the predictions and the **R** commands and output used to compare the predictions with the actual values for 2017. Briefly comment on the model.

Question Two: [25 marks]

Find the best predicting Harmonic model of the data (2000 to 2016). See pages 97 – 114 of the Course Notes.

In your assignment only include the following for the **best predicting Harmonic model**: the **R** summary output for the best predicting model, the **R** commands and output used to do the predictions and the **R** commands and output used to compare the predictions with the actual values for 2017. Briefly comment on the best predicting model. Briefly discuss the other Harmonic models that you tried and briefly ex-plain why they were rejected.

For Questions Three and Four, use the best predicting model from Questions One and Two.

Question Three: [30 marks]

Write up a brief set of Technical Notes for **the best predicting model**. You do not need to discuss any model building steps. You should also discuss the predictions and their reliability.

Question Four: [20 marks]

Re-run the best predicting model using all the available data (2000 to 2017) and do predictions for the 4 quarters of 2018. You are not required to do any model building in this question. Just use the best predicting model from Questions One and Two.

In your assignment only include the **R** commands and output for the best predicting model and the **R** commands and output for the 2018 predictions. Briefly comment on the model.

Question Five: [5 marks]

Which is the best predicting model from Assignments Two and Three? Justify your choice.