Department of Statistics
STATS 326: Applied Time Series

Summer Semester, 2020
Test 2
Total Marks = 100
9.15 to 10.15 am

1. Briefly discuss the plot of the Antarctic Sea Ice data on page 1 of the Appendix.
(5 marks)

2. Are the assumptions satisfied for the Seasonal Factor model of the Antarctic Sea Ice data on pages 2 and 3 of the Appendix? Briefly explain.
(10 marks)

3. Calculate the predictions for January and February 2019 using the Seasonal Factor model on page 3 of the Appendix. Calculate the RMSEP statistic for January to March 2019. (Note: the actual values for January to March 2019 are given on page 1 of the Appendix and the prediction for March 2019 is on page 3 of the Appendix.)
(20 marks)

4. What would the predictions and RMSEP statistic be for a Full Harmonic model of the Antarctic Sea Ice data for January to March 2019.
(5 marks)

5. Comment on the predictions and RMSEP statistics for the Reduced Harmonic models on page 4 of the Appendix.
(10 marks)

6. What is the difference between the Reduced Full Harmonic Models in relation to the explanatory variables included in each model?
(5 marks)

7. Under what circumstances will a lagged response variable fitted as an additional explanatory variable solve an autocorrelation problem detected in the Residual Series of a model of a Non-stationary Time Series? You may use sketch diagrams to illustrate your answer.
(10 marks)

8. When we are unable to correct for autocorrelation in a Residual Series from a Non-stationary Time Series model using a lagged response variable as an additional explanatory variable, what options do we have? Briefly explain.
(15 marks)

9. What Stationary model would you initially fit to each of the 4 simulated Stationary Time Series (`TS1`, `TS2`, `TS3` and `TS4`) on pages 5 – 8 of the Appendix? Justify your choice of model and write down the equation of the model you have chosen for each series.
(20 marks)