

Department of Statistics
STATS 326: Applied Time Series

Summer Semester, 2020

Test 1

Total Marks = 100

9.15 to 10.15 am

1. What patterns are we likely to see in Stationary Time Series and what patterns are we likely to see in Non-stationary Time Series.
(10 marks)
2. Briefly, why is dependence on the past so important in Time Series modelling?
(10 marks)
3. Sketch the partial autocorrelation function (pacf) plot for a monthly Time Series with a strong positive trend and a random component. Assume the variable is a ts object.
(5 marks)
4. If we had a Time Series with 361 observations, what are the values for the 95% confidence bands in a plot of the autocorrelation function of the Residual Series?
(5 marks)
5. Assume we had a Non-stationary Time Series and we differenced twice to remove the trend and once to remove the quarterly seasonal component. This produced a White Noise Residual Series. Write down the model using backshift notation and show your final model in the form: $y_t = \dots\dots\dots$
(20 marks)
6. Briefly discuss the plot of the Antarctic Sea Ice data on page 1 of the Appendix.
(5 marks)
7. Calculate the predictions for January to March 2019 using the Holt-Winters model on page 2 of the Appendix. Calculate the RMSEP statistic for those predictions. (Note: the actual values for January to March 2019 are at the bottom of page 1 of the Appendix.)
(15 marks)
8.
 - a. Identify the most important feature of the plot of the seasonally adjusted series on page 3 of the Appendix.
(5 marks)
 - b. Using the information on pages 3 to 4 of the Appendix, are the assumptions of the Seasonal Trend Lowess Seasonally Adjusted model satisfied? Explain briefly.
(10 marks)
9. Calculate the prediction for January 2019 using the Seasonal Trend Lowess Seasonally Adjusted model on page 4 of the Appendix. Calculate the RMSEP statistic for the January to March 2019 predictions. (Note: the actual values for January to March 2019 are at the bottom of page 1 of the Appendix and the February and March STL predictions are given at the bottom of page 4 of the Appendix.)
(10 marks)
10. Which model is the best predicting model for January to March 2019? Why?
(5 marks)