Assignment 3
STAT317/ECON323

Due 5pm Monday, 4 October 2021

A reminder that graphs help in interpretation and explanation and you are expected to present them properly.

1 Question 1 – 11 Marks

For assignment 3 I have supplied a text file (rainfall.dat). This has the hourly rainfall data at Christchurch for .

a

b Since most of the time the hourly rainfall is zero (0) this are not in the file. Create a complete time series with all 8,784 hours in the year. That is, add the hours with zero rainfall. Plot this series. Also what percentage of the hours have zero rainfall?

c Produce an ACF plot for this series. What does this tell you about rainfall?

d From the hourly data create a time series of <u>daily data</u>

e Produce an ACF plot for the daily rainfall series? Comparing it with previous ACF how similar or dissimilar are they? Explain your result?

2 Question 2 – 9 marks

For this question use the time series you selected for the previous assignments. Use the data from the years 2000-2019 only i.e. suppress COVID effects. It is recommended you use the HoltWinters option in the forecast package.

a Fit the following models to your data using the following methods:

    (a) Single exponential smoothing

    (b) Exponential Smoothing with trend

    (c) Exponential Smoothing with trend and seasonal component

    (d) The previous model but applied to a log transformed series;

For each of the models, is the time series of the residuals what you would expect for a proper time series model fit? Also from the residuals, which do you think is the best model? Explain your reasoning.

b For model 1(d) what are the values of for α, β, γ? What does this tell you about the weighting for measured recent data compared to that for estimates?