Statistics 565 Applied Time Series Analysis Spring 2019

# Homework 6

**Due: Mon 04/08/19 @ 6:00pm** rutgers.instructure.com/courses/21204

1. Generate 100 observations from the model $Y_t = e_t + 0.7e_{t-1}$ as follows:

```
set.seed(1000)
y = arima.sim(n=100, list(ma=c(0.7)))
```

   This is the same data used in last week's class to demonstrate the fitting of an MA(1) model. Your task is to fit an MA(2) model to the data using maximum likelihood. Specifically,

   (a) Write down the covariance matrix $\Gamma_{100}$ for $(Y_1, \ldots, Y_{100})$ in terms of parameters $\theta_1$, $\theta_2$ and $\sigma_e^2$;

   (b) Explain how you will use it to obtain maximum likelihood estimates of $\theta_1$ and $\theta_2$;

   (c) obtain these estimates; and

   (d) obtain their standard errors.

2. Problem 7.1.

3. Problem 7.11.

4. Problem 7.31. Please do so for all four bootstrap methods discussed in class, and compare their differences.

5. Problem 8.9. Hint: the aspects to be examined include the overall fit of the two models (AIC), residual plots, normality and autocorrelations of the residuals. Visualizations as well as formal tests shall be used.