STAT 804

Assignment 3

1. The S command

   attach('/home/math4/lockhart/teaching/courses/804/datasets')

   will make a dataset *influenza* available. If you type

   ls(pos=2)

   you will see the data set for this question and the next two.

   The data consist of monthly counts of influenza cases over a 9 and a half year period. Fit an ARIMA model to the data.

2. Fit an ARIMA model for the Johnson and Johnson earnings per share data which is in the dataset *earnings*. There is 20 years of quarterly data.

3. Fit an ARIMA model for the data set called *fake*.

4. For the data set *raindiff* fit the model

   $$X_t - \mu = \phi(X_{t-1} - \mu) + \epsilon_t$$

   where the ϵ_T are iid $N(0, \sigma^2)$ in each of the following ways

   (a) By full maximum likelihood. (Maximize the joint density of the X's over the parameters μ, ϕ and σ.)

   (b) By estimating μ by the sample mean and then doing full maximum likelihood for the model

   $$Y_t = \phi Y_{y-1} + \epsilon_t$$

   where $Y_t = X_t - \bar{X}$.

   (c) By estimating μ by the sample mean and then doing conditional maximum likelihood for the previous model.

   Remarks: I do not want you to use *ar* or other built-in S time-series functions to do these but you may want to use them to get starting values for estimates. It is probably easier to do the methods in reverse order, using the results as starting points for iterative solutions.

DUE: Friday, 12 November.