Project in STK4060/STK9060-Time series, spring 2010.
Deadline: Friday, May 28 at 2pm.

The completed project should be marked by your candidate number, found on the Student Web, not by your name. It should also be marked with your birth date. It should be delivered to the mail box of Inge Helland at the 7. floor in the Niels Henrik Abel's building (first right from the elevator, then far to the left). Delivering through e-mail will not be permitted. The project and the written exam will count equally for you grade. It is permitted to discuss aspects of the project with your fellow students, but all answers should be your own. Include R-codes with your answers of Assignment no. 1.

Assignment no. 1.

a) When writing >Nile in R, you get a time series with 100 observations. To this, add an observation no. 101 of the form 10dd, where dd is your birth data. For instance, if you are born on February 6, 1975, the observation is 1006. In practice, this can be done at least in two ways: (i). Write >write.table,(Nile, file="xxx"), add the observation in the file xxx, and then write in R: >Nile1=read.table(file="xxx"). (ii). Write simply >Nile2=c(Nile, 10dd). Try both options, and try to comment on the two different forms that Nile1 and Nile2 take.
b) Plot the time series Nile1, and discuss eventual signs of non-stationarity. If you had seen such signs, what could you have done? Discuss also if transformations are desirable.
c) Plot autocorrelation function and partial autocorrelation function for Nile1, and discuss possible choices of model.
d) For each model chosen, calculate the one-step-ahead predictions and the standardized innovations. Discuss relevant diagnostics.
e) If several models were chosen under c), use AIC to find the final model.
f) In the final model, estimate parameters, calculate the m-steps ahead predictions from time 101 for m=1,2,...,10, and plot these together with the time series. Find also standard errors of estimators and predictions.

Assignment no. 2.

Read through the descriptions of Box-Jenkins models that you find on http://www.itl.nist.gov/div898/handbook/pmc/section4/pmc445.htm and on http://en.wikipedia.org/wiki/Box–Jenkins . Find four topics that are common to those discussed in our textbook, and discuss similarities and eventual conflicts in the recommendations.

Assignment no. 3.

Read through p. 122 in the textbook. Write out in more detail all arguments used on that page. How can you use Property P3.7 to find asymptotic confidence intervals and confidence regions for the parameters? Why are these results limited to the AR(p)-process?