SMF Problems 9. 05.06.2013.

The purpose of this problem is to use time series modelling on some financial data using R. The first exercise consists in fitting some

Q1. ARMA fitting and the Box-Jenkins methodology
(i) *Getting the data:* Load the data from the file and create the log-return series. Be careful about the fact that –as often– the data is in chronological reverse order. Note, however that if you have a vector **vec**, you can revert it by

```
vec<-vec[length(vec):1]
```

(iii) *Looking at the ACF and PACF functions:* Use the **acf** and **pacf** functions to check whether there are features characteristic of AR or MA models.
(iv) *ARIMA fitting:* Even if the ACF/PACF exploration is useful, in practice, one uses an information criterion based approach to figure out the ARMA. Use the package **forecast** and notably the **auto.arima** function to fit the best possible model in terms of Akaike Information criterion, ensuring the function goes through all possible models by setting the **stepwise** parameter to false.
(v) reiterate the same procedure with the Coca-Cola log returns. In particular

Q2. GARCH fitting
(i) *Getting the data:* Download the VIX times series, which models the S&P volatility.
(ii) *Fitting a GARCH model:* Use the **garchFit** in the **fGarch** package (which you may have to install on your R distribution) to fit a GARCH(1,1) model to the data. What are the parameters of the model?

NHB/PMBF