Exercise 4

Consider the dataset 2010CL_BL.XLS and perform the following tasks:

1. Construct a time series for the daily returns in euro of MSCI_EURO, MSCI_USA, MSCI_UK over the period 02/01/2006-02/02/2009. Plot them and assess the magnitude of variations across different returns.
2. Construct the unconditional covariance and correlation matrices for the three returns.
3. Calculate the unconditional 1-day, 1 per cent value at risk of a portfolio equally in- vested in the MSCI_EURO, MSCI_USA and the MSCI_UK. Calculate also the same VaR individually. Compare the portfolio VaR with the sum of individual VaRs.
4. Estimate three GARCH models for the returns on MSCI_EURO, MSCI_USA and the MSCI_UK. Standardize each return and construct the unconditional correlation matrix for the the standardized returns of the three assets. This is the Constant Conditional Correlation Model. Compare VaR based on CCC with that based on the unconditional covariance method.
5. Use MLE to estimate λ in the exponential smoother version of the Dynamic conditional correlation model (DCC) for the bivariate system considered in point 4. Compare one per cent VaRs from the two models.
6. Estimate GARCH DCC model for the bivariate system, and compare VaRs from all estimated models. (Hint: download the package *UCSD GARCH*)