**Tutorial 4**

**Week 5**

We use Tute-wk-5.R file in this tutorial. Data series are provided in crude.txt and rice.txt files.

1. R revision – list().
2. By conducting unit root tests identify whether there is a unit root in the rice and crude oil price series.

Dickey-Fuller or Augmented Dickey-Fuller

1. Consider the monthly log return series of rice and crude oil prices. Test versus for some . Draw the conclusion.
2. Randomly generate white noise series with mean zero, standard deviation one, and the number of observations 500. Test versus for some . Draw the conclusion. Compare the results with those of found in part 3.
3. Plot autocorrelation function (ACF) and partial autocorrelation function (PACF) for logged rice and crude series and their log returns.
4. Estimate following models for the rice and crude oil log returns using maximum likelihood method.

Model 1:

Model 2:

1. Which estimated model in part 6 is preferred model in terms of Akaike information criterion?
2. Conduct the residual diagnostic tests for the models estimated in part 6.