**ECOM90024**

**Forecasting in Economics and Business**

**Tutorial 6**

1. Consider the variables and such that is described by an AR(1) model,

while is described by the following restricted ARMA(4,1) model,

where both and are white noise series and , and so that the stationarity and invertibility of and are guaranteed.

Show that the variable can be described by an ARMA(5,4) model. (*Hint:* *The lag operator will be useful here*!)

1. Consider the general MA() representation for a stationary time series , that is,

and suppose that the parameters are known.



1. The 1 step ahead forecast error is defined as:



What are the forecast errors for 3 and 4 steps ahead?

1. What is the covariance between the 3 and 4 step ahead errors?



1. Suppose that the time series is governed by the following process,

Where is a white noise series with and for all . Also suppose that that is observed every six months, but that it is aggregated to annually observed time series by taking the sum of the two observations of in year . Show that can be described by

Where is an MA(1) process with first order autocorrelation equal to . (*Hint: Let periods and be in year* )

1. For each of the following stationary time series processes

Where is a white noise process with and

1. Derive the unconditional mean
2. Derive the unconditional variance
3. Derive the first-order autocovariance