

Exercise session 8

Course: Introductory Econometrics

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The purpose of this handout is to illustrate the usage of Box-Jenkins methodology. One has to follow the steps below.

1. Identify if the time series is stationary. If yes, proceed to point 2. If no, transform the variables to first differences or log-differences.
2. Plot PACF and ACF functions to identify parameters p , d , q of $ARIMA(p, d, q)$ model.
3. Check if the error term is white noise. If yes, then proceed to point 4. If no, return to point 3 and adjust parameters p , d , q .
4. Do forecasting.

Problem 1

Write down code to simulate AR(p), MA(q) and ARMA(p,q) processes. For each process plot ACF and PACF functions. You can adjust the code below.

```
clear all
nulldata 100
setobs 1 1 –time-series
series y = normal(10,1)
series u = normal(0,1)
series y = 0.3*y(-1) + u
```

Problem 2

Use *Table_21.1.gdt* from Gujarati tab for this exercise. Setup $ARIMA(p, d, q)$ model for GDP time series and do a one-step ahead forecast.

1. To check the time series for stationary, go to *Variable* → *Unit root tests*.
2. To construct PACF and ACF functions, go to *Variable* → *Correlogram*.
3. To fit an ARIMA model, go to *Variable* → *Time series*.
4. To check the residuals for white noise, plot respective PACF and ACF functions.
5. Perform one step ahead forecast. In the window of obtained estimates, go to *Analysis* → *Forecasts....*