قسم الاحصاء وبحوث العمليات

المقرر: 436 إحص: تحليل السلاسل الزمنية

Tutorial set #5

Question 1:

Suppose that the process $\{y_t\}$ follows an AR(1) model, with $|\phi_1| < 1$, find the autocovariance function for the process $W_t = \nabla y_t = (y_t - y_{t-1})$ in terms of ϕ_1 and σ_ε^2, (where σ_ε^2 is the white noise variance).

Question 2:

Let the process $\{y_t\}$ follows an AR(2) model, with the following special form: $y_t = \phi_2 y_{t-2} + \varepsilon_t$, use the general method to find the values of ϕ_2 that make the process stationary.

Question 3:

Let the process $\{y_t\}$ follows an AR(2) model, with the following parameter values: $\phi_1 = 0.5$, $\phi_2 = -0.5$:

1- is the process $\{y_t\}$ stationary?

2- find the ψ_j weights in the general linear process.

Question 4:

Let the process $\{y_t\}$ follows an AR(2) model, for the following cases find the roots of the characteristic equation, and check if the process is stationary:

1- with parameters: $\phi_1 = 0.6$, $\phi_2 = -0.8$
2- with parameters: $\phi_1 = 2.4$, $\phi_2 = -0.8$

Question 5:

Find the Yule-Walker equations for the following models:

1- $y_t - 0.8y_{t-1} = \varepsilon_t$
2- $y_t - 0.9y_{t-1} + 0.4y_{t-2} = \varepsilon_t$

and solve these equations to get values for ρ_1 and ρ_2.

Question 6:

For the attached two sets of data (data1) and (data2), do the following:

1- Plot the series, and check its stationarity in mean and variance.
2- plot the ACF and PACF , suggest a preliminary model for the data.
3- Fit the suggested models, and get acquainted with the MINITAB output.