Assignment

Full Marks : 60

1. Write a short note within 400 words explaining applications of Time Series Analysis. (10)

2. Consider an ARMA(1, 1) model given by

$$X_t - \phi X_{t-1} = Z_t + \theta Z_{t-1}$$

where $\phi = 0.1$, $\theta = 0.4$

and $Z_t \sim IID(0, \sigma^2)$, with $\sigma^2 = 1$.

Draw a sample of size 40, $x_1, x_2, \ldots, x_{40}$ from this.

Calculate $\hat{\rho}_1, \hat{\rho}_2, \ldots, \hat{\rho}_7$ from the data.

Hence calculate 95% Confidence Interval for ρ_1. Does it contain the model value of ρ_1?

(20)

3. Draw random numbers $x_1, x_2, \ldots, x_{40}$, $0 \le x_i \le 9$.

Consider it as IID $(0, \sigma^2)$ sequence.

Calculate $\hat{\rho}_1, \hat{\rho}_2, \ldots, \hat{\rho}_7$.

On the basis of these, test for independent and identical distribution of the sequence.

[Use all 4 methods discussed in the class]

Also use test based on Ranks.

(30)

[Total answer should not exceed 10 typed pages.
Send in pdf format.]