College of Sciences

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Stat 336 – Time Series Analysis

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1- Define what do we mean by time series and give two examples of time series.

2- Explain briefly meaning of each component of a time series.

3- Mention three ad hoc methods that are used in forecasting a time series.

4- What does **weak stationarity** mean for a stochastic process $\{Y_t\}$?

5- Derive the autocorrelation function ρ_k for the white noise process.

6- **If** $y_t = 1.5y_{t-1} + \varepsilon_t + 0.25\varepsilon_{t-1}$;$\varepsilon_t \sim WN(0, \sigma_\varepsilon^2)$, state its type, and check its stationarity and/or invertibility.

7- If the series $\{Y_t\}$ can be expressed in the form:

$$Y_t = \beta_0 + \beta_1 t + \beta_2 t^2 + \varepsilon_t$$

where $\{\varepsilon_t\}$ is the white noise process.

i-   Show that $\{Y_t\}$ is **not** a stationary process?

ii-   Use the difference operator ∇^r to render $\{Y_t\}$ to a stationary process .

iii- Derive the autocorrelation function ρ_k for the stationary process you found in part (ii).

8- The following data represent the total profit (in million riyals) for a company:

Year	1435	1436	1437	1438	1439
Profit y_t	4	5	6	4	5

Calculate all the coefficients of the sample autocorrelation function (SACF) and calculate the standard errors for these estimates