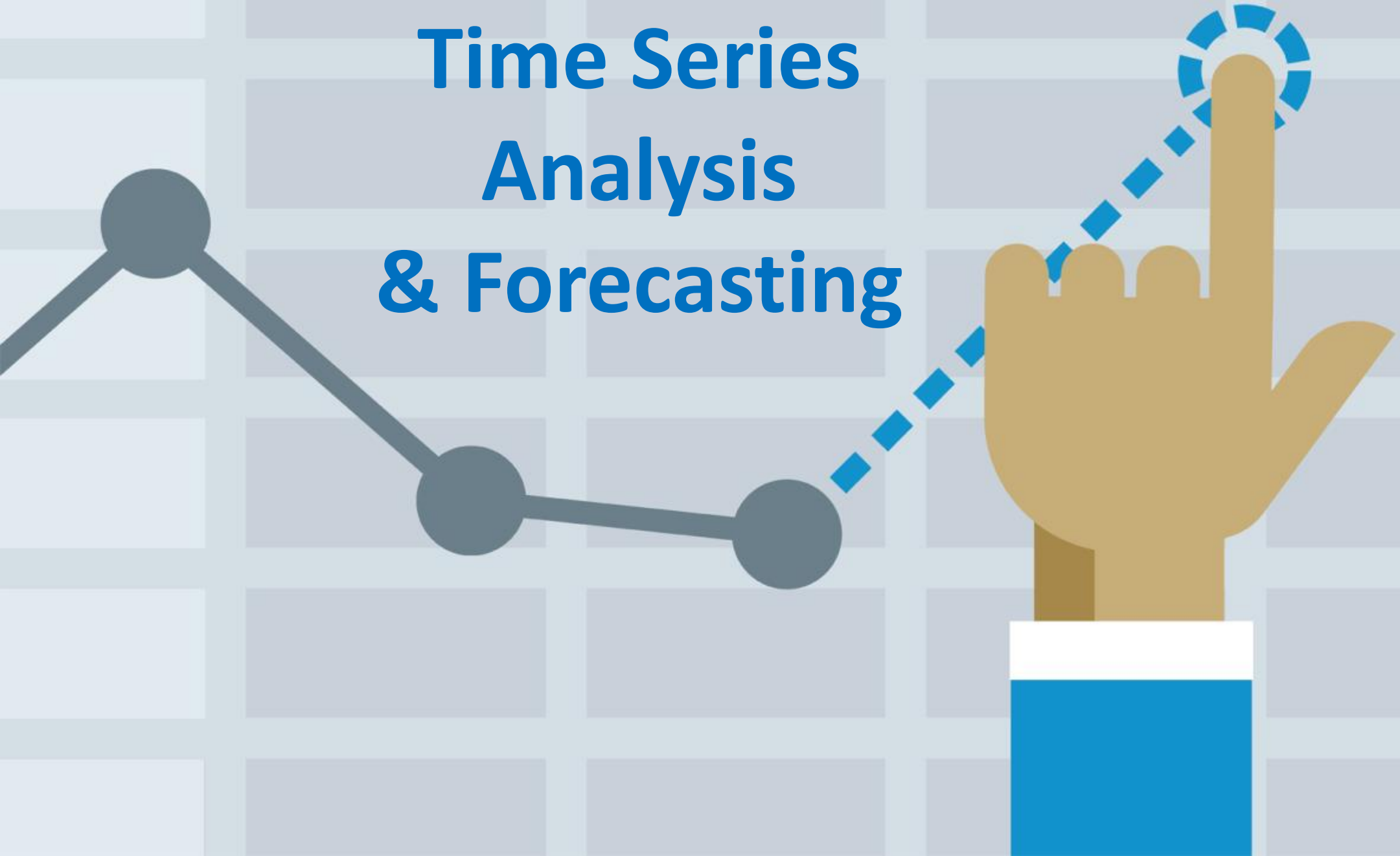

A good thing never ends.
Mick Jagger
quotefancy

Time Series Analysis & Forecasting

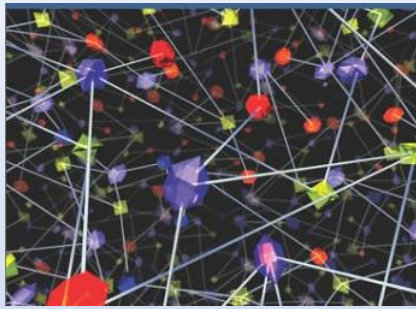


APPLICATIONS OF TIME SERIES

AQI

Price Forecast

Political Forecast



Weather Forecast

Sales Forecast

Technology Forecast

Risk Analysis

What is a TIME SERIES ?

Arrangement of statistical data in a chronological order

A collection of data recorded over a period of time (weekly, monthly, quarterly)

Usually assumes past pattern to continue into the future

COMPONENTS OF TIME SERIES

TREND

- Tendency of data to increase or decrease during a long period of time.
- Classified into two categories viz linear and non-linear trend.
- Increase in prices, Increase in pollution, increase in the need of wheat, increase in literacy rate, decrease in deaths due to advances in science.

SEASONAL

- Patterns of change in a time series within a year which tends to repeat each year
- Classified into two categories viz natural and man made seasonal variations
- For example, traffic on roads in morning and evening hours, Sales at festivals like EID etc., increase in the sales of umbrella during rainy season .

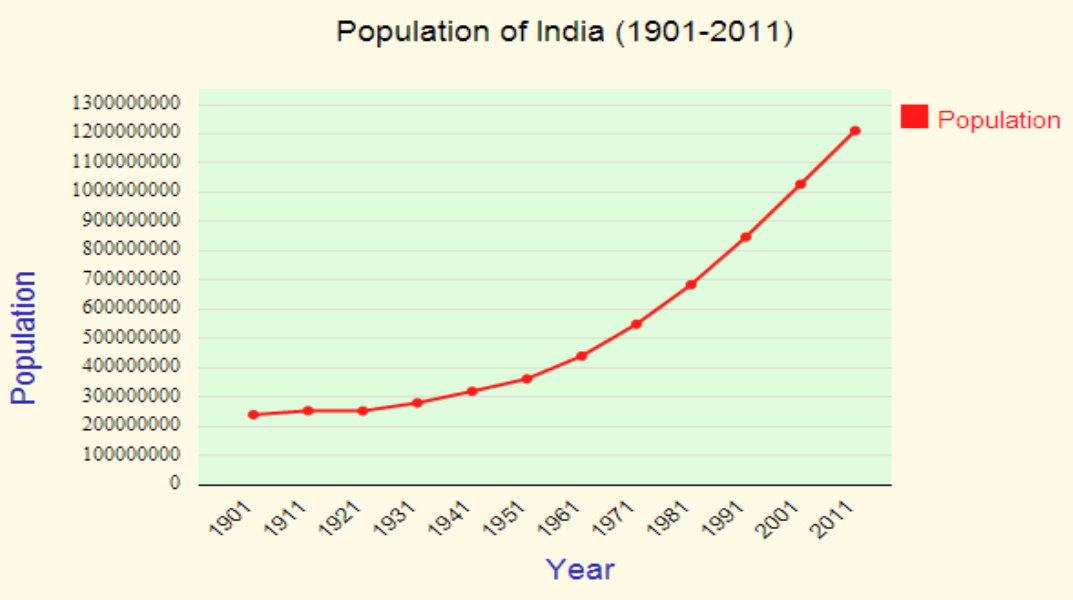
CYCLIC

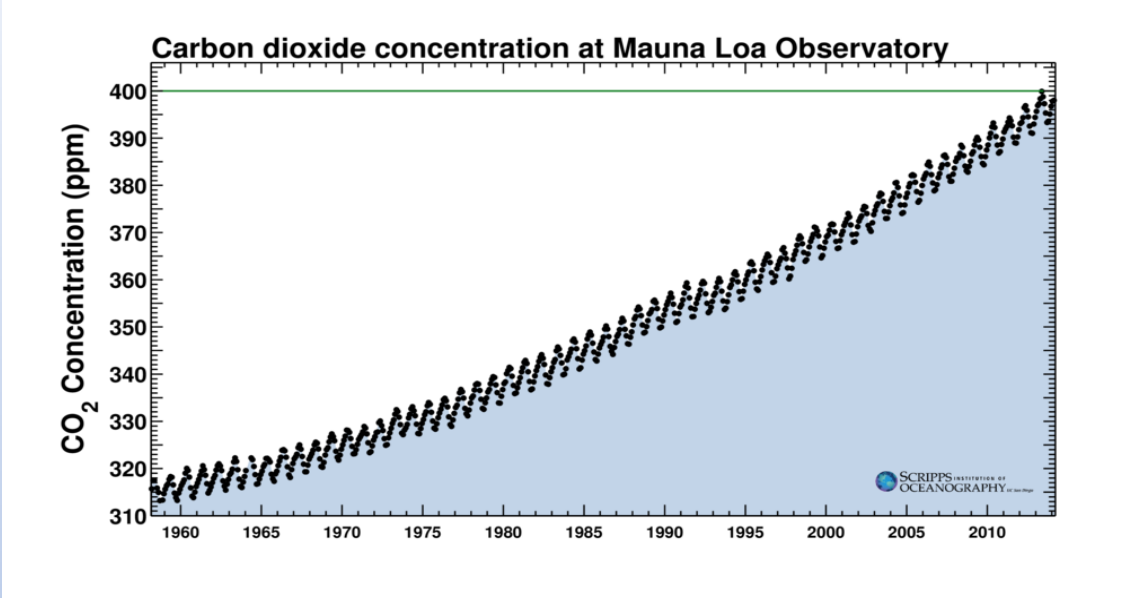
- The oscillatory movement in the time series with a period of oscillation more than a year.
- The cyclic movement is also called “four-phase” cycle composed of prosperity, recession, depression and recovery.
- For example business cycles.

RANDOM

- These fluctuations are purely random, erratic, unpredictable and are beyond human control
- For example famines, droughts, earthquakes, wars, floods, etc.

GRAPHICAL REPRESENTATION





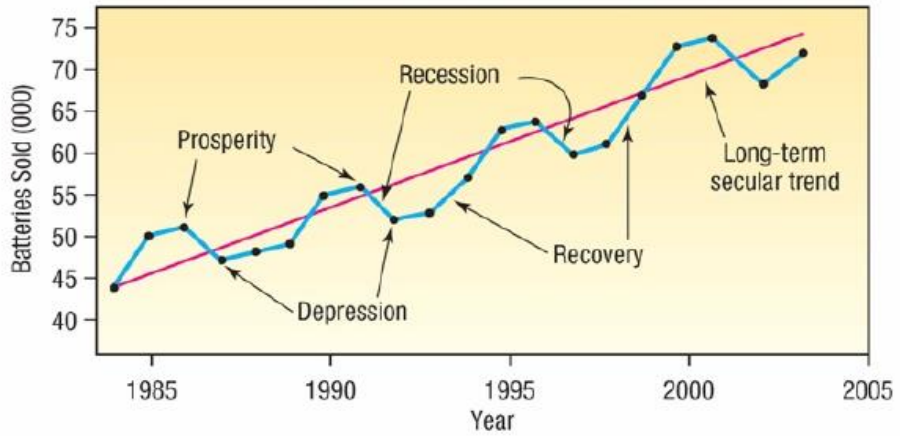
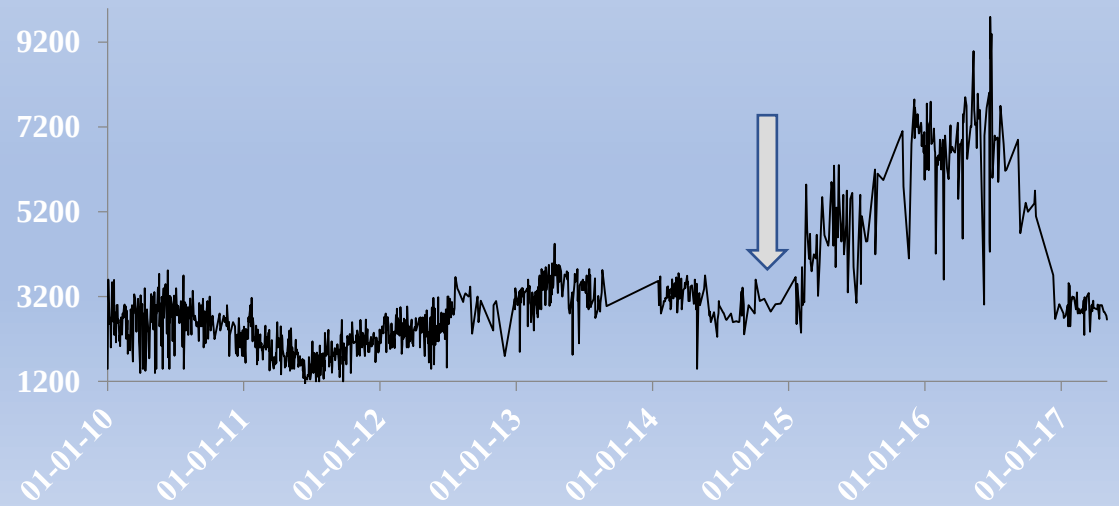
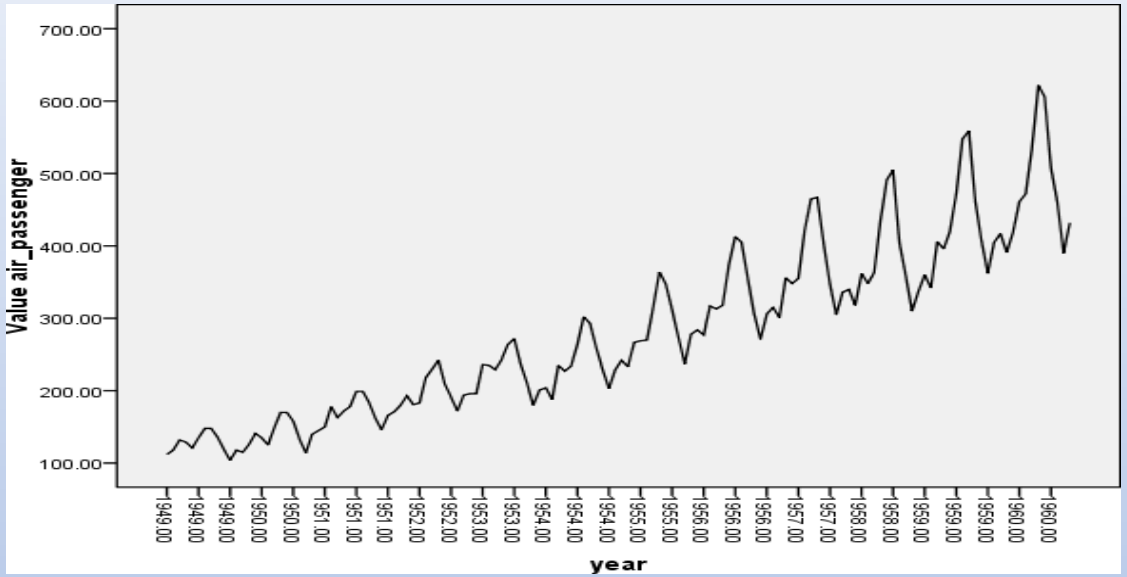


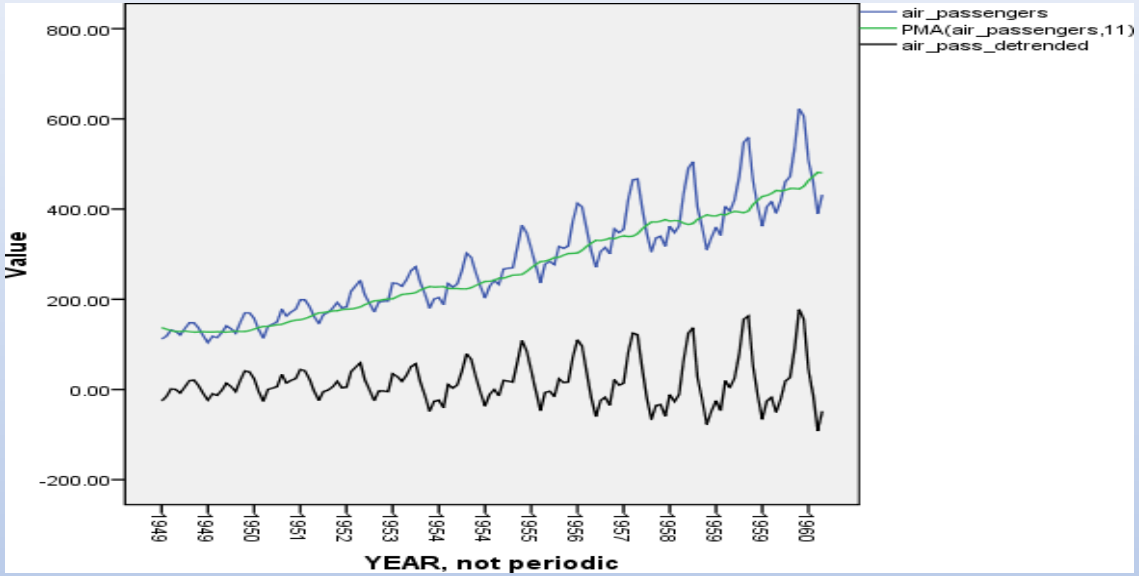
CHART 16–1 Batteries Sold by National Battery Retailers, Inc., from 1984 to 2004



DECOMPOSITION : Understanding through Graphs

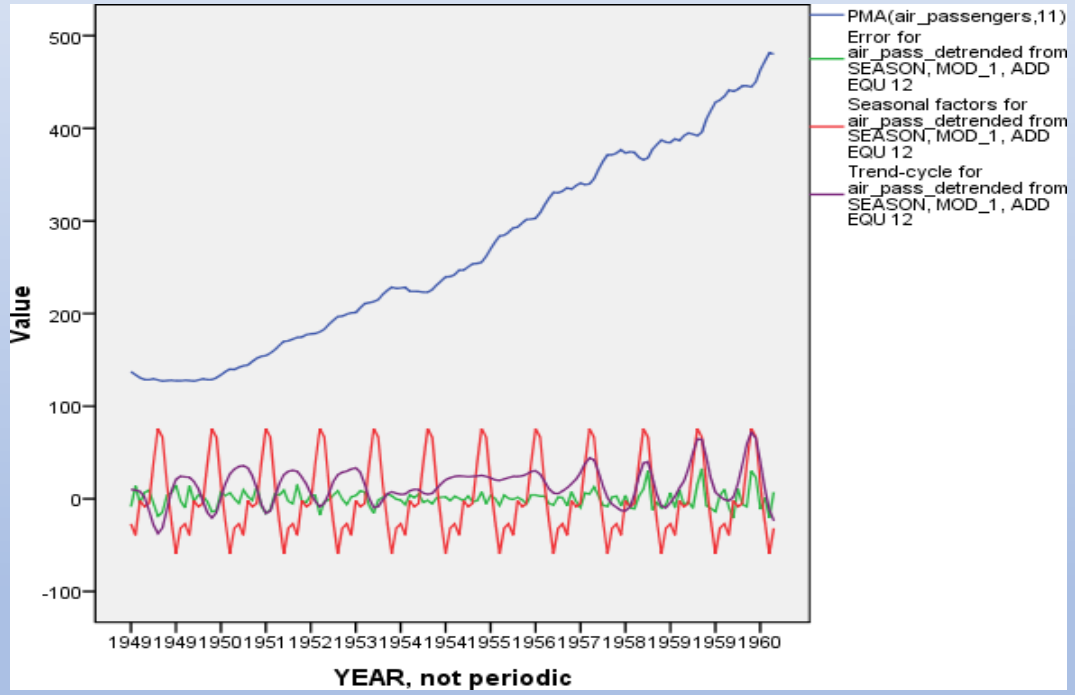


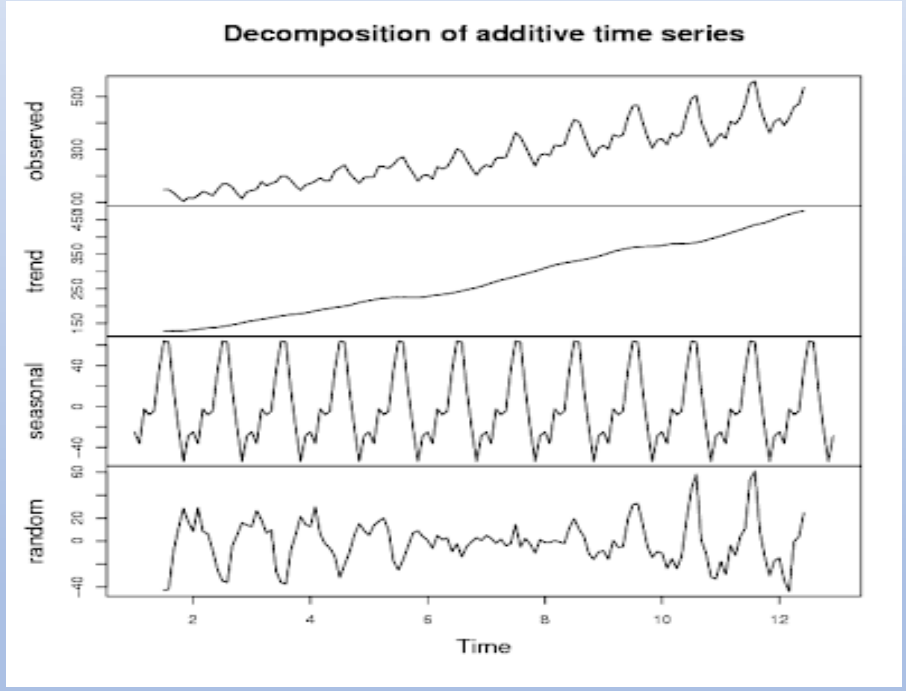
- The graph represents monthly World Airline Passengers data from 1949-1960
- From graph we observe that there is an increasing trend.
- Also there is seasonal component present in the data.



- Here we removed the trend component using the moving average trend having spam of 11.
- Now on the de-trended data we will check for the seasonality using friedman JASA test.

DECOMPOSITION : Understanding through Graphs





FORECASTING

- Estimation of future demand of a product

- A planning tool that attempts to cope with the uncertainty of the future

- Process of making predictions about economic and market condition

METHODS

MODEL	DESCRIPTION
Naïve	Uses last period's actual value as a forecast
Simple Mean (Average)	Uses an average of all past data as a forecast
Simple Moving Average	Uses an average of a specified number of the most recent observations, with each observation receiving the same emphasis (weight)
Weighted Moving Average	Uses an average of a specified number of the most recent observations, with each observation receiving a different emphasis (weight)
Exponential Smoothing	A weighted average procedure with weights declining exponentially as data become older
Trend Projection	Technique that uses the least squares method to fit a straight line to the data
Seasonal Indexes	A mechanism for adjusting the forecast to accommodate any seasonal patterns inherent in the data

SOME MORE APPLICATIONS

To study the relationship between government expenditure and GDP

To forecast the tax revenue for any fiscal year

To study the effects of government policies in different industries

To track expenditure on various national/state level schemes

To find relationship between debt and investment

Thank You!!!