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FORECASTING USING TIME SERIES WITH VARIOUS METHODS

(i) Mean Forecast: Forecast the value of the series to be equal to the mean of the series

$y_t = \bar{y}$ $\frac{\sum x}{r}$

(ii) Naive Method: Forecast the value, for the time period t, to-be equal to the actual value observed in the previous period that is, time period (t – 1)

$y_t = y_{t-1}$

(iii) Linear Trend forecast: A linear relationship between the time and the response value

linear   reg. t^1

$y_t = a + bX$

(iv) Non linear trend forecast: A non-linear relationship between the time and the response value

parabol.

$y_t = a + bX + cX^2$

(v) Forecasting will Exponential Smoothing: The forecast value for the time period t is found using exponential smoothing of time series.

$$y_t = y_{t-1} + \alpha(y_t - y_{t-1})$$

where   the forecasted value for time period t + 1 ;

y_{t-1} = the forecasted value for time period t. :

y_t = the observed value for time period t.

Problem:
The following time series data are given. Find the forecast for various years
using mean forecast, naïve forecast, linear trend forecast, non-linear trend forecast.

Year	1980	1981	1982	1983	1984	1985
Sales (Rs. In Crores)	24.5	25.9	27.6	30.1	34.8	41.5

y_{t-1}

(x) Year.	Sales y_t	mean $\bar{y}$ $y_t = \bar{y}$	naive. $y_t = y_{t-1}$
1980	24.5	30.73	
1981	25.9	30.73	24.5
1982	27.6	30.73	25.9
1983	30.1	30.73	27.6
1984	34.8	30.73	30.1

1985   41.5.   30.73.   34.8

$$\Sigma y \quad 184.4$$

mean $\quad \dfrac{\Sigma y}{n} = \dfrac{184.4}{6} = 30.73$

linear trend.

$$y = a + bx.$$

$$\Sigma y = Na + b\Sigma x$$

$$\Sigma xy = a\Sigma x + b\Sigma x^2.$$

year.	x.	y	xy	x^2.
	1	24.5		
	2	25.9		
	3	27.6		
	4	30.1		
	5	34.8		
	6	41.5.		

Quadratic trend $\longrightarrow$ tm.