



IIT ROORKEE



NPTEL ONLINE
CERTIFICATION COURSE

SUPPLY CHAIN ANALYTICS

Exponential smoothing method of forecasting

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Exponential Smoothing Model

$$F_t = F_{t-1} + \alpha(D_{t-1} - F_{t-1})$$

Where

F_t = Forecast value for the coming “t” time period

F_{t-1} = Forecast value for the “t-1” time period

D_{t-1} = Actual Demand for the “t-1” time period

α = Smoothing constant , Values lie between 0 to 1.

Premise: The most recent observations might have the highest predictive value , therefore, we should give more weight to the more recent time periods when forecasting .

A lower value of α indicates that the forecast is not responsive to the demand.

A higher value of α means that model is giving more weight to recent demand points.

$\alpha = 0$ means that we want to neglect all recent fluctuations .

$\alpha = 1$ means that we want to neglect previous forecast completely and want to use most recent demand for future calculations.

An illustration of the Exponential Smoothing Method

Period	$\alpha = 0.20$		$\alpha = 0.80$
	Forecast	Actual Demand	Forecast
January	100	90	100
February	98	95	92
March	97	105	94
April	99	110	103
May	101	100	109
June	101	130	102
July	107	90	124
August	103	???	97

Exponential smoothing with Additive Trend

- Use of two smoothing constants α and β .
- α for smoothening the fluctuations of base value.
- β for smoothening the fluctuations of trend value.



Formula for Exponential smoothing with Additive Trend

$F_{t,1}$ = updated Base Value + Updated Trend Value

Updated Base (S_t) = $\alpha D_t + (1-\alpha) (S_{t-1} + T_{t-1})$

Updated Trend Value (T_t) = $\beta (S_t - S_{t-1}) + (1-\beta)(T_{t-1})$

$F_{t,1} = S_t + T_t$

In case we want to forecast for m period ahead using current trend value

$F_{t,m} = S_t + mT$

THANK YOU

