Solved Example of Exponential Smoothing

Question:

Given the weekly demand data, what are the exponential smoothing forecasts for
Periods 2-10 using

    A) $\alpha = 0.10$

    B) $\alpha = 0.60$

Assume *F1=D1*

Week	Demand
1	820
2	775
3	680
4	655
5	750
6	802
7	798
8	689
9	775
10	?

Solution:

We know the formula for exponential smoothing which is:

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

Where

Ft = Forecast value for the coming time period

Ft-1 = Forecast value in 1 past time period

At-1 = Actual occurrence in the 1 past time period

α = Alpha smoothing constant

A)

α = 0.10

We will calculate it in the following table:

Week	Demand	α = 0.10
	(A_t)	(F_t)
1	820	820 **$(F_1 = D_1)$** *Assumed*
2	775	820
3	680	815
4	655	801.5
5	750	787
6	802	783
7	798	785
8	689	786.3
9	775	776.6
10	----	776.4

$F_t = F_{t-1} + α (A_{t-1} - F_{t-1})$

Exponential smoothing forecast for period 2 – 10 years.

$F_2 = F_{2-1} + α (A_{2-1} - F_{2-1})$

$F_2 = F1 + α (A1 – F1)$

$F_2 = 820 + 0.10\ (820\text{-}820)$

$F_2 = 820+0$

$F_2 = 820$

Similarly,

$F_3 = F_2 + \alpha\ (A_2 - F_2)$

$F_3 = 820 + 0.10\ (775\text{-}820)$

$F_3 = 820 - 4.5$

$F_3 = 815$ (Approx.)

$F_4 = 815 + 0.10\ (680\text{-}815)$

$F_4 = 801.5$

$F_5 = 801.5 + 0.10\ (655\text{-}801.5)$

$F_5 = 787$

$F_6 = 787 + 0.10\ (750\text{-}787)$

$F_6 = 783$

$F_7 = 783 + 0.10\ (802\text{-}783)$

$F_7 = 785$

$F_8 = 785 + .10\ (798\text{-}785)$

$F_8 = 786.3$

$F_9 = 786.3 + 0.10\ (689–786.3)$

$F_9 = 776.6$

$F_{10} = 776.6 + 0.10\ (775-776.6)$

$F_{10} = 776.4$ *(Which is the required amount)*

Students, in the same way you can calculate the value of forecast (F_{10}) for **α = 0.60.**

Also note that smaller values of α shows smoother trend because if α = 0.10, it implies that your results will be 90% accurate and there will be 10% chances of error. If α = 0.60, it implies that your results will be 40% accurate and there will be 60% chances of error.

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