

FORECASTING PROBLEMS

Sales of Volkswagen's popular Beetle have grown steadily at auto dealerships in Nevada during the past 5 years (see table below). The sales manager had predicted before the new model was introduced that first year sales would be 410 VWs. Using exponential smoothing with a weight of $\text{Alpha} = .30$, develop forecasts for years 2 through 6.

YEAR	SALES	FORECAST
1	450	410
2	495	
3	518	
4	563	
5	584	
6	?	

2-

Sales of hair dryers at the Walgreens stores in Youngstown, Ohio, over the past 4 months have been 100, 110, 120, and 130 units (with 130 being the most recent sales).

Develop a moving-average forecast for next month, using these three techniques:

- 3-month moving average.
- 4-month moving average.
- Weighted 4-month moving average with the most recent month weighted 4, the preceding month 3, then 2, and the oldest month weighted 1.
- If next month's sales turn out to be 140 units, forecast the following month's sales (months) using a 4-month moving average.

3-

The following data come from regression line projections:

PERIOD	FORECAST VALUES	ACTUAL VALUES
1	410	406
2	419	423
3	428	423
4	435	440

Compute the MAD and MSE.

4-

Room registrations in the Toronto Towers Plaza Hotel have been recorded for the past 9 years. To project future occupancy, management would like to determine the mathematical trend of guest registration. This estimate will help the hotel determine whether future expansion will be needed. Given the following time-series data, develop a regression equation relating registrations to time (e.g., a trend equation). Then forecast year 11 registrations. Room registrations are in the thousands:

Year 1: 17	Year 2: 16	Year 3: 16	Year 4: 21	Year 5: 20
Year 6: 20	Year 7: 23	Year 8: 25	Year 9: 24	

5-

Quarterly demand for Ford F150 pickups at a New York auto dealer is forecast with the equation:

$$\hat{y} = 10 + 3x$$

where x = quarters, and:

Quarter I of year 1 = 0

Quarter II of year 1 = 1

Quarter III of year 1 = 2

Quarter IV of year 1 = 3

Quarter I of year 2 = 4

and so on

and:

$\hat{y}$ = quarterly demand

The demand for trucks is seasonal, and the indices for Quarters I, II, III, and IV are 0.80, 1.00, 1.30, and 0.90, respectively. Forecast demand for each quarter of year 3. Then, seasonalize each forecast to adjust for quarterly variations.