

Study questions on forecasting

1.

Suppose that a Hamburger chain has 12 stores in a certain city. Sales figures and profits for the stores are given in the table below. Obtain a regression line for the data, and predict profit for a store assuming sales of \$10 million.

Sales (million)	Profit (million)
7	0.15
2	0.10
6	0.13
4	0.15
14	0.25
15	0.27
16	0.24
12	0.20
14	0.27
20	0.44
15	0.34
7	0.17

Hint: Use the Linear regression analysis equation: $Y = a + bX$

Where: Y = dependent variable

X = independent variable

a = Y-intercept of the line

b = slope of the line

Further: $a = \bar{y} - b\bar{x}$ and $b = (\sum XY - n\bar{x}\bar{y}) / (\sum X^2 - n\bar{x}^2)$

Where: \bar{y} = average of the Y-values

\bar{x} = average of the X-values

n = number of points in the sample

2.

The monthly demand for a certain model of industrial robots has been as follows:

Month:	May	June	July	August	September	October	November	December
Units:	90	72	99	103	95	99	113	108

- Use the exponential smoothing method to forecast the number of units for June - January. The initial forecast for May was 95 units; $\alpha = 0.2$.
- Calculate the absolute percentage error for each month from June through December and the MADE and MAPE of forecast error as of the end of December.
- Repeat the calculations, but with $\alpha = 0.4$ and compare the outcome.
- Which α generates the better forecasts?

3.

A company that manufactures electrical motors have the following statistics of their quarterly demand for the last three years:

Quarter	Year 1	Year 2	Year 3
1	350	380	450
2	230	280	310
3	190	240	270
4	290	330	390
Total:	1060	1230	1420

Use the multiplicative seasonal method to estimate the quarterly demand for the fourth year.

Other excersises can be found in the old exams:

2011-06-09: Q1

2012-01-12: Q5