
FIT3158 Business Decision Modelling

Tutorial 10

Forecasting

Topics covered:

- Moving Average Forecast
 - Regression Analysis
 - Exponential Smoothing
 - Seasonal forecasting: Multiplicative Model
 - Seasonal forecasting: Additive Model
-

Download the Excel spreadsheet, **Tutorial 10.xlsx** for Exercises 1, 2 and 3 below.

Exercise 1

vData for Exercise 1:

Year	Sales
1	283
2	288
3	336
4	388
5	406
6	412
7	416
8	435
9	428
10	435
11	462
12	452
13	474
14	476
15	497
16	487
17	523
18	528
19	532
20	552

This is non-examinable except for (b). But solution is provided.

- a) Make a one, two and three period forecast of the data using double exponential smoothing using $\alpha = \beta = 0.5$.
- b) Calculate the MSE and MAPE of your forecasts and comment on the accuracy as t is increased.
- c) Using the solver determine the values of α and β that result in the most accurate forecast for $t = 1, 2$, and 3. Are the optimal values of α and β the same for each value of t ?

- a) Perform a two and three period moving average forecast of the data.
- b) Perform a simple exponential smoothing using $\alpha = 0.5$.
- c) Calculate the MSE and MAPE of your forecasts and comment on the accuracy of the forecast.
- d) Using the solver determine the value of α that result in the most accurate forecast for part (b).

Let's do this instead.

FIT3158 Tutorial 10 – Forecasting

Data for Exercises 2 and 3:

Year	Season	Period	Sales Y_t
2013	Winter	1	3.9
	spring	2	6.1
	Summer	3	4.3
	Autumn	4	10.8
2014	Winter	5	7.8
	spring	6	10.6
	Summer	7	6.9
	Autumn	8	13.5
2015	Winter	9	12.9
	spring	10	15.2
	Summer	11	10.3
	Autumn	12	18.7
2016	Winter	13	13.9
	spring	14	14.4
	Summer	15	10.2
	Autumn	16	17.3
2017	Winter	17	13.5
	spring	18	18.2
	Summer	19	14.2
	Autumn	20	20.7

Exercise 2 (Multiplicative model)

- Smooth the data using a centred 4 period moving average.
- Calculate the seasonal indices.
- Deseasonalise the data.
- Fit a least squares regression line to the data.
- Forecast sales for 2018.
- If it turned out that sales in 2018 were: 19.2, 22.7, 17.1 and 21.7, calculate the MAPE and MSE of the forecast.

Exercise 3 (Additive model)

- Create indicator variable for each of the 4 seasons.
- Fit a multiple regression model to the data.
- Forecast sales for 2018.
- If it turned out that sales in 2018 were: 19.2, 22.7, 17.1 and 21.7, calculate the MAPE and MSE of the forecast.