Laboratory Exercises (Forecasting Techniques)

Answer the following exercises with your partner. For each of the following, use R and include the codes as part of your solution. Upload a pdf file of your answers, solutions and R codes, indicating the names of the members who participated. Only one member will upload to Canvas a pdf file for each group.

NOTE: YOU MAY USE R TO COMPUTE, BUT YOU CANNOT USE ANY BUILT-IN FUNCTIONS FOR THE STATISTICS OR FORECASTS ASKED. WRITE YOUR OWN CODE.

1) Obtain a forecast for the 11th -14th weeks for each product using exponential smoothing with α=0.3.

The manager has compiled data on product demand for the two products from order records for the previous 14 weeks. These are shown in the following table:

Week	Product 1	Product 2
1	50	40
2	54	38
3	57	41
4	60	46
5	64	42
6	67	41
7	90	41
8	76	47
9	79	42
10	82	43
11	85	42
12	87	49
13	92	43
14	96	44

2) (Double exponential smoothing = trend-adjusted exponential smoothing)
Use Double Exponential Smoothing for the following actual demand data for a 4-month period: 30, 35, 37, 40 corresponding to Month 1, 2, 3 and 4, respectively
α = 0.3, β = 0.2
Initial Trend = 0; Initial Base = 30
Solve for the forecast for month 2, 3, and 4. Assume that the forecast for month 1 is forecasted using the naïve method.

3) The volume of transactions of a BPO are as follows (in thousands).

Qtr	2008	2009	2010
1	29.8	34.7	42.9
2	33.5	38.1	46.1
3	33.5	40.4	45.6
4	35.3	51.3	56.5

Determine the seasonal relatives, and the forecast number of transactions being handled by the year 2015.

4) Compare the actual and forecast figures using MSE, MAD and MAPE. Which forecast is better, Model 1 or Model 2? Why?

Actual Sales	Forecasted Sales	
	Model 1	Model 2
56	54	50
43	44	40
22	20	22
24	19	20
55	50	49