

1. AirCanada.xls

This dataset consists of Air Canada miles flown with 96 entries. The question tells us that the year is from 1998 to 2005. We will be adding a year column with 1998 to 2005 for each month (12times).

Let's look at the time series plot.

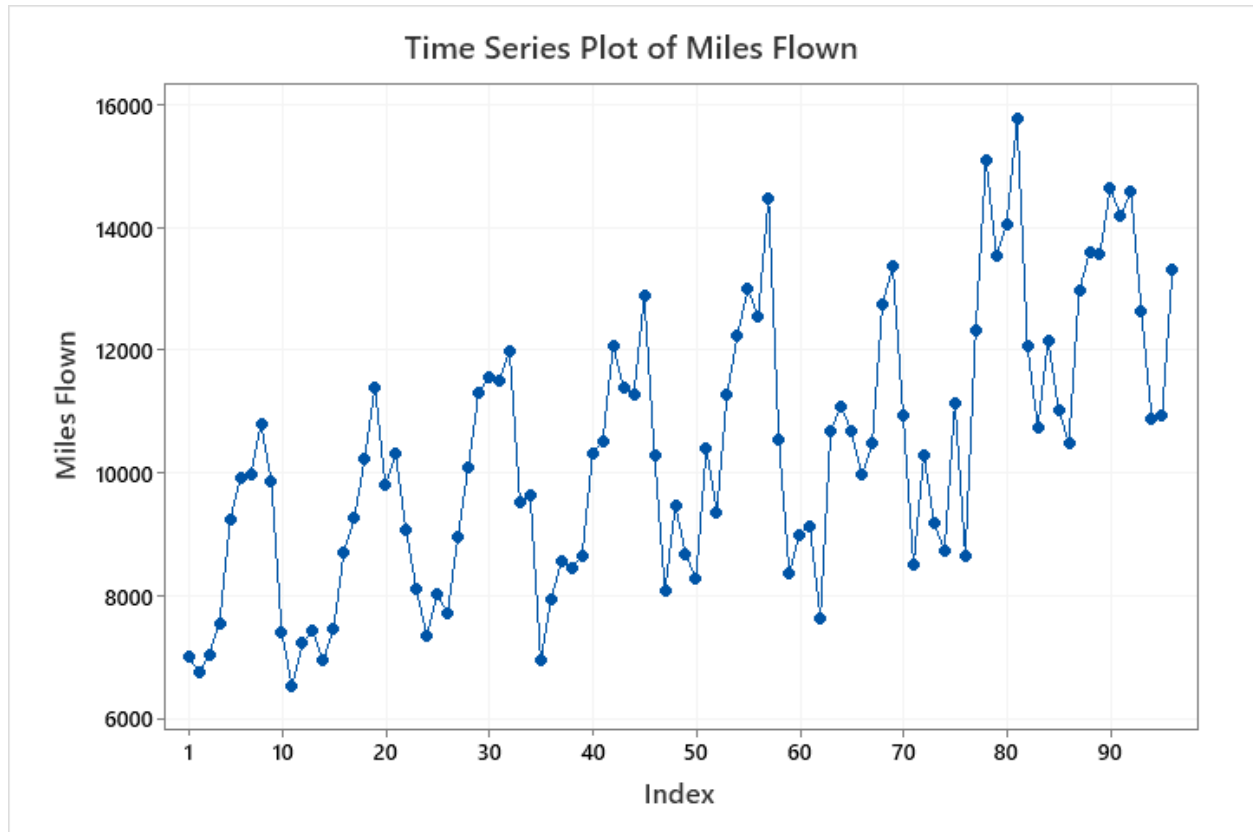
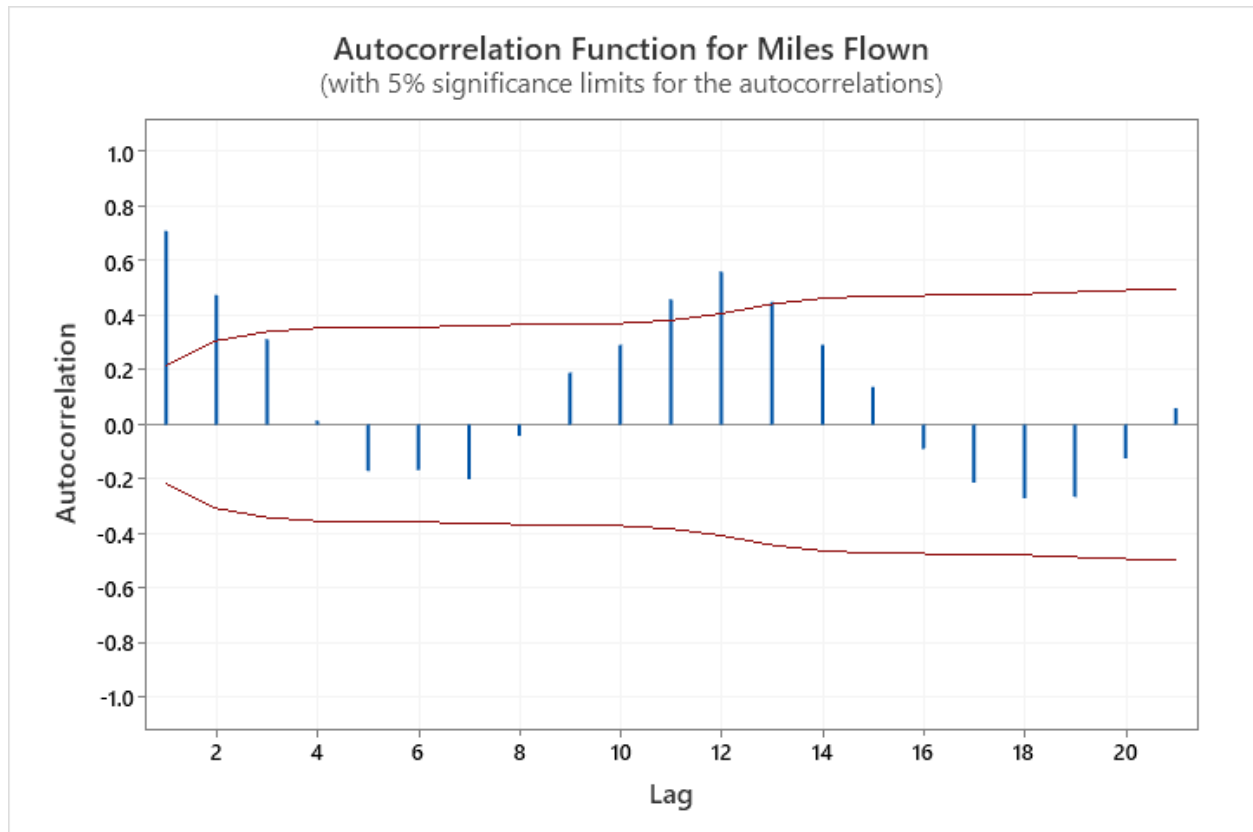


Figure 12 : Time series plot of miles flown

The below acf shows us that this dataset (aircanada) has a seasonal component.



There seems to be a trend and seasonality to this dataset. We know that Holt-Winters method is going to be utilized for this time series(given in the question) but let us try to use single and double exponential smoothing to get an idea of what the alpha, beta, gamma values we can use to come up with a good model.

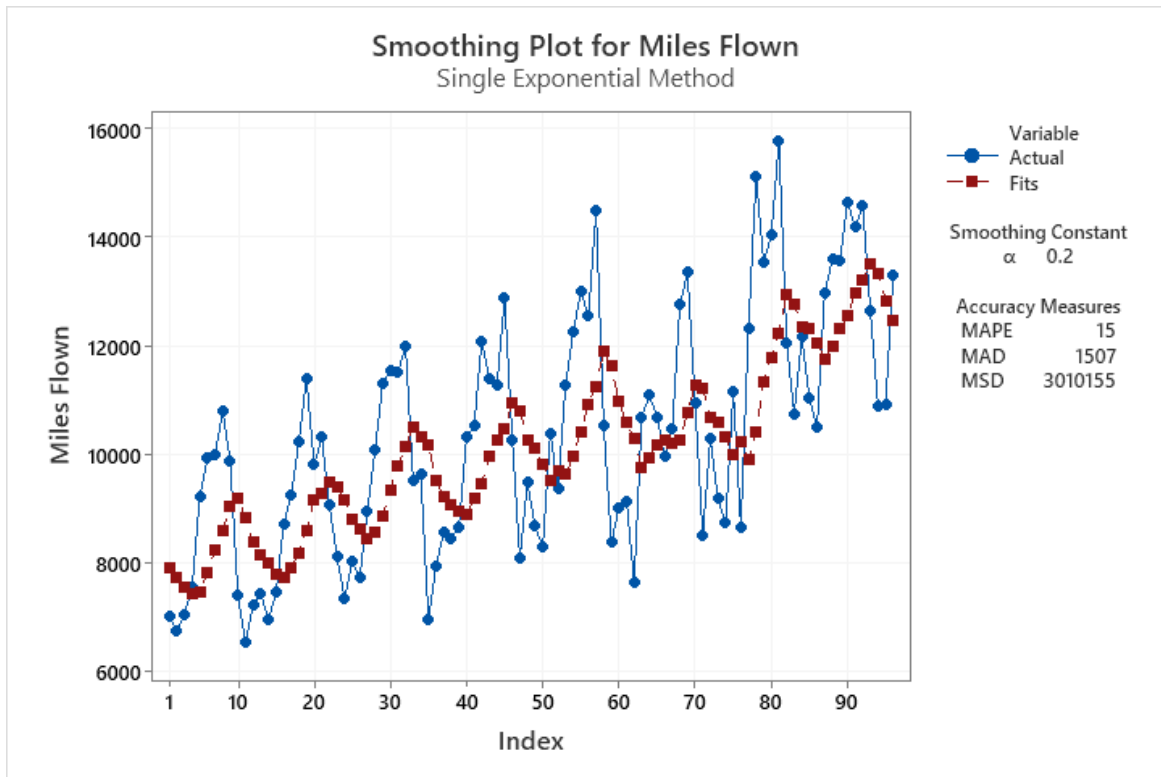


Figure 13: Alpha value 0.2 Single exponential

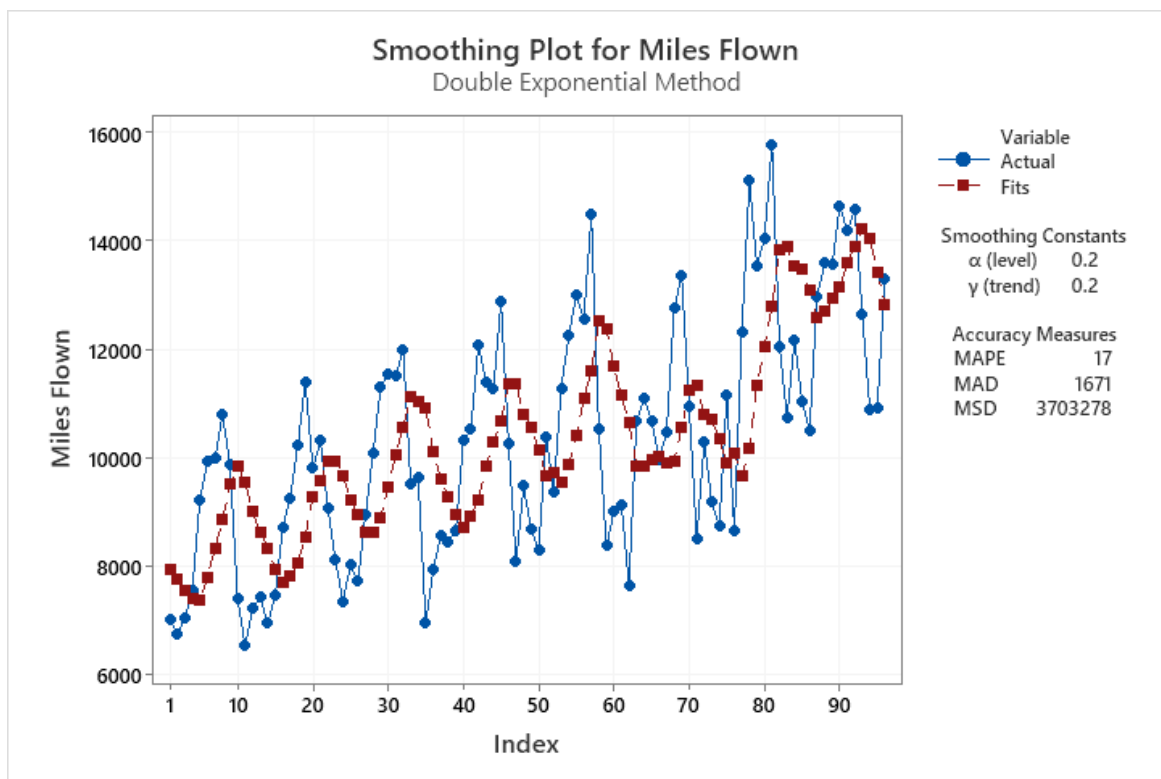


Figure 14: Double exponential with level and trend as 0.2

In the two above plots, the alpha value is taken as 0.2. For figure 14, the trend is taken as 0.2. We can observe in both of these graphs that the fit values are following a similar pattern to the actual values but are not accurate enough. This could be because these two techniques do not take into consideration the seasonality into consideration (gamma value).

Let us check for alpha, beta and gamma values as 0.2,0.2,0.2 using the Holt-Winters method.

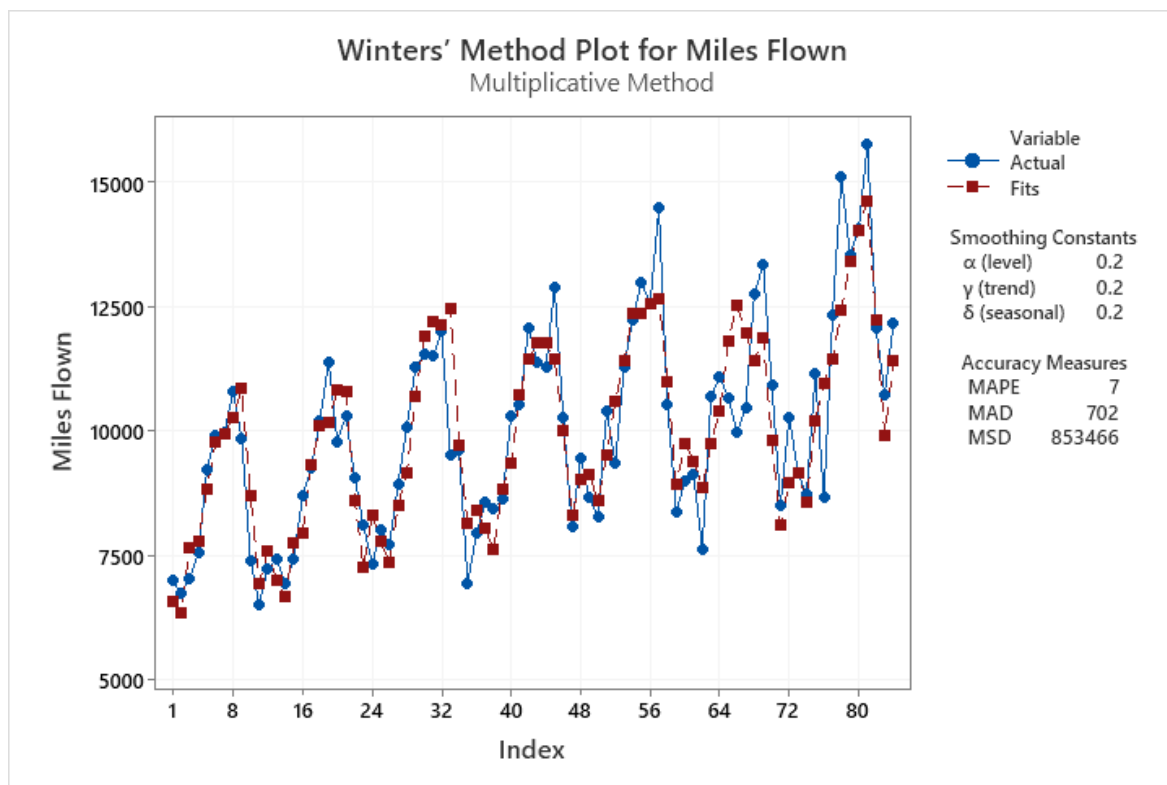


Figure 15 : Winters method using multiplicative method

In figure 15, we can see that when we used the default 0.2 value for all three smoothing constants the graph seems to follow the same cyclic pattern but does not get the values right. The accuracy measures when compared to other values of smoothing constants have similar accuracy measures except for the MSD which is the lowest in the above model.