Problem Set 9

Part I

Data has been collected on the weekly sales of Ultra Shine tootpaste. 90 past values have been recorded and sales are in units of 1000 tubes. Use the output from the SAS program “**Toothpaste – problem set 5**” to answer questions 1 – 4.

1. Time series plots are included in the output for both the original time series and the differenced time series , where .

a) Examine the plot of the original sales data, . Does the original time series appear stationary? Explain.

b) Compute and .

c) Examine the plot of the first differences of the sales data. Do the first differences appear stationary? Explain.

2. Compute for the original time series , using only the first 10 observations .

3. Graphs of the SAC, SPAC, as well as values for are included for both the original time series and the differenced time series .

a) Examine the SAC plot for the original time series . What does this plot indicate regarding the stationarity of ? Explain.

b) Examine the SAC plot for the differenced time series . What does this plot indicate regarding the stationarity of ? Explain.

c) Using the values for the differenced time series , hand calculate

d) Using the values for the differenced time series , hand calculate by using the for the differenced time series . Also calculate . (Don’t attempt this one)

4. A tentative model was fit to the differenced time series

a) Using the SAC and SPAC for , justify the choice of the model.

b) Identify the least squares point estimates for .

c) Compute the mean of the differenced time series

d) Algebraically expand the model to express it in terms of the original time series .

e) Calculate the residual .

f) Calculate .

Part II

Data has been collected for 150 daily viscosity readings for chemical product XR-22. Use the output from the SAS program “**Viscosity XR22 – problem set 5**” to answer question 5.

5. Examine the time series plot, as well as plots of both the SAC and SPAC for the original time series, .

a) Use the time series plot and the SAC plot to determine if the original time series, appears stationary. Explain.

b) Use the SAC and SPAC to tentatively identify a model for the original time series, . Explain your answer.

Part III

Data has been collected on the weekly sales of Shimmer Shampoo bottles. Use the output from the SAS program “**Shampoo – problem set 5**” to answer question 6.

6. Examine the time series plot, as well as plots of both the SAC and SPAC for the original time series, and the differenced time series .

a) Decide whether to use or based on stationarity. Justify your choice.

b) Identify a tentative model for your chosen time series in part (a) using the appropriate SAC and SPAC. Justify your choice. Did you include a constant term? Why or why not?