

Statistics 3540
Assignment #4: February 29, 2008
Due in class: March 10, 2008

All problem numbers are from the textbook.

If it appears that you can do a problem either by hand or using a computer package, the method you choose to use is up to you.

Any data you need for this assignment is available on our course website:

www.math.mun.ca/~sneddon/st3540

1. Use the unemployment data from Assignment #3 to answer the following:
 - (a) Analyze the data by using the multiplicative decomposition method. Make sure to comment on any features you see in the plots of (i) the deseasonalized and (ii) detrended values. In particular, does it seem reasonable to assume a linear trend in the detrended values? Finally, tell how many observations are used to calculate each moving (or centered moving) average.
 - (b) Repeat (a) using the additive decomposition method.
 - (c) Do the two methods appear to give similar results for this data?
2. Refer to the data on yearly U.S. lumber production in Table 6.6, p. 315. The data is on the course webpage in the file **lumber.mtw**.
For the purpose of this question, assume the series runs from 1946–1975.
 - (a) Plot the data vs. time. Is there any trend apparent?
 - (b) Analyze the data using simple exponential smoothing, setting (i) $\alpha = 0.5$, (ii) $\alpha = 0.2$, (iii) $\alpha = 0.1$, (iv) $\alpha = 0.05$.
 - (c) *Using the most appropriate α from (b)*, calculate **by hand** a 90% prediction interval for lumber production in 1978. Make sure to explain your choice of α .
3. For the Dow Jones data used in previous assignments:
 - (a) Use trend-corrected double exponential smoothing to model the data, using the following combinations of (α, γ) :
(0.03, 0.1), (0.05, 0.1), (0.1, 0.2), (0.3, 0.2), (0.9, 0.1), (0.1, 0.9).
 - (b) Which choice of (α, γ) from (a) is best for this dataset? Explain.
 - (c) Examine the plot of the smoothed estimates and actual DJIA values. Does it appear the exponential smoothing has done well? Explain.
 - (d) Using the choice of (α, γ) from (b), find a 95% prediction interval for the DJIA in 1996. How does this interval compare with the one found in Assignment #2?