FINANCIAL MODELING AND ECONOMETRICS
FIN 6271

Assignment 7

PART I: Nikkei Index

Consider the daily values of the NIKKEI index (NIKKEI) during the period of 1/1/91 through 12/1/1991. The data is in file "Nikkei.txt" in free format and only consists of the variable NIKKEI.

Please do the necessary analysis to determine if the NIKKEI index is difference stationary and not trend stationary. In so doing, please perform the necessary tests and state the null hypothesis associated with the test. Please justify all your conclusions statistically and use a signicance level of 0.05 in your analyses.

PART II: Forecasting

(1) Consider the second-order invertible Moving Average Process:

$$Y_t = 10 + \epsilon_t - 0.65\,\epsilon_{t-1} - 0.24\,\epsilon_{t-2}$$

(a) Given the data available at time n, obtain a general formula for the one-step ahead, two-step ahead and three-step ahead forecasts. That is, obtain the formulas for $\widehat{Y}_n(1)$, $\widehat{Y}_n(2)$, and $\widehat{Y}_n(3)$.

(b) If the values of Y_{99}=13, Y_{100}=11, Y_{101}= 12, $\widehat{Y}_{98}(1)$=11, $\widehat{Y}_{99}(1)$=10 obtain forecasts $\widehat{Y}_{100}(1)$, $\widehat{Y}_{100}(2)$, $\widehat{Y}_{100}(3)$, and $\widehat{Y}_{101}(1)$.

(2) A regression model with a first-order autoregressive process on the residuals is estimated as

$$Y_t = 750 - 100\,X_t + \epsilon_t\,,$$
$$\epsilon_t = 0.575\,\epsilon_{t-1} + a_t\,,$$

where a_t's are uncorrelated series with mean 0 and constant variance.

If the values of Y_{49} = 250 and X_{49}=0.55, X_{50} =0.45 and X_{51}= 0.3, obtain forecasts for Y_{50} and Y_{51}.