

Optional Quiz

1. Download the GAP store sales data from the class web page [gapsales.wf1]. The quarterly data covers the period from 1985:1 to 1999:4. Use Akaike Information Criterion (AIC) and the Schwarz Information Criterion (SIC) to assess the necessity and desirability of including trend and seasonal components in a forecasting model for the GAP Sales data.
 - (a) Display AIC and SIC for a variety of specifications of trend and seasonality. Which specification would you select using AIC? SIC?
 - (b) Based on your preferred model, perform point and interval in-sample forecast for the 1998 and 1999 years. Show the forecasts graphically and explain your results.
 - (c) Discuss the estimation results and residual plot from your preferred model, and perform a correlogram analysis on the residuals. Discuss, in particular, the patterns of the sample autocorrelations and partial autocorrelations, as well as their statistical significance.
2. A successful online store monitor and forecasts the number of “hits” per day of its web page. You are given this “hits” daily data from January 1, 1998, through September 28, 1998. Download the EVIEWS file from the class web page [webhits.wf1].
 - (a) Fit and assess the standard linear, quadratic and log linear trend models.
 - (b) For a few contiguous days roughly in April and early May, hits were much higher than usual during a big sale. Do you find evidence of a corresponding group of outliers in the residuals from your trend models? Do they influence your trend estimates much? How should you treat them?
 - (c) Model and assess the significance of day-of-week effects in the web page hits data.
 - (d) Select a final model, consisting only of trend and seasonal components, to use for forecasting.
 - (e) Forecast (point and interval) the web hits through the end of 1998.
3. Let $\{X_t\}$ be a moving-average process of order 2 [MA(2)] given by $X_t = Z_t + \theta Z_{t-2}$, where Z_t is white noise $WN(0,1)$. [Hint: generate the series using EVIEWS].
 - (a) Find the autocovariance and autocorrelation functions for this process when $\theta = 0.8$.

- (b) Repeat (a) when $\theta = -0.8$ and compare your results.
4. Let $\{X_t\}$ be an auto-regressive process of order 1 [AR(1)] given by $X_t = \phi X_{t-1} + Z_t$, where Z_t is white noise $WN(0,1)$. [Hint: generate the series using EVIEWS].
- (a) Find the autocovariance and autocorrelation functions for this process when $\phi = 0.9$.
- (b) Repeat (a) when $\phi = -0.9$ and compare your results.