Forecasting: principles and practice

Lab Session 10 25 September 2014

Before doing any exercises in R, load the **fpp** package using `library(fpp)`.

1. For the time series you selected from the retail data set in previous lab sessions:
   (a) Develop an appropriate dynamic regression model with Fourier terms for the seasonality. Use the AIC to select the number of Fourier terms to include in the model. (You may need to use the same Box-Cox transformation you identified previously.)
   (b) Check the residuals of the fitted model. Does the residual series look like white noise?
   (c) Compare the forecasts with those you obtained earlier using alternative models.

2. This exercise concerns the total monthly takings from accommodation and the total room nights occupied at hotels, motels, and guest houses in Victoria, Australia, between January 1980 and June 1995 (Data set `motel`). Total monthly takings are in thousands of Australian dollars; total room nights occupied are in thousands.
   (a) Use the data to calculate the average cost of a night's accommodation in Victoria each month.
   (b) Plot this cost time series against CPI.
   (c) Produce time series plots of both variables and explain why logarithms of both variables need to be taken before fitting any models.
   (d) Fit an appropriate regression model with ARIMA errors.
   (e) Forecast the average price per room for the next twelve months using your fitted model. (Hint: You will need to produce forecasts of the CPI figures first.)