# Homework 8

1. The "gasprices.txt" data set includes average price (US dollars per gallon) for regular gasoline in the United States; there are 145 weekly observations collected from 1/5/2009 to 10/10/2011 (Source: Rajon Coles, Fall 2011). Use only the first $n = 140$ weekly observations to fit models and make predictions.

**a)** Calculate MMSE forecasts and prediction intervals for next 5 weeks (week 141 to week 145) using an ARIMA(0,1,1) model. Display the forecasts and prediction intervals visually.

**b)** Calculate MMSE forecasts and prediction intervals for next 5 weeks (week 141 to week 145) using an ARIMA(1,2,0) model. Display the forecasts and prediction intervals visually.

**c)** Since we already know the observed values from week 141 to week 145, we want to compare which model is better in prediction. For the above two models, calculate and compare the mean squared forecast error (MSFE) using the following formula:

$$MSFE = \frac{1}{5}\sum_{l=1}^{5}\{Y_{140+l} - \hat{Y}_t(l)\}^2 \tag{1}$$