Assignment 4: Due date: Tuesday 16 April

1. Given a data set

$$Y = (1.33, -0.56, -1.31, -0.37, 0.05, 0.46, 2.00, -0.19, -0.25, 1.07, \\ -0.17, 1.14, 0.63, -0.75, 0.15, 0.71, 0.45, -0.14, 0.57, 1.43).$$

   a) Fit an ARMA(1,1) model to $\{Y_t\}$, find the 95% prediction intervals for the 1st and 2nd-step predictions.

   b) Fit an ARIMA(1,1,0) model to $\{Y_t\}$, find the 95% prediction intervals for the 1st and 2nd-step predictions.

   c) Use Holt-Winters procedure to find the 1st and 2nd-step predictions.

2. Download the stock price of HSBC (0005.hk) from 2012 to 2016.

   a) Draw the time series plot and ACF plot for the **log**-price. Is it stationary?

   b) Fit an ARIMA model to the **log**-price.

   c) Find the residuals of the ARIMA fitting, call it $\{X_t\}$. Draw the ACF plots for each of $\{X_t\}$ and $\{X_t^2\}$.