Assignment 8

1. Suppose that the simple return of a monthly bond index follows the MA(1) model

$$R_t = a_t + 0.2a_{t-1}, \qquad \sigma_a = 0.025$$

Assume that a_{100} = 0.01. Compute the 1-step- ahead and 2-step-ahead forecasts of the return at the forecast origin t = 100. What are the standard deviations of the associated forecast errors? Also compute the lag-1 and lag-2 autocorrelations of the return series.

2. Consider the monthly simple returns of the Decile 1, Decile 2, Decile 9, and Decile 10 of NYSE/AMEX/NASDAQ based on market capitalization. The data span is from January 1970 to December 2008, and the data are obtained from CRSP.

   (a) For the return series of Decile 2 and Decile 10, test the null hypothesis that the first 12 lags of autocorrelations are zero at the 5% level. Draw your conclusion.
   (b) Build an ARMA model for the return series of Decile 2. Perform model checking and write down the fitted model.
   (c) Use the fitted ARMA model to produce 1- to 12-step-ahead forecasts of the series and the associated standard errors of forecasts.

3. Consider the monthly log returns of CRSP equal-weighted index from January 1962 to December 1999 for 456 observations. You may obtain the data from CRSP directly or from the file m- ew6299.txt on the Web.

   (a) Build an AR model for the series and check the fitted model.
   (b) Build an MA model for the series and check the fitted model.
   (c) Compute 1- and 2-step-ahead forecasts of the AR and MA models built in the previous two questions.
   (d) Compare the fitted AR and MA models.