Time Series Analysis Exam II, Jan. 12, 2001

(1) Find the ACF of the process $Z_t = (1 - 1.2B + 0.5B^2)a_t$, by using the autocovariance generating function of the process.

(2) Express the model $(1 - 1.1B + 0.8B^2)Z_t = (1 - 1.7B + 0.72B^2)a_t$ in an AR representation.

(3) Assume the statistic r_n is asymptotically distributed as $N(\rho, (1 - \rho^2)^2/2)$. Find a variance-stabilizing transformation of r_n.

(4) Consider the stationary MA(1) process $Z_t = (1 - \theta B)a_t$, where $|\theta| < 1$. If we take the first differencing of Z_t, explain the effect of this overdifferencing.

(5) Show that $Cov[e_n(l), e_{n-j}(l)] = Cov[e_n(l), e_n(l - j)]$ where $e_i(j)$ denote the j-step ahead minimum mean square forecast error for the forecast origin i.

(6) Consider the IMA(1,1) model $(1 - B)Z_t = (1 - \theta B)a_t$.
(a) Find the 95% forecast limits produced by this model.
(b) Express the forecasts as a weighted average of previous observations.

(7) Obtain the eventual forecast function for the model $(1 - 0.6B)Z_t = (1 - 0.8B + 0.3B^2)a_t$.

(8) Identify appropriate time series models based on the information included in the next page.

(9) (a) Describe four estimation procedures used for parameters of time series models.

(b) Describe the methods used in checking the adequacy of proposed time series models.

(c) Describe the usage of model selection criterion such as AIC, BIC.