

Economics 618B: Time Series Analysis
Department of Economics
State University of New York at Binghamton
Fall, 2011
Midterm

The exam is worth 100 points. Each question is of equal value.

1. Let X be a random variable which is symmetrically distributed about 0, with variance σ^2 . If $X_t = (-1)^t X$, show that the stochastic process X_t is covariance stationary.
2. Consider a stationary AR(1) process

$$(1 - \phi L)Y_t = \varepsilon_t, \quad \varepsilon_t \sim WN(0, \sigma^2)$$

- (a) Give the h -step ahead forecast for $h = 1, 2, \dots$
 - (b) Give the h -step ahead forecast error for $h = 1, 2, \dots$
 - (c) Give the variance of the h -step ahead forecast error for $h = 1, 2, \dots$
 - (d) Give the confidence bound for the h -step ahead forecast for $h = 1, 2, \dots$
3. Consider the model

$$y_t = \gamma y_{t-1} + \varepsilon_t$$

where $|\gamma| < 1$, $\varepsilon_t = \rho \varepsilon_{t-1} + u_t$, $|\rho| < 1$, $u_t \sim N(0, \sigma^2)$, and $E(u_t u_{t-j}) = 0$. Give the log-likelihood function as well as the first-order conditions.