TS Module 3 Trends

(The attached PDF file has better formatting.)

Time series practice problems means and correlations

*Question 3.1: Var($\bar{y}$)

A white noise process $Y_t = \epsilon_t$ has 200 observations, with $\gamma_0 = 1$.

What is Var($\bar{y}$)?

A. 0.001
B. 0.002
C. 0.005
D. 0.010
E. 0.050

Answer 3.1: C

$\gamma_0 = \sigma^2 = 1$.

$\text{Var}(\bar{y}) = (1/200)^2 \times 200 \times \sigma^2 = 1/200 = 0.005$

(See Cryer and Chan page 28)

$\text{Var}(\bar{y}) = (\gamma_0 / n) \times [(1 + 2 \times \rho_1 \times (n-1)/n] = 1/200 = 0.00500$

*Question 3.2: Autoregressive process

A stationary time series Y of 300 observations has $\rho_k = (½)^{|k|}$ for all k and $\gamma_0 = 1$.

What is Var($\bar{y}$)?

A. 0.01
B. 0.03
C. 0.05
D. 0.15
E. 0.30

Answer 3.2: A

Var($\bar{y}$) $\approx \frac{(1+\phi)}{(1-\phi)} \frac{\gamma_0}{n}$

= (1.5)/(0.5) × 1/300 = 0.01000