

Name: _____

1. (12 points) What are $\rho(1)$ and $\rho(2)$ for an AR(2) process having coefficients α_1 and α_2 ? (Hint: Use the Yule-Walker Equations for $v = 1$ and $v = 2$, expressed in terms of ρ 's, to find two equations in two unknowns.)
2. (8 points) Find the frequency transfer function of 4th differencing and find the frequencies where it is zero.
3. (16 points)
 - a) Show that a spectral density function is real.
 - b) What are the equivalent number of uncorrelated observations for an AR(1) having $\alpha = -0.5$?
 - c) What is TOEPL(1,.8,.6,.4,.2)?
 - d) What happens to the spectral window K_n as the truncation point M increases?
4. (10 points) Draw pictures of the frequency transfer function of low, high, and band pass filters. Be sure to label the axes.
5. (10 points) Show that the sum of two covariance stationary time series is covariance stationary.
6. (16 points) If $X \sim AR(2)$ with $\alpha_1 = .3$ and $\alpha_2 = .9$,
 - a) What are the first three coefficients of the MA(∞) representation of X ?
 - b) If $X(n - 1) = 2$ and $X(n) = 3$, what are the BLUP's of $X(n + 1)$, $X(n + 2)$, and $X(n + 3)$? (I expect you to remember the AR BLUP formula without solving any systems of equations).
7. (8 points) What basic property of WN is the Bartlett test based on? How about the Q test?
8. (20 points) On the next page are the plots of the population correlogram and partial correlogram for 10 different processes. For each of the processes, tell me whether you think it is an MA, and AR, or an ARMA process. If an AR or MA, tell me what order it is.

Process	Type	Process	Type	Process	Type
A		E		H	
B		F		I	
C		G		J	
D					