

HOMEWORK 5. Due Monday March 1st.

1. Let

$$x_t = \alpha_0 + u_t + 0.5 * u_{t-1} ,$$

where u_t is white noise.

Find the autocovariances for x_t in terms of σ_u^2 (the variance of u_t).

2. Given the AR(1) process

$$x_t = 3 + .4 * x_{t-1} + u_t$$

where $Eu_t^2 = 2$. Find the variance of x_t , and the first 3 autocovariances and autocorrelations. (Note: when it is stated that x_t is an AR(1) process this implies that u_t is white noise. Even if it is not stated directly that x_t is an AR(1) process, it is almost always implicit when we write equations like the ones above.)

3. Now use the model

$$y_t = u_t + 0.2u_{t-1} ,$$

where u_t is white noise.

b) Calculate the variance of y_t ?

4. Consider again the AR(1) process from question 2. If x_0 is a constant use recursive substitution to find the variance of x_1 and of x_4 .