

HOMEWORK 5. Due Monday March 7.

1. Let

$$x_t = \alpha_0 + u_t + 0.5 * u_{t-1} + u_{t-2} ,$$

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

$$x_t = 3 + .4 * x_{t-1} + .2 * x_{t-2} + u_t$$

where $Eu_t^2 = 2$. Is this process stable?

3. Now use the model

$$y_t = u_t + 0.5u_{t-1} ,$$

where u_t is white noise with variance 4.

a) Calculate the variance of y_t and the first order autocovariance?

4. Consider the model

$$y_t = u_t + 2u_{t-1} ,$$

where u_t is white noise with variance 0.25.

a) Calculate the variance of y_t and the first order autocovariance?

5. 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_2 .