

ECON 6310
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Practice Problems

Problem 1. Take the following population model for the federal funds rate:

$$i_t = c + \phi_1 i_{t-1} + \epsilon_t \quad (1)$$

- a. Suppose $\phi_1 = .3$. Calculate γ_{jt} for $j = 1, 2, 3$.
- b. Suppose instead that the federal funds rate can be represented by an $AR(2)$ model such that $i_t = c + \phi_1 i_{t-1} + \phi_2 i_{t-2} + \epsilon_t$ where $\phi_1 = .3$ and $\phi_2 = .1$. Calculate the $IRF(\Psi_s)$ for $s = 0, 1, \dots, 6$.¹ Graph the impulse response function as a function of s .

Problem 2. In this problem you will write your own matlab code that simulates an arbitrary $MA(2)$ model. The code should take as inputs T , θ_1 , and θ_2 and the output will be the simulated series.

Problem 3. In this problem you will write your own matlab code that simulates an arbitrary $AR(1)$ model. The code should take as inputs T and ϕ . The output should be the simulated series.

Problem 4. Using the code *fredget.m* collect data on the effective federal funds rate at a monthly frequency for all available dates. You will also need to get monthly industrial production data which you will also use for this problem.

- a. Using matlab, plot interest rates and industrial production growth rates on the same graph. Be sure to label the x and y axis appropriately and include a title and a legend.
- b. Using the *vecar.m* code, estimate the parameters of a VAR(2) model.
- c. Do interest rates Granger cause industrial production? Does this result depend on your choice of p ?

¹Recall that $\Psi_s = \frac{\partial i_{t+s}}{\partial \epsilon_t}$