

ECONOMETRIC METHODS II: TIME SERIES

SPRING 2011 HOMEWORK 1

INSTRUCTIONS

Write up your results and submit electronically (preferably in pdf format) to knimark@crei.cat and fernandojose.perez@upf.edu before 24.00 Friday April 29 together with any MatLab code used in the exercise. Explain each step involved in answering each question carefully. You may work in groups of up to four people. Please list all names in group on front page.

QUESTION 1

Consider the VAR(2) process

$$y_t = v + A_1 y_{t-1} + A_2 y_{t-2} + u_t : u_t \sim N(0, I) \quad (0.1)$$

- Find the companion form (i.e. rewrite it as a VAR(1) process).
- What is the unconditional mean $E(y_t)$?
- For the matrices

$$A_1 = \begin{bmatrix} 0.5 & 0 \\ -0.7 & 0.3 \end{bmatrix}, A_2 = \begin{bmatrix} 0.2 & 0 \\ 0.1 & -0.2 \end{bmatrix} \quad (0.2)$$

determine whether y_t is a stable process.

- Define

$$y_t = \begin{bmatrix} y_{1t} \\ y_{2t} \end{bmatrix} \quad (0.3)$$

Does y_{1t} Granger cause y_{2t} ? Does y_{2t} Granger cause y_{1t} ?

- Compute impulse response functions (for 20 periods) for both y_{1t} and y_{2t} . How are the impulse responses related to your answer to question d)?

- Find the fractions of the unconditional variances of y_{1t} and y_{2t} that are due to u_{1t} and u_{2t} . Relate to your answers to questions d) and e).