Tutorial 0: Matlab Introduction

Empirical Exercises

1. Create and save a script file `Matlab_intro`. In the script file, create the following vectors and matrices

   (a) m = $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \end{pmatrix}$, and n = $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \end{pmatrix}'$

   (b) O = $\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$, Z = $\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$, and I = $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$

   (c) Q = $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \end{pmatrix}$

2. Consider the matrix Q in 1.(c)

   (a) create a transpose matrix P = Q' = $\begin{pmatrix} 1 & 5 & 9 \\ 2 & 6 & 10 \\ 3 & 7 & 11 \\ 4 & 8 & 12 \end{pmatrix}$

   (b) select the column vector $\begin{pmatrix} 9 & 10 & 11 & 12 \end{pmatrix}'$, row vector $\begin{pmatrix} 3 & 7 & 11 \end{pmatrix}$, and matrix $\begin{pmatrix} 7 & 11 \\ 8 & 12 \end{pmatrix}$

3. Consider the AR(1) process

$$y_t = \alpha + \beta y_{t-1} + u_t \tag{1}$$

   where $u_t \sim N(0, 1)$

   (a) Create a random column vector u_t with 100 elements, each are independently drawn from standard normal distribution.

   (b) Assume $y_0 = 0$, $\alpha = 0.5$ and $\beta = 0.2$. Use **for** loop to generate a sequence of y_t. Plot y_t

4. Use the simulated time series y_t in 3. to estimate parameters α and β.