

Financial Econometrics, MFE 2019-2020

Tales Padilha
tales.padilha@economics.ox.ac.uk

MATLAB Review Exercises

1

Recall that a stochastic process $\{y_t\}$ is known as a random walk if:

$$y_t = y_{t-1} + \varepsilon_t \tag{1}$$

with $\varepsilon_t \stackrel{IID}{\sim} N(0, 1)$.

For simplicity, also assume that $y_0 = \varepsilon_0$.

Exercise 1. With this in mind, simulate a random walk process with 10,000 observations and plot the simulated series.

2

Load the **FF_Data.mat** dataset. This dataset includes data on the daily returns of a portfolio and three Fama and French factors (MKT, SMB, and HML). Using the `ols_review` function¹ do the following exercises:

Exercise 2.1. Estimate the coefficients for the regression of the returns of the portfolios on the three factors. Are these factors significant? What is the adjusted R^2 of this model?

Exercise 2.2. For the same portfolios in the previous exercise, compute rolling β s using 60 consecutive observations using a `while` loop.

Exercise 2.3. For each of these β s, produce a plot containing four series:

- A line corresponding to the constant β (full sample);
- The β s estimated on the rolling sample;
- The constant β plus 1.96 times the variance of a 60-observation estimate of β ;
- The constant β minus 1.96 times the variance of a 60-observation estimate of β .

¹Available in the folder with the MATLAB review files.