Introduction to Matlab

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1. Information

- Instructor: Rafael Serrano Quintero
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- Office Hours: Mondays 09:00 - 11:00 (confirm by email 24 hours before)

2. Course Objectives

The goal of the second part of the course *"Introduction to Matlab and Stata"* is to learn the basics of Matlab. Students will then be able to apply the acquired knowledge to problem solving in their research projects.

3. Grading Policy

- Problem Sets (40 % of the final grade). Students will get two problem sets to solve at home and some exercises that must be solved and explained in class. Answers must be submitted formatted in LaTeX with the original code as well. The students will send me one compressed file named `SURNAME_NAME_PSX.zip` where `X` is the number of the problem set. The file must have the following structure:

```
SURNAME_NAME_PSX.zip
├── tex
│   ├── SURNAME_NAME_PSX.tex
│   └── SURNAME_NAME_PSX.pdf
└── code
    └── ... All Matlab codes.
```

- Exam (60 % of the final grade). Students will have 24 hours to complete a take-home exam with exercises similar to those of the problem sets.

4. Topics and Organization

Session 1 Matlab preliminaries.

- First interactions. Script vs Command Window.
- Creating Variables. Basic Operations. Arrays and Matrices.
- Control Flow. Plots. Functions.

Session 2 Importing and manipulating data. Polynomial fit and evaluation. Nonlinear least squares.

Session 3 Basics of root finding, numerical differentiation and integration.

Session 4 Basics of numerical optimization.

5. Materials

I will send you slides, problem sets, and codes that we will use during class but here are other materials from which I have taken a lot.

- Judd, K. L. (1998). *Numerical Methods in Economics.* MIT Press
- Kochenderfer, M. J. & Wheeler, T. A. (2019). *Algorithms for Optimization.* MIT Press
- Peter H. Gruber — Script Solving Economics and Finance Problems with MATLAB
- QuantEcon Cheatsheet — for Matlab, Python, and Julia.
- QuantEcon Lectures. These are written for Python and Julia but many ideas port to Matlab easily.
- Jesús Fernández-Villaverde — Computational Methods for Economists
- Numerical Tours — Gabriel Peyré

6. Calendar

	Session 1	Session 2	At Home
01-10-2021	Matlab Preliminaries	Data Fitting	Solve PS1
15-10-2021	Root Finding, Numerical Differentiation and Integration	Grade PS1	PS2
22-10-2021	Optimization	Grade PS2	