

Introduction to Matlab

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1. Information

- Instructor: Rafael Serrano Quintero
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- Email: rafserqui@gmail.com
- Office Hours: Monday 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 (50 % of the final grade). Students will get two problem sets to solve (each counts for 25 %) at home. Answers must be submitted in PDF 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
├── Answers
│   └── SURNAME_NAME_PSX.pdf
└── Code
    └── ... All Matlab codes.
```

- Exam (50 % 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 Basics of root finding, numerical differentiation and integration.

Session 3 Basics of numerical optimization.

Session 4 Importing and manipulating data. Polynomial fit and evaluation. Nonlinear least squares.

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.

- [Attaway, S. \(2019\). *MATLAB: A Practical Introduction to Programming and Problem Solving*. Butterworth-Heinemann, 5th edition](#) — The UB provides an online copy of the 2012 version. For our purposes, it works fine.
- [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](#)
- [Nocedal, J. & Wright, S. J. \(2006\). *Numerical Optimization*. Springer, 2nd edition](#)
- [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 |
|------------|------------------------------------------------------------|--------------|-----------|
| 30-09-2021 | Matlab Preliminaries | Data Fitting | Solve PS1 |
| 7-10-2021 | Root Finding, Numerical Differentiation and Integration | Grade PS1 | PS2 |
| 14-10-2021 | Optimization | Grade PS2 | |