

Preface

The purpose of this book is to introduce the essentials of the MATLAB[®] software environment and to show how to start using it well.

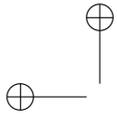
MATLAB began life as a friendly interface to numerical libraries for linear algebra. Every variable in MATLAB was a matrix, which made it easy to learn how to solve certain core problems and interact with the results. Over time, as interest in MATLAB shifted from pedagogy to larger and more complex applications, the limitations and annoyances of programming with only a text-based interface to matrices became apparent. In accordance, MATLAB added higher dimensionality, many more data types, graphical and object-oriented interfaces, and loads of additional technical and helper functions.

The result has been spectacularly, perhaps uniquely, successful both commercially and in terms of educational influence. Few successes are unqualified, however, and one price of the success of MATLAB has been the loss of its initial simplicity and unity of concept. Upon starting MATLAB version 4 in 1992, one got a simple prompt demanding that the user start defining variables and running functions on them. Upon starting MATLAB 7 in 2008, one gets four tabbed windows, six main menus, and a dozen or so clickable buttons. The prompt is still there, but it is now just one familiar face in a crowd.

This observation is not meant as a Luddite screed against the perils of progress! Yet complexity *has* made the job of getting to know MATLAB more difficult—or so it would seem, given the cornucopia of books now available that have as their primary purpose the aim of teaching it.

Why do I add another book to this pile? Mainly because of the thickness, or rather the slenderness, of the volume you now hold. I offer you a guide on a human scale, rather than the scale of MATLAB. One of the jobs of this book is to get out of the way in a timely manner. You won't find a lot of application areas in this guide; nor will you find mathematical properties or descriptions of numerical algorithms. You will find, in places, some practical but editorial advice based on my 16 years of MATLAB programming experience.

You wouldn't expect to learn how to play piano without sitting at a keyboard. The same is true for learning MATLAB! You are well advised to enter the examples yourself, read online help about a newly introduced function, and, above all, try the exercises. Because I do assume that you are an active reader, I list some commands simply by name and with a brief description, with the idea that you will look up the details online if interested.



The first four chapters cover the most essential material. Chapter 5 is a bare-bones introduction to the big subject of graphics, which is also fairly indispensable. Chapter 6 covers some advanced topics, and Chapter 7 introduces commands useful in scientific computation. The version of MATLAB referred to in this book is 7.7 (Release 2008b). Virtually everything presented will work in older versions, but the probability of finding exceptions increases as the version number decreases, particularly if it gets below 7.

No prior knowledge of MATLAB should be necessary to read this book, though a working knowledge of programming is a big help. Mathematically, you should have a fair understanding of calculus and the mechanics of matrix algebra. If some of the linear algebra terminology is unfamiliar to you, it can probably be safely skipped until you have seen the relevant mathematics elsewhere.

This book could not have come to be without a lot of help. In particular I must thank Nick Trefethen, who made many instructive comments, and an anonymous reviewer, who did likewise. Thanks go especially to the Mathematical Sciences Department at the University of Delaware, for giving graduate students the opportunity to take a summer workshop on MATLAB, and me the opportunity to teach it since 2001. (The workshop was initially partially supported by a Group Infrastructure Grant from the National Science Foundation.) The Delaware students, who persevered through early drafts and suffered as test subjects for difficult exercises, deserve credit as well. Finally, I give thanks to my wife Jen, who never once showed anything less than enthusiasm and support for a book about MATLAB.

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