MATLAB for Psychologists

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To my three women: my wife, Tatiana,
my mother, Angelina, and my grandmother
Emilia

–Mauro Borgo

To my father

–Alessandro Soranzo

To Viola and Ruggero

–Massimo Grassi

Preface

Psychological researchers should possess several skills, and one of them is surely creativity. Creativity is needed at several key points of the research process, such as in creating experimental stimuli and planning and designing an experiment. Creativity drives good data analysis, so that numbers can reveal their full potential.

Much of this creativity is now expressed through a computer program. For example, in planning and designing a psychological experiment and in analyzing data, we use specific software that has been dedicated to that particular job. This software might, however, be a hindrance to creativity, preventing it from permeating research. This is because in the majority of cases, software is designed to satisfy the average user and it is not flexible enough to meet specific needs.

In this sense, MATLAB is exactly the other side of the coin. When we first open the software, the lack of a graphical interface may be frustrating: at a first glance, the program may seem difficult to use. This book is aimed at helping users in their first approaches to this software, to aid them in programming their psychological experiments and consequently in liberating their creativity. And this is MATLAB's major advantage: we do not have to adapt our needs to the software; it is the software that adapts to our needs.

MATLAB is an extremely powerful research tool. By means of this single software tool we can control every step of our research. We can create stimuli of any kind (e.g., pictures, sounds), and we can program psychological experiments, calculate statistics, run simulations, and do any kind of signal or biosignal processing. In brief, the flexibility of this software lets us to control and customize every conceivable step of our research requiring a computer program. Moreover, knowledge of MATLAB will help you to find a postdoc in experimental psychology after completing the Ph.D. In many cases, research groups look for researchers with good MATLAB programming skills.

The current text is written to help the newcomer in using MATLAB for research in experimental psychology. However, the content can be transferred to any application. The reader can find the scripts written in this book at the following web page: http://www.psy.unipd.it/~grassi/matlab_book.html

A final recommendation for the reader: do not begin to work with MATLAB without a goal. Our teaching experience suggests that having a goal greatly accelerates your learning. Therefore, think immediately about the amazing custom code you need to complete your state-of-the-art research. That code is here in this book, waiting to be written by you.

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