

# Experiments with MATLAB<sup>®</sup>

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# Preface

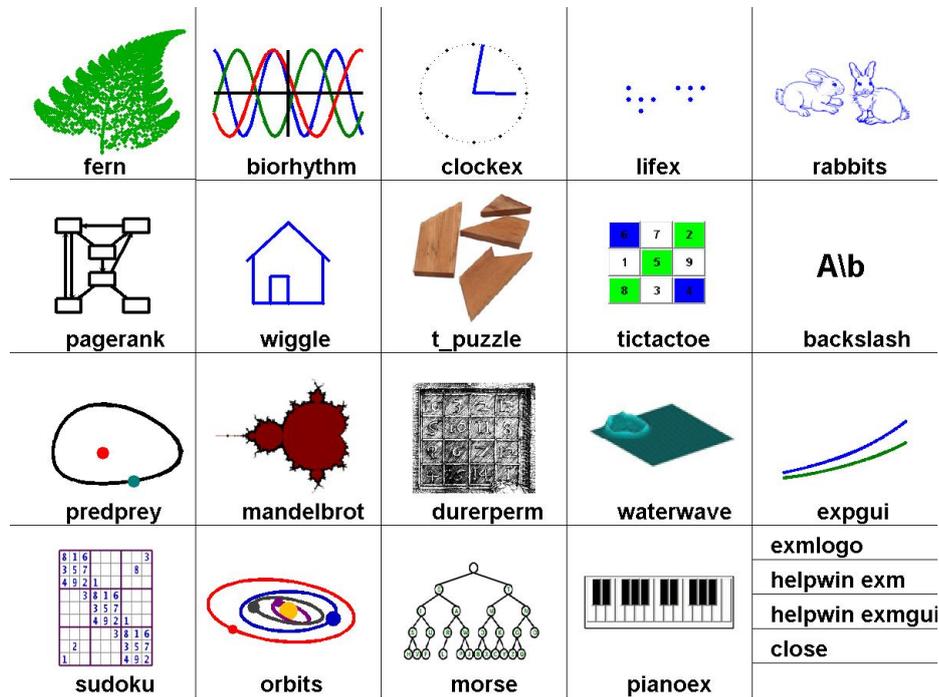


Figure 1. *exmgui* provides a starting point for some of the experiments.

Welcome to *Experiments with MATLAB*. This is not a conventional book. It is currently available only via the Internet, at no charge, from

<http://www.mathworks.com/moler>

There may eventually be a hardcopy edition, but not right away.

Although MATLAB is now a full fledged Technical Computing Environment, it started in the late 1970s as a simple “Matrix Laboratory”. We want to build on this laboratory tradition by describing a series of experiments involving applied mathematics, technical computing, and MATLAB programming.

We expect that you already know something about high school level material in geometry, algebra, and trigonometry. We will introduce ideas from calculus, matrix theory, and ordinary differential equations, but we do not assume that you have already taken courses in the subjects. In fact, these experiments are useful supplements to such courses.

We also expect that you have some experience with computers, perhaps with word processors or spread sheets. If you know something about programming in languages like C or Java, that will be helpful, but not required. We will introduce MATLAB by way of examples. Many of the experiments involve understanding and modifying MATLAB scripts and functions that we have already written.

You should have access to MATLAB and to our `exm` toolbox, the collection of programs and data that are described in *Experiments with MATLAB*. We hope you will not only use these programs, but will read them, understand them, modify them, and improve them. The `exm` toolbox is the apparatus in our “Laboratory”.

You will want to have MATLAB handy. For information about the Student Version, see

[http://www.mathworks.com/academia/student\\_version](http://www.mathworks.com/academia/student_version)

For an introduction to the mechanics of using MATLAB, see the videos at

[http://www.mathworks.com/academia/student\\_version/start.html](http://www.mathworks.com/academia/student_version/start.html)

For documentation, including “Getting Started”, see

<http://www.mathworks.com/access/helpdesk/help/techdoc/matlab.html>

For user contributed programs, programming contests, and links into the world-wide MATLAB community, check out

<http://www.mathworks.com/matlabcentral>

To get started, download the `exm` toolbox, use `pathtool` to add `exm` to the MATLAB path, and run `exmgui` to generate figure 1. You can click on the icons to preview some of the experiments.

You will want to make frequent use of the MATLAB help and documentation facilities. To quickly learn how to use the command or function named `xxx`, enter

```
help xxx
```

For more extensive information about `xxx`, use

```
doc xxx
```

We hope you will find the experiments interesting, and that you will learn how to use MATLAB along the way. Each chapter concludes with a “Recap” section that is actually an executable MATLAB program. For example, you can review the Magic Squares chapter by entering

```
magic_recap
```

Better yet, enter

```
edit magic_recap
```

and run the program cell-by-cell by simultaneously pressing the Ctrl-Shift-Enter keys.

A fairly new MATLAB facility is the `publish` command. You can get a nicely formatted web page about `magic_recap` with

```
publish magic_recap
```

If you want to concentrate on learning MATLAB, make sure you read, run, and understand the recaps.

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