

# *Review of Mathematica Navigator, 3rd Edition, by Heikki Ruskeepää*

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**Robert M. Lurie**

*Mathematica Navigator: Mathematics, Statistics, and Graphics*, 3rd edition, is an important resource for all users of *Mathematica*, Version 6 or 7. This reviewer has found the book to be invaluable in using and understanding *Mathematica* and taking advantage of the many advances in the most recent versions of the program.

## ■ Review

Wolfram Research, Inc. ([www.wolfram.com](http://www.wolfram.com)) has really given *Mathematica* users several new bumps in their learning curve with the advent of Versions 6 and 7 (7.0.1 at this writing). These new challenges occur with the introduction of `Manipulate`, `Dynamic`, and a large variety of data source files (which are updated over the Internet) as well as new commands, graphic options, and table-formatting capabilities. Clearly a lot to absorb!

To help with all of this, *Mathematica* now contains some new tutorials (91.5 MB), guides (8.76 MB), and “How tos” (11.5 MB), in addition to the reference pages (523 MB). With the many-faceted `Manipulate`, Wolfram has introduced a Demonstrations website ([demonstrations.wolfram.com](http://demonstrations.wolfram.com)) that illustrates many examples (6226 at this writing) of the use of `Manipulate`, as well as other new features of *Mathematica*. These examples do not have uniformly documented programs, so that it is often difficult to follow the programming features.

But help is on the way: *Mathematica Navigator*!! This is a real (not virtual) book of 1111 pages (but it really lies flat on your desk), as well as a CD for your hard drive that makes the book accessible from within *Mathematica* (103 MB plus a 15.1 MB update for Version 7). This book is very well organized, clearly written, and indispensable. This reviewer’s copy is already full of underlines, a personal index on the two blank pages in the back, and a number of paper scraps as bookmarks.

*Mathematica Navigator* is written for three groups of people:

First are novices or beginners who may be students of engineering, science, or mathematics, or just someone interested in mathematics who wants to use an advanced, state-of-the-art software system to investigate various mathematical oddities or just to have fun. This group definitely needs *Mathematica Navigator*; no previous knowledge of *Mathematica* is assumed in this book. The first four chapters are basic introductions and Chapter 13 is an excellent summary of standard expressions. In fact, Wolfram Research should include this book with every copy of *Mathematica*.

Second are those who do not use *Mathematica* every day; they may work with it for a while and then not again for several weeks or more. This reviewer falls into this category and finds that *Mathematica Navigator* is totally indispensable. There are hundreds of functions available to the user, but even more important are the more common methods of handling lists, properly formulating `NSolve`, handling the various controls in `Manipulate`, or remembering all of the options in the plotting functions. *Mathematica Navigator* quickly and effectively refreshes your memory.

Finally, there are users who are constantly working with *Mathematica*, probably teaching courses or writing programs and perhaps writing (or rewriting) one of the hundreds of books on *Mathematica*. This group should definitely have *Mathematica Navigator* as a model of clarity, as an aid to explaining the usage of *Mathematica* operations and features, and as a reference to operations that may be relatively new to the user. This group of users will undoubtedly want to recommend *Mathematica Navigator* to their students, coworkers, and readers. For example, *Nonlinear Physics with Mathematica for Scientists and Engineers*, by Richard Enns and George McGuire, published by Birkhäuser, 2001, comments on page 7, “We have also found that two very useful texts which illustrate scientific and engineering applications of *Mathematica* are *Mathematica Navigator* by Heikki Ruskeepää and *Mathematica for Scientists and Engineers* by Richard Gass.”

So why is the reviewer so bullish on *Mathematica Navigator*?

There are 42 pages devoted to `Manipulate` in an orderly, well-illustrated, and clear manner, with useful and varied examples. This is followed by 38 pages about `Dynamic`. After considerable experience with decoding Demonstrations, these chapters are still extremely beneficial.

The remarkable utility of a wealth of data, such as `ChemicalData`, `CountryData`, `FinancialData`, `AstronomicalData`, `WordData`, and so many more (and continually increasing!) is beautifully handled in Chapter 9 (32 pages). In Chapter 8, “Graphics for Data” (all kinds of data, not just the specialized data) (52 pages), whole new (and older) types of graphics are presented.

The chapters on graphics have combined 2D and 3D graphics (which were separate in the second edition) and clearly cover all aspects of graphics in Chapters 5 through 8. Easily forgotten while discussing the large number of changes is the ability to rotate 3D graphics by dragging with the computer mouse. The chapter on programming (the longest chapter in the book at 73 pages) is about twice as long as the chapter in the second edition. Of

course, not every function or operation is covered in the detail that is available in the many help files and tutorials in the *Mathematica* program itself; however, this book is a wonderful guide to many of the more common functions. Amazon.com currently offers this book and includes a Look Inside that has the preface as well as the table of contents and the index, which clearly show the vast extent of the book.

Anyone familiar with the second edition of *Mathematica Navigator* will find much of the older material carried over, with any updates that are needed. Users of the second edition have almost certainly already ordered the third edition. If they have not upgraded to Version 6 or 7, they should see a copy of the third edition at a bookstore; then they will surely order Version 7 and obtain the third edition.

In a review of the second edition, this writer concluded with: “Run, do not walk, to get your copy of Heikki Ruskeepää’s *Mathematica Navigator*.” This only needs to be changed to: “Run, do not walk, to get your copy of Heikki Ruskeepää’s *Mathematica Navigator*, 3rd edition.”

## ■ References

R. M. Lurie, “Review of *Mathematica Navigator*, 3rd Edition, by Heikki Ruskeepää,” *The Mathematica Journal*, 2010. [dx.doi.org/doi:10.3888/tmj.12-5](https://doi.org/10.3888/tmj.12-5).

## About the Author

Robert M. Lurie received a B.S. and Sc.D. in chemical engineering at MIT (1952 and 1955). After retirement from a career in material development, he joined the Harvard Institute for Learning in Retirement, where he has led or co-led seminars on Fractals and Chaos, Nonlinear Dynamics, The Essence of Chaos, Networks and Six Degrees of Separation, and Risk and Rationality. *Mathematica* was used for demonstrations in all of these seminars. Most recently, he has led a seminar on chaos, utilizing many Manipulates that are run by the other seminar members with *Mathematica Player 7*.

### **Robert M. Lurie**

4 Tufts Road  
Lexington, MA 02421  
USA  
[rmlurie@alum.mit.edu](mailto:rmlurie@alum.mit.edu)