



Scientific Computation: Python Hacking for Math Junkies

By Bruce E Shapiro

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This is a book about hacking, but not just any kind of hacking. It is about *mathematical hacking*, or *scientific computing*. If you like math and want to use computers to do math or solve mathematical problems, then this book is the for you.

This is version 3, which includes over 80 additional pages, with extensive additions on Python classes, iPython, magic functions, random numbers, and probability and statistics. The emphasis throughout the text is on programming in the iPython notebook.

Part I gives an introduction to programming, the Python shell, and using iPython notebooks.

Part II gives a thorough tour of the Python language. Topics include data types, simple statements, assignments, conditionals, loops, list comprehension, sorting, Numpy, pyplot, using dictionaries, functions, classes, functional programs, lambda functions, and recursion.

Part III gives applications, including probability and statistics, and topics from machine learning such as clustering, linear regression, logistic regression and principal component analysis. Other topics include image analysis, the singular value decomposition, solving initial value problems, discrete systems, fractals, estimating pi, geographic maps, and satellite orbit analysis.

Over 300 problems are included that can be used for student programming projects.

No programming background required. Some basic understanding of math through calculus expected for the applications.



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Scientific Computation: Python Hacking for Math Junkies By Bruce E Shapiro Bibliography

- Sales Rank: #260342 in Books
- Published on: 2015-01-11
- Original language: English
- Number of items: 1
- Dimensions: 10.00" h x 1.24" w x 7.00" l, 1.74 pounds
- Binding: Paperback
- 548 pages

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