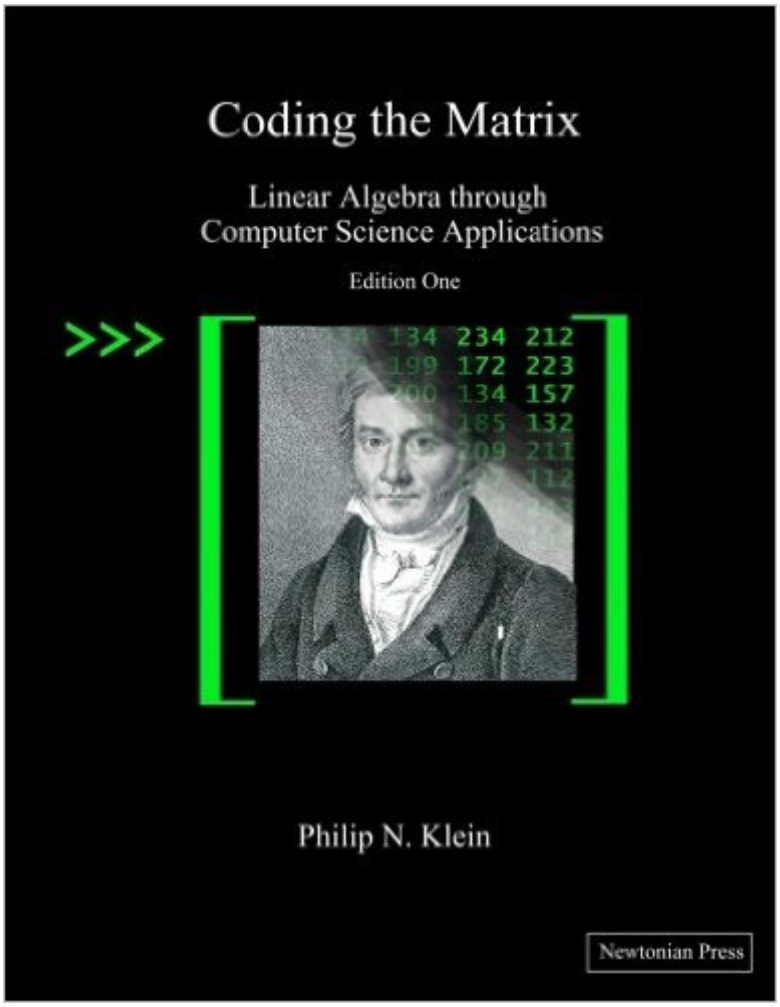
Coding The Matrix: Linear Algebra Through Applications To Computer Science



Synopsis

An engaging introduction to vectors and matrices and the algorithms that operate on them, intended for the student who knows how to program. Mathematical concepts and computational problems are motivated by applications in computer science. The reader learns by doing, writing programs to implement the mathematical concepts and using them to carry out tasks and explore the applications. Examples include: error-correcting codes, transformations in graphics, face detection, encryption and secret-sharing, integer factoring, removing perspective from an image, PageRank (Google's ranking algorithm), and cancer detection from cell features. A companion web site, codingthematrix.com provides data and support code. Most of the assignments can be auto-graded online. Over two hundred illustrations, including a selection of relevant xkcd comics. Chapters: The Function, The Field, The Vector, The Vector Space, The Matrix, The Basis, Dimension, Gaussian Elimination, The Inner Product, Special Bases, The Singular Value Decomposition, The Eigenvector, The Linear Program

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Customer Reviews

I rarely write book reviews but I am compelled to write one for Coding the Matrix. This book first caught my attention when a course by the same name was offered at Coursera. I did not enroll in the course but instead bought the book for self study at some stage. This year, I spent 5 months working through the problems in the book (I am down to the last 2 of the 14 chapters) and I just want to say that I really wish there was a book like this in bookstores 20 years ago. What a fantastic

way to teach Linear Algebra!! Previously, I had tried working through Gilbert Strang's book and video lectures on Linear Algebra but the material never stuck in my head. This book is quite different in its approach because it spends a lot of time providing the intuition behind fundamental concepts. What is the intuition behind a Matrix? What is the "meaning" of Matrix multiplication? What really is a Vector Space? What is the relationship between a Matrix and a Function? The author goes about explaining these basic concepts using a combination of worked exercises and hands on Python implementations. After working through this book I am convinced that implementing Linear Algebra algorithms and applying them to real world problems is the most effective way to learn the subject.The hard copy book has several typos and errors but the Kindle version has been updated to fix most of these. Still, before you start, I suggest downloading the errata from the book's website just to be sure. The book has a short intro on Python which I thought was quite sufficient to tackle the programming exercises. This book requires real hard work if you want to get through it. Many times (especially in the Orthogonalization and Special Bases chapters) I found the going tough.

Edition (Computer Science & Scientific Computing Series) C++: The Crash Course to Learn C++ Programming and Computer Hacking (c plus plus, C++ for beginners, programming computer, hacking the system, how to ... Coding, CSS, Java, PHP) (Volume 9) JAVA: The Ultimate Guide to Learn Java Programming Fast (Programming, Java, Database, Java for dummies, coding books, java programming) (HTML, Javascript, ... Developers, Coding, CSS, PHP Book 1) Java: The Ultimate Guide to Learn Java and C++ (Programming, Java, Database, Java for dummies, coding books, C programming, c plus plus, programming for ... Developers, Coding, CSS, PHP Book 2)