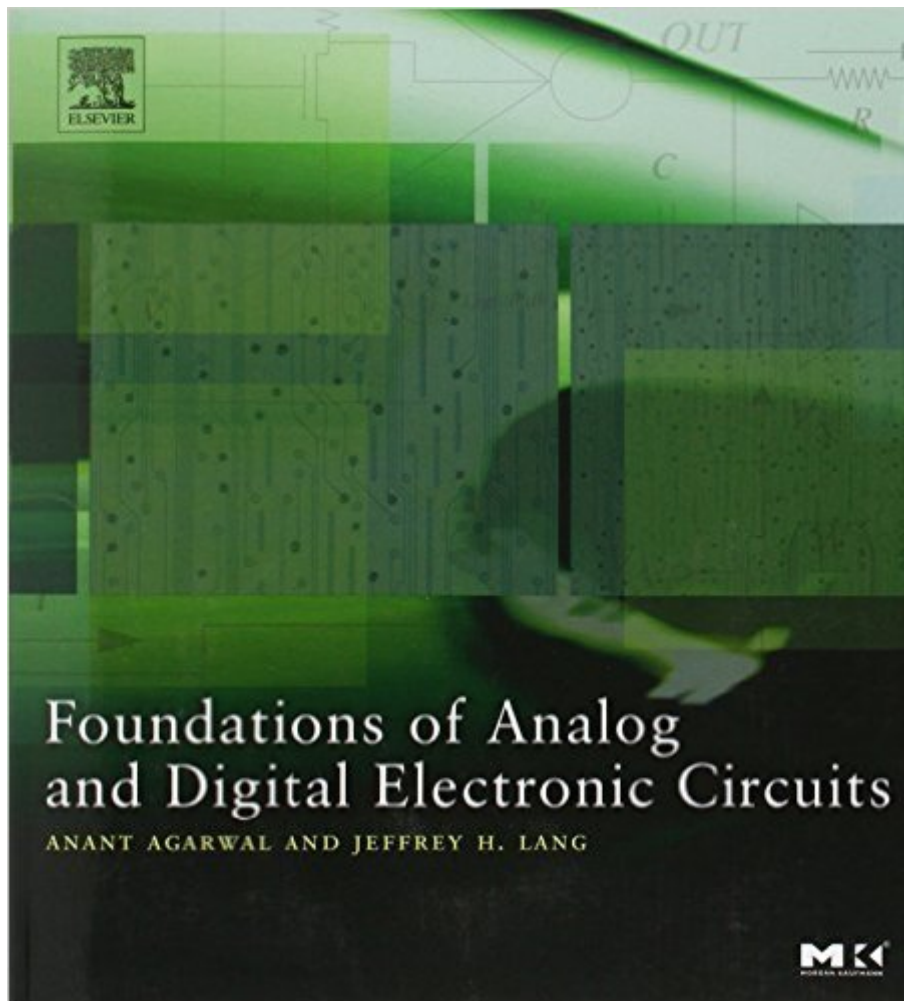


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# Foundations Of Analog And Digital Electronic Circuits (The Morgan Kaufmann Series In Computer Architecture And Design)



## Synopsis

Unlike books currently on the market, this book attempts to satisfy two goals: combine circuits and electronics into a single, unified treatment, and establish a strong connection with the contemporary world of digital systems. It will introduce a new way of looking not only at the treatment of circuits, but also at the treatment of introductory coursework in engineering in general. Using the concept of "abstraction," the book attempts to form a bridge between the world of physics and the world of large computer systems. In particular, it attempts to unify electrical engineering and computer science as the art of creating and exploiting successive abstractions to manage the complexity of building useful electrical systems. Computer systems are simply one type of electrical systems.

- +Balances circuits theory with practical digital electronics applications.
- +Illustrates concepts with real devices.
- +Supports the popular circuits and electronics course on the MIT OpenCourse Ware from which professionals worldwide study this new approach.
- +Written by two educators well known for their innovative teaching and research and their collaboration with industry.
- +Focuses on contemporary MOS technology.

## Book Information

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## Customer Reviews

I came across this book while searching for an introductory text to review my fundamentals. The book developed from an introductory course taught at MIT in electronic circuits. I like the coverage

of topics in the book and the manner in which the authors have presented them. The best part is that the course webcast is freely available over the MIT's Open Course Ware initiative. I benefited most from listening to one of the authors lectures on the web and using this book as a text. End of chapter problems emphasize applications of the various abstractions the authors use which is very intuitive. There are zillions of circuit theory books in the market but all of them just deal with the concept and circuit techniques. This book develops the concept and encourages the reader to think about the various simplifications and assumptions that have been made in circuits and systems theory and their domains of existence. Again, the best way this book can be put to use is to listen to the accompanying webcast lectures and take the "virtual course" on MIT OCW website. Don't forget to leave a small donation if you like the contents of the course so institutions like MIT can continue to open up their resources to the general public.

Many have aspired, but few have succeeded providing a truly top-notch introduction to circuits. Agarwal and Lang, of MIT, hit a home run with this comprehensive introduction, tailor-made for students. The text links theory to everyday applications. So often in college level texts, authors dwell on theory but leave the reader starved for applications. How can I apply this stuff? Why do I need it? These questions are answered in "Foundations of Analog and Digital Electronic Circuits." The book clearly and concisely educates the reader not only in circuits, but in application of circuit theory to electronics, both analog and digital. The book is complete with solved exercises and answers to select chapter problems. I just can't praise this book enough. One word of caution. There are substandard prints of this book available from sellers outside . I bought a second copy for a friend thinking it was an original run from the publisher. It wasn't in color, had publisher's pages missing from the front, had a couple pages stuck together, and didn't meet the high standards of binding from the publisher. I suggest you ask before you buy used copies from sellers other than . Please hit the "I'd like to read this book on Kindle" button, if appropriate. There is a PDF version available from a competitor, but their e-reader required for download has received terrible reviews (crashes, poor performance, no book mark, etc.). It's the same price as the hard copy from .

If you have seen Agarwal lecture at MIT, you know the man is pretty darn good at what he does. This book, lived upto the standards. IT's like the bible of under-graduate electronics. I have read other books here and there. If you get this one with Art of Electronics...you can build yourself, any electronics gadget (almost any). I treasure this with all my life, although I am not a EE person!

The authors do a great job of explaining the foundational physics of why devices do what they do and then layering on the math. The book has some other shortcomings that I didn't like. But, as a beginner, I found myself getting lost in the math. There would be pages and pages of differential equations and I just couldn't bring myself to try to keep up with it all. And all that math becomes obsolete when the impedance method is explained. It's good to understand the foundations, but that's not what I was hoping to get from the book. I know the book isn't geared towards me, but I wanted to mention it just for anyone thinking of starting the MIT OpenCourseware in hopes of learning more about electronics than a basic robotics kit will teach you. If you're like me or want some basics before getting into this book, go to [\[link in comments\]](#). It's a great site that'll teach the fundamentals you're looking for. What really affected my review was that the book didn't seem to be organized very well, relying on a lot of work from the reader. Certain sections of the book, and later on figures referred to in the text, aren't included in the book; they're online. And many times the writer talks about a figure several pages or chapters away. And it's not just a mention, it's something that may or may not be important and you can't follow it unless you remember every little detail of the figure or finally give up and go find it.

The title, "Foundations of Analog and Digital Electronic Circuits" is, above all, truth in advertising, and I mean that in a good way. I took the recent online version of the MIT 6.002 and this was the textbook. It starts with the basics: Ohm's Law, Kirchoff's Laws, works its way into RC, RL, and RLC circuits, time constants, Q factor, and of course the differential equations governing them. The good news is that it skips Laplace Transforms (which most of us forget ten minutes after graduation anyway) and nicely bridges the gap between differential equations used in the time domain and solving circuits in the frequency domain using impedances ( $s = j\omega$ ). The text also delves into basic transistor level design using MOSFETs (CMOS), which are prevalent in digital design, and bipolar devices, which are still used in analog design. MOSFETs are covered starting with the Switched Resistor model and finally for all regions of operation. The text pulls everything together when you start calculating circuit on and off switching times, pulling together the material covered on RC circuits and MOSFETs plus calculating the energy consumed. (Yes, minimizing power consumption is a big thing in the world of chip design and the authors make you aware of it.) When you're done you'll be able to bias a transistor and calculate the circuits small and large signal gain. The material assumes a basic knowledge of calculus, including some differential equations, along with some basic complex analysis. The course is available online from MIT as open courseware and is also available for download via iTunes University. The math isn't too ghastly and there are several

Internet sites that provide tutorials on what's needed plus there's an Appendix in the text. Disclaimer: I might be a slightly biased MIT alumni who is also a working EE.

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