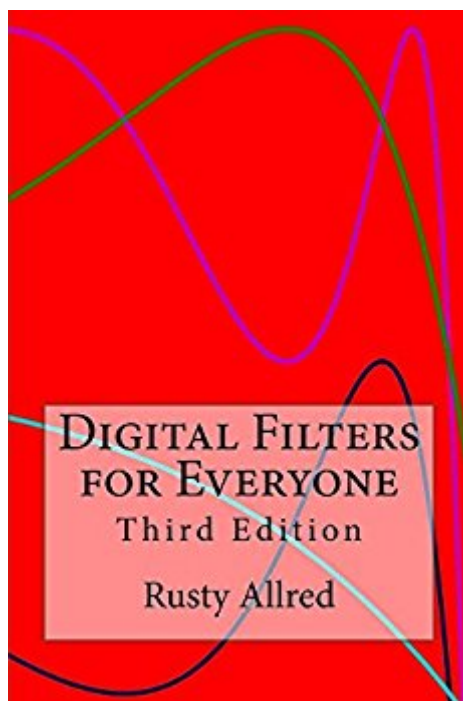


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# Digital Filters For Everyone



## Synopsis

Performing such functions as noise mitigation and signal conditioning, digital filters are everywhere: in your car, in your TV, in your music player, in your phone, everywhere. But an engineering degree or expensive software is not required to design and analyze them. In fact, whoever you are and whatever your background, this book will help you understand, design, analyze and use digital filters. This book was written to make digital filters more accessible to everyone. Practicing engineers will appreciate its straightforward approach and the simple formulas that readily lend themselves to real-time applications. Others will find that digital filter design and analysis is really not as difficult as they may have thought. For each IIR filter type (Butterworth, Linkwitz-Reilly, Bessel, Chebychev I & II, Variable Q, Allpass, Equalization, Notch and Shelf), the reader will find one equation for each coefficient. Plug in what you know – cutoff frequency, sample rate – and the equations will give you the coefficient values; no expensive software, transforms or complicated manipulations are needed. This approach does have its limitations. Although the book does explain how to create higher orders by combining lower orders, there are no equations for IIR filters larger than fourth order. Several FIR methods (Fourier Series and Frequency Sampling Methods) are included and they do apply to any order. Since elliptical (Cauer) IIR filters and the Remez and Parks-McClellan algorithms for equiripple FIR design require specialized software and do not lend themselves to simple formulas, they are not included. The third edition includes a new chapter on two-dimensional (2D) filters and a new section on software filter implementation. In addition, there are language and formatting changes aimed at making the book clearer and easier to use. As with the first and second editions, the book gives the simplest possible equations for the design of IIR and FIR filters and examples for their use. Nothing from the earlier editions has been omitted.

## Book Information

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## Customer Reviews

Wow, the other reviewers here are really humble, not to mention SMART! To a person, they characterize this little manual as fairly basic. Say what? I guarantee you that if you're a circuit hobbyist just getting into DSP, you'll need CPR after you page through this. The author starts with a few "basic" ideas, then launches into what you might imagine as 140 or 150 pages of "applications." Well, these pages are really a jam packed cookbook of formulas, equations and diagrams that read WAY more like an engineering reference handbook than a learning guide. I just don't want you taking the "for everyone" literally, then regret or return this purchase! The formulas often have 12 to 20 variables in the numerator and 20 plus in the denominator, and for a "small" book the author has really jammed the pages with valuable parameters, but the functions are far from simple. You really have to know filters before getting max value from this cookbook. On the other hand, if you're an engineer, the author does something quite ingenious-- instead of requiring extensive linear algebra, Fourier transforms (there ARE some), Matlab/GNU Octave/ PSpice, etc., Rusty, via EXTENSIVE ratios, gives "chunks" of parameters for different filter types so, theoretically, you could put his variables in Excel, and with no more than non matrix algebra and a few well thought out macros or VBA, plug in a couple parameters and get the third. Boom, you've programmed your own filter plug in! In today's "advanced" texts, filters are designed by creating an analog version of a filter (define: real world), transform the frequencies needed, then translate/ transform those to digital.

I just finished reading this book, and it was very enjoyable. It's a very practical book that will get you designing filters in no time. However, in my opinion its not "for everyone", I think that having previous knowledge on control/feedback theory is a must in order to understand things like the transfer function, the Z transform, poles, zeros, root locus, etc... otherwise the reader will be left confused as to what exactly is the author talking about, dont get me wrong the author makes a great

job at explaining the concepts, but for instance, when the author explains the bilateral transform, if you don't know what "s" (as in Laplace) means then the bilateral transform doesn't make much sense. In my opinion this book should be called something like "practical digital filters", engineers who know control theory or basic digital signal processing will greatly benefit from this, but someone without the math requirements will be left out confused. Overall I consider it to be a great book, however I gave it 4 stars because I feel that the author could have included Matlab (there's only a tiny Matlab program at the beginning of the book) or software codes in his "Handbook" section rather than only the formulas. Nowadays, Matlab is extensively used to calculate FIR and IIR filters, so whilst it's really useful to have a table of formulas and examples on how to use them, I believe that by not having any Matlab implementation (or any other software for that matter), to me it is an "old school" approach which has less practical value nowadays. If the author included more software applications, and perhaps a real DSP program as an example, then this would be an amazing book.

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