

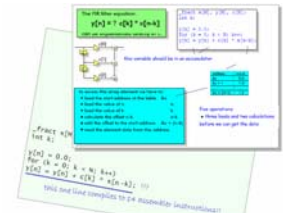
FIR filter design: a 1-day class

DSP training

Benefits

- Understand FIR filters
- Design FIR filters
- Program FIR filters

Learn why and how to design, implement and use FIR filters: with a focus on efficient implementation using DSP hardware.



From bad design..

...to good design

Contents

Learn how FIR filters are designed and used. We also give clear guidance on how to write programs for FIR filters that are efficient when implemented on DSP hardware.

FIR filter basics

We review the basics of FIR digital filtering, especially with regard to practical effects.

- Linear Filters
- Finite Impulse Response filter
- Filtering to smooth a signal

Analysis of FIR filters

We explain how to analyze the FIR filter operation, and how to calculate impulse and frequency responses.

- Fourier transforms
- Spectral analysis
- Fourier analysis of FIR filtering
- Filtering in frequency
- FIR frequency response
- Naive FIR filter design

Practical limitations

Understand the limitations and compromises faced in practical design situations.

- Effect of limited filter length
- Frequency resolution
- Broadening of frequency shape
- Frequency response leakage

Windowing

Windowing is an important design method for FIR filters. Learn how and why it works, and to use it.

- What windowing does
- Filter sharpening by windowing
- Window method of FIR design
- How windows shape the filter
- Problems of window designs
- Typical window design function

Optimization

We introduce the idea of mathematical optimization methods of filter design, taking the Parks-McLellan design as an example.

- Window design as non-optimal
- Iterative FIR design optimization
- Parks-McLellan equiripple design

Filter programming

We develop an FIR filter program, from inefficient C to an optimal implementation in DSP assembly language.

- DSP processor operations
- A typical DSP core
- Naive FIR filter in C
- Efficiency gain of using pointers
- Using multiple memories
- Placing data in assembler
- Efficient C filter example
- Assembler multiply/accumulate
- Programming parallel operations
- Optimal DSP filter program

DSP training

'FIR digital filters' is self-contained but we recommend you should first take our 1-day class 'Introduction to DSP' covering the essential foundation topics. It can also be followed by our 1-day 'IIR digital filters' class which explains how IIR filters are designed and used.

Time and arrangements

This class takes 1 day. Check our schedule at:

www.bores.com/index_schedule.htm

It can also be presented 'on site' and the material can be adapted if you have specific needs, at no extra cost.

Booking and questions

Call us by phone or send an email to book or to ask questions:

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About Us

BORES Signal Processing train managers, engineers and programmers to understand and use DSP and streaming media processing.

- established 19 years
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