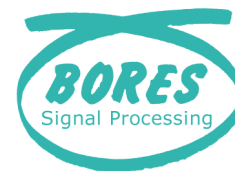# Introduction to Digital Signal Processing

DSP foundation series

Benefits

Get started quickly, make well-informed DSP design choices, and implement DSP programs correctly and efficiently, thanks to the insights and understanding we give you through this well-established seminar.

This seminar is unique in offering real insight and depth of knowledge, without getting bogged down in unnecessary formal mathematical proofs and derivations.

Feedback from previous students, over 12 years of presenting this seminar, is excellent.
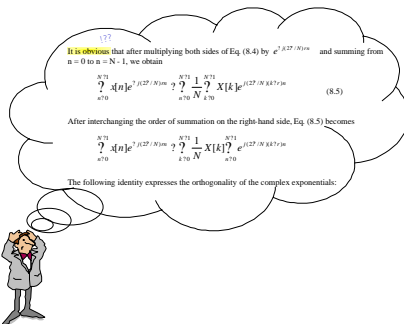
Confused by DSP?
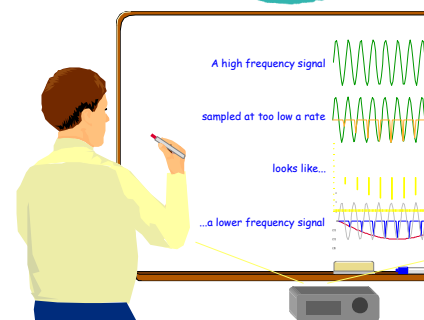
We clarify & explain

Contents

In this seminar we explain DSP including its advantages, applications and limitations. We offer real understanding of the practice and limitations of converting analog to digital signals; principles and applications of correlation and convolution; frequency spectrum analysis and the Fourier Transform; basics of digital filters and their application; and an initial introduction to digital filters and their design.

Background to DSP

We consider the background to DSP including factors that guide design choices, such as why to use DSP and its advantages.

- What is DSP
- Where is DSP best used?
- Reasons to consider a DSP solution

DSP basics

A good grasp of fundamentals takes you a long way in understanding how to apply DSP correctly and productively. We give you that grasp of the foundations of the subject.

- Converting analogue signals
- Sampled data systems
- Aliasing and antialiasing
- Sampling theorem
- Why what you see isn't what you thought
- Reconstruction

Practical limitations

We help you to understand the real practical limitations of DSP, and show you how to avoid common pitfalls. We take a highly practical approach that leads to you gaining a good 'feel' for the subject as well as having knowledge.

- Frequency resolution
- Amplitude resolution
- The neglected effects of bad timing
- Quantization noise
- Sampling and aliasing

Time domain processes

Operations on signals in the time domain (basically, weighted averaging) are the basis for many useful applications as well as the foundation to digital filtering.

- Correlation and convolution
- Uses of convolution and correlation

Frequency analysis

Fourier transform theory is easier than you think: practice is harder than you think. We clarify this crucial area and show how you can apply these techniques in practical ways.

- Fourier transforms and spectral analysis
- Convolution and the Fourier Transform
- Short Fourier transforms
- Limitations on frequency resolution

Fourier transform limitations

Many compromises in DSP relate to effects that arise from the Fourier Transform. We show you how to understand these effects and compromises intuitively and how to apply that understanding in practical situations.

- FT assumption of periodic signals
- Effects of short-duration signal data
- Frequency 'leakage'

Windowing

Windowing is important in FT analysis and in filtering. We explain how windows work and what they do.

- The basis for windowing
- Improving frequency resolution
- Unwanted (and oft-neglected) side effects

Filtering

Filtering is the most common application of DSP. We give you insight into what it does, how it works, and how to do it.

- FIR and IIR filters
- Impulse and frequency responses
- Introduction to FIR filter design
- Introduction to IIR filter design

Time and arrangements

The 'DSP foundation' 3-day seminar series gives a thorough grounding in DSP including fundamentals, FIR filters and IIR filters. It is presented 'on-site' by arrangement - the material can be adapted if you have specific needs (at extra cost). We recommend it be followed as a series, but individual 1-day seminars can be taken by arrangement if desired.

- on-site by arrangement
- contact: Chris Bore
- email: chris@bores.com

Introduction to DSP seminar

- 1-day seminar presentation
- £330 (€550, $ 660) per person
- arrangements as above

DSP 'foundation' series

- 3-day seminar series
- £ 990 (€1,650 : $ 1,980) per person
- arrangements as above

To book or find out more

Call us by 'phone or send email to book or to ask questions.

- contact: Chris Bore
- 'phone: +44 (0)1483 740138
- mobile: +44 (0)7793 732293
- email: chris@bores.com

DSP foundation seminars

The 'DSP foundation' is a 3-day series of seminars designed to give a thorough understanding of DSP including FIR and IIR filtering. The series can be followed as a 3-day session or as separate 1-day sessions, by arrangement.

- Introduction to DSP
- FIR digital filters
- IIR digital filters