FAME	ENSEA	
	Signals and Systems	
US Credits : 3	Lecture : 30h ; Tutorials : 15h	Language : English

Summary

The goals of this course are to understand the main characteristics about continuous and discrete time signals and the basis needed for their further processing (filtering for example).

Prerequisites

Students are supposed to have knowledge about circuit analysis with sinusoidal signals and some ideas about Fourier series representation of periodical signals. They must of course know how to calculate basic integrals (mainly exponential functions and rectangular window) and finite and infinite geometrical series.

Contents

Continuous time signals

- Fourier and Laplace transforms
- Time invariant linear systems and convolution
- Transfer functions, stability, frequency response, Bode representation, poles / zeros diagrams
- Application to physical systems (electrical, mechanical)

Discrete time signals

- Sampling theorem. Fourier equivalence of sampled signals and sequences. Practical sampling and converters. Problem of practical reconstruction (blocker effects).
- Linear systems, time invariant and non time invariant (i.e. compressor and oversampler)
- Fourier and Z transforms
- Convolution, transfer functions, stability, frequency response, poles / zero diagrams
- Convolution / product duality. Windowing.
- Frequency sampling : Discrete Fourier Transform and applications
- Introduction to filter design.

Organization

- Approximately 40 % on continuous time signals, 60 % on discrete time signals
- Approximately 2/3 of the time will be used for formal lecturing, the remaining third being in form of tutorials (tutorial and lecture will be intertwined, as the group will be small enough to do it in the same place).

Textbook

1. B. P. Lathi, Linear Systems and Signals, Oxford Univ. Press, 2nd edition

Similar to the following courses

- IIT Chicago ECE 308
- University at Buffalo EE 303
- University of Pittsburgh ECE 1552
- University of Illinois at Urbana-Champaign ECE 310
- Mississippi State University ECE 3443
- University of Michigan at AA EECS 351 or EECS 216
- Michigan Tech EE 3160