



TRAITEMENT DU SIGNAL

SIGNAL PROCESSING

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| Lecturers : 12.0 | TC : 14.0 | PW : 4.0 | Autonomy : 2.0 | Study : 2.0 | Project : 0.0 | Language : FR

Objectives

Signal processing consists of all the techniques used to describe the acquisition, storage, modification, coding and transmission of information. Faced with the mass of the signals that need to be processed, often in real time, technological systems of great complexity have invaded our society. In response to current challenges, powerful scientific methods have been developed to manage such complexity. The mastery of these methods becomes inescapable in the practice of the engineer whatever the field to which it is destined. The objective of this course is to present the preliminary bases for the acquisition and mastery of these methods and to illustrate them by their application.

Keywords : Deterministic and random signals, Analog and digital signals, Time domain and frequency domain analysis, Fourier and Laplace transforms, Analog and digital filtering, Sampling, Fast Fourier transform, Signal models

Programme

- 1) Modelling and characterizing a signal: time domain and frequency domain analysis
- 2) Modelling and characterizing a system: convolution and filtering
- 3) Autocorrelation and intercorrelation for deterministic signals
- 4) From analog signals to digital signals
- 5) Digital Filtering
- 6) From deterministic signals to random signals

Learning outcomes

- Be able to analyse a signal in the time and frequency domains.
- Be able to sample a signal.
- Be able to design analog and digital filters.
- Be able to model a signal.

Independent study

Objectifs : Follow an engineering approach by mobilizing knowledge and know-how acquired during the AF.

Méthodes : Solve a practical and original signal processing problem by applying the numerical methods and tools acquired during the course.

Core texts

G. Scorletti, *TRAITEMENT DU SIGNAL*, Polycopié de cours, SDEC – École Centrale de Lyon, 2021
E. Tisserand, J.F. Pautex et P. Schweitzer *ANALYSE ET TRAITEMENT DES SIGNAUX*, Sciences sup. Dunod, 2004
E.W. Kamen et B.S. Heck *FUNDAMENTALS OF SIGNALS AND SYSTEMS WITH MATLAB*, Pearson Prentice Hall, 2007

Assessment

Final mark = 90% knowledge + 10% know-how
Knowledge = 80% final exam + 20% continuous assessment
Know-how = 100% continuous assessment