2EL5060 – Analysis and processing of audio data (speech and music)

Instructors: Stephane Rossignol
Department: CAMPUS DE METZ
Language of instruction: ANGLAIS
Campus: CAMPUS DE METZ
Workload (HEE): 60
On-site hours (HPE): 35,00
Elective Category : Fundamental Sciences
Advanced level : Yes

Description

The aim of this course is to present the corpus of non-parametric and parametric spectral analysis methods, as part of the analysis of musical and speech sound signals.

Spectral analysis is one of the elements of signal processing chains; therefore, it is not just the visualization of spectra. The main objective is to decide and/or estimate. Some examples: What was the original score? Or what instruments are present in the orchestra? What is the fundamental frequency of this or that sound? What does this person say? Where is this person or this other one? Etc. The choice of this or that spectral analysis method is crucial, depending on the current problem.

The focus is put on the different concepts underlying each method, and the performance of these methods are compared. This last approach also highlights the concept of modeling (physical modeling/signal modeling/...), inherent in an efficient engineering approach.

Moreover, the various tools are studied in the context of the observation of the human being, who communicates with his fellow beings and his environment through his senses. Of these, sight and hearing are the best known, and only they allow a remote approach to the environment. Communication systems (human-to-human, human-to-machine or machine-to-human) are designed to acquire and reproduce these perceptions as faithfully as possible. It is therefore useful to know and be able to model in detail on the one hand the system of human perception, that is to say the receiver (the ear, here), but also the system of production of the signal concerned by the perception (human speech, music, various sounds), that is, the transmitter.