



CONTRÔLE ACTIF DU BRUIT ET DES VIBRATIONS

ACTIVE NOISE CONTROL AND VIBRATION

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| Lecturers : 10.0 | TC : 0.0 | PW : 8.0 | Autonomy : 0.0 | Study : 10.0 | Project : 0.0 | Language : MI

Objectives

Active control systems have been widely developed in the last 20 years. The basic principle is well known : a secondary wave, 180° out of phase, is synthesized to interfere with the primary one. Active noise or vibration control therefore aims to reduce an existing noise or vibration, especially at low frequencies, where passive means are unefficient. The objective of this course is to introduce the basic principles and the main realizations in mechanics. Other topics are also investigated: active absorption, semi-active control, smart materials...

Keywords : active control, acoustics, vibration, fluid mechanics, adaptive filters, real time, analog filters

Programme

- 1- active noise control
- 2- adaptive algorithms
- 3- energy in active systems. Local control/ global control
- 4- semi-active and active control of vibrations
- 5- LQG control - MIMSC control
- 6- smart structures
- 7- vibro-acoustic control
- 8- active control of flow instabilities

Learning outcomes

- to identify potential applications of active control systems
- to select the suited active control technologies
- to design an active control system
- to discuss about active systems' limitations

Independent study

Objectifs : The practical activities (12h) reflect the variety of applications :
- active headset
- real time systems for noise control
- active vibration control of a structure

Méthodes : 2 Experimental Work sessions (Lab Work)
1 Practical Work

Core texts

Stephen Elliott , *SIGNAL PROCESSING FOR ACTIVE CONTROL*, Academic Press, 2001
Leonard Meirovich *DYNAMIC AND CONTROL OF STRUCTURES*, John Wiley and Sons, 1990
P.A. Nelson, S.J. Elliott *ACTIVE CONTROL OF SOUND*, Academic Press, 1992

Assessment

Final mark = 45% Knowledge + 40% Know-How +15% Methodology
K= 10% final exam + 35% Continuous Assessment
KH=40% Continuous Assessment