CONTRÔLE ACTIF DU BRUIT ET DES VIBRATIONS

ACTIVE NOISE CONTROL AND VIBRATION

Lecturers: **Marie Annick GALLAND, Marc JACOB, Mohammed ICHCHOU**

| 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 synthetized 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
	
	Méhodes : 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