PHÉNOMÈNES COMPLEXES EN DYNAMIQUE DES STRUCTURES

COMPLEX PHENOMENA IN STRUCTURAL DYNAMICS

Lecturers: **Olivier DESSOMBZ, Jean-Jacques SINOU**

| Lecturers : 4.0 | TC : 24.0 | PW : 0.0 | Autonomy : 0.0 | Study : 0.0 | Project : 0.0 | Language : FR

Objectives

The behavior of real structures often exceeds the basic mechanics framework for various reasons. The non-deterministic nature of the structures, the presence of nonlinearities are taken into account to better understand the behavior of these structures in real cases operating in engineering.

We propose here to give tools and address the conventional methods of engineering for introducing randomness and non-linearities in the systems, and to describe and more realistically the behavior of real structures and their optimization. Particular attention will also be paid to the engineer's process of defining a relevant mathematical model with regard to the experimental observations. These tools will be

Keywords : Solid Mechanics, Structural Dynamics Engineering of complex systems, Uncertainty, Optimization, Stability, Nonlinear Systems

Programme	1) Introduction 2) Instability 3) Nonlinear behavior and methodology 4) Dispersions 5) Structural optimization
Learning outcomes	• Formulate a complex problem in structural dynamics • Explain physical phenomena in structural dynamics • Evaluate according to the dynamic operating criteria of an object • Knowing the sources of uncertainties and nonlinearities and how to model them
Independent study	Objectifs : Méhodes :
Core texts	A.H. Nayfeh and D.T. Mook, *NONLINEAR OSCILLATIONS*, John Wiley & Sons, 1979 A. Preumont *VIBRATIONS ALÉATOIRES ET ANALYSE SPECTRALE*, Presses Polytechniques Romandes, 1990 D.-J. Ewins*MODAL TESTING: THEORY, PRACTICE AND APPLICATION*, Study Press,, 1984
Assessment	Final mark = 30% Knowledge + 70% Know-how Knowledge = 100% final exam Know-how = 100% continuous assessment