



## VIBRATION DES SYSTÈMES MÉCANIQUES

### VIBRATION ANALYSIS

Lecturers: **Olivier DESSOMBZ**

| Lecturers : 12.0 | TC : 16.0 | PW : 4.0 | Autonomy : 12.0 | Study : 4.0 | Project : 0.0 | Language : FR

#### Objectives

Within the framework of general mechanics and structural mechanics, the course constitutes an introduction to vibration mechanics and an opening towards non-linear phenomena and the stability of mechanical systems.

**Keywords :** Vibrations, discrete / continuous systems, damping, modal synthesis, non-linear systems

#### Programme

- Discrete Systems Program : Vibration response of systems. Insulation and damping of systems. Modal synthesis.
- Continuous systems : Calculation of beam modes. Building discrete models. Application of the finite element method.
- Non-linear systems.
- Stability of mechanical systems.

#### Learning outcomes

- To know how to put into equations a mechanical system within the framework of small movements.
- Know how to calculate normal eigenmodes and use them in modal synthesis.
- Understand the major approximation methods, in particular the finite elements method.
- Know how to take into account non-linearities in vibratory mechanics.

#### Independent study

**Objectifs :** Allow students to assimilate notions and concepts seen in class and in BE.

**Méthodes :** Formatting of results and writing.

#### Core texts

J-F. Imbert, *ANALYSE DES STRUCTURES PAR ÉLÉMENTS FINIS (3ÈME ED)*, Cépaduès éditions, 1991

M. Géradin & D. Rixen *THÉORIE DES VIBRATIONS. APPLICATION À LA DYNAMIQUE DES STRUCTURES*, Masson, 1993

P. Pahut & M. Del Pedro *MÉCANIQUE VIBRATOIRE. SYSTÈMES DISCRETS LINÉAIRES*, Presses polytechniques et universitaires romandes, 2003

#### Assessment

Score = 50% knowledge + 50% know-how

Knowledge score = 100% terminal exam

Know-how score = 100% continuous assessment