



PROPAGATION DES ONDES ÉLASTIQUES

ELASTIC WAVE PROPAGATION

Lecturers: **Sebastien BESSET, Marc JACOB**

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

Objectives

In the field of Vibro-acoustics, the control of the behavior of structures is hampered by the difficulty of using the finite element method. In this way, wave propagation view is essential and constitutes the basis of many analytical methods used in industry. Its implementation in the field of transport has made it possible to optimize the vibro-acoustic comfort of vehicles. In the field of Civil Engineering, the calculation of the vibro-acoustic behavior of buildings has been made necessary by the evolution of standards of safety and comfort. On the other hand, wave

Keywords : Propagation, vibroacoustics, radiation, seismic, stratified media, fluid-structure coupling.

Programme

I - Introduction: Propagation of a mono-dimensional medium - Harmonic waves - Power flow
II - Wave analysis in solids: Propagation in a finite space - Propagation in a half-space - Waves in stratified media - Waveguide - Case of periodic media
III - Vibro-acoustic analysis: Non-modal behavior of structures - Integral formulation - Energy methods - Static analysis of dynamic problems
IV - Ground-structure coupling: Superficial foundations dynamics - Modeling of foundations

Learning outcomes

- Understanding the main vibro-acoustic phenomena
- Understanding vibratory energy exchanges between elastic media
- Learn about the vibro-acoustic calculation tools used in mechanical design
- Understanding the seismic design rules

Independent study

Objectifs : Learning and deepening a part of the course through a bibliographic analysis and reflection on an application problem.

Méthodes :

Core texts

A. Bedford & D.S. Drumheller, *INTRODUCTION TO ELASTIC WAVE PROPAGATION.*, Wiley, 1994
F.E. Richard, JR Hall & R.D. Woods *VIBRATIONS OF SOILS AND FOUNDATION*, Prentice Hall, 1970
James F. Doyle *WAVE PROPAGATION IN STRUCTURES. SPECTRAL ANALYSIS USING FAST DISCRETE FOURIER TRANSFORMS - SECOND EDITION*, Springer, 1997

Assessment

Technical study
Scientific paper study