DYNAMIQUE DES STRUCTURES

STRUCTURAL DYNAMICS

Lecturers: **Olivier DESSOMBZ, Marc JACOB**

| Lecturers : 16.0 | TC : 0.0 | PW : 8.0 | Autonomy : 0.0 | Study : 4.0 | Project : 0.0 | Language : FR

Objectives

The dynamic analysis of structures using modal synthesis and finite element methods has found a large number of industrial applications (aeronautics, automotive, shipbuilding, rail, civil engineering). The main goal of this course is to present these methods in a general framework by carrying out in parallel and in interaction a numerical approach and an experimental approach based on vibratory tests. Model correction and the influence of damping are also discussed.

Keywords : Finite elements - modeling - numerical methods - numerical modal analysis - substructuring - modal synthesis - damping

Programme
- Discretization by finite elements
- Modification of the global matrix formulation
- Standard conservative problem
- Spectral problem
- Temporal integration of the transient problem
- Modeling of damping
- Identification of the damping matrices
- Modal synthesis, Sub-structuring
- Disturbance of dynamic models

Learning outcomes
- Model a finite element structure
- Use a general industrial finite element calculation code
- Understand the foundations of finite element methods
- Implement vibration measurements

Independent study   Objectifs :   Finalize the TP and BE, write the reports

Méhodes :

Core texts   J.-.F. IMBERT, *ANALYSE DES STRUCTURES PAR ÉLÉMENTS FINIS (3ÈME ED)*, Cepadues, 1995
M. GERARDIN, D. RIXEN *THÉORIE DES VIBRATIONS*, Masson, 1996
L. MEIROVITCH*COMPUTATIONAL METHODS IN STRUCTURAL DYNAMICS*, Sijthoff Nordhoff, 1980

Assessment   Score = 50% knowledge + 50% know-how
Knowledge score = final exam
Know-how score = continuous assessment