INTERACTIONS FLUIDE-STRUCTURE

FLUID-STRUCTURE INTERACTIONS

Lecturers: **Mohammed ICHCHOU, Gilles ROBERT, Marc JACOB**

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

Objectives

Introduction of the fluide Structure Interactions (FSI) problems. Modeling of such coupling situations and design of mechanical systems evolving fluide Structure Interactions.

Keywords : Added mass operator - elastic effects - Sloshing - Free surface effects - Gravity waves - Capilarity waves -Fluide-structure impacts - Dissipative effects - Radiation - COupled fluid-structures modes - FInite Element modeling - Piston like cases - Instabilities - Forcing through the fluid - incompressible effects - compressible effects.

Programme

I- Classification of the main fluide-structure problems.
II- FOrmulation of the fluid-structure coupling issues.
III- INertia effects and strong coupling.
IV- Dissipative coupling - radiation effects
V- Vibroacoustic coupling (boiunded and unbounded)
VI- Physical interpretation of the fluid-structure coupling effects, numerical formulation and assessments.
VII- Fluid-structure coupling under flow

Learning outcomes

- Assessment of the type of fluide structure interaction
- Assessment of the relevant parameters belonging to the main fluid-structure interactions
- Being able to formulate the relevant model for the main fluid-structure interaction
- Define the relevant sources of excitations by the fluid injected in the structure

Independent study

Objectifs : Analysis of a real case and assessments of its class among the possible fluid-structure families

Méhodes : Analysis of a journal paper/patent

Core texts

F. Axisa, *MODÉLISATION DES SYSTÈMES MÉCANIQUES VOL. 3 : INTERACTIONS FLUIDE STRUCTURE*, Lavoisier
Emmanuel de Langre *FLUIDES ET SOLIDES*, Ecole Polytechnique, 2002
J. P. Morand et R. Ohayon*INTERACTIONS FLUIDES-STRUCTURES*, Broché, 1997

Assessment

Reports of the Experimental/numerical trainings (team work)
Report on a chosen journal paper/patent (team work)
Final individual exam