Wave dynamics

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

Code ELP: N7EM03A

Presentation

Objectives

At the end of lectures and tutorials on the dynamics of strained string vibrations, sound waves, surface waves and elastic waves, students in this course will be able to:

- quickly produce the linearized version of a model,
- accurately illustrate the oscillations of the physical fields,
- quickly apply the method of solving the wave equation,
- generate with hindsight calculations of coefficients of reflection and transmission,
- generate without error the dispersion relation of the waves,
- systematically compare their phase and group speeds,
- explain the phenomenon of wave packets,
- describe qualitatively the impulse response of a medium.
- read and assimilate a significant part of the concepts and developments of a reference book on the subject, in English.

Course teaser

Click here to see the video

Description

Non-contractual information.
Last update on 18 December 2024

Lectures and tutorials

The following chapters of the book of reference (wave motion) are discussed in the following order:

7. Formation and propagation of shock waves
1. Basic Concepts
2. Waves along a string with tension
3. Sound Waves
4. Linear surface waves
5. Waves in an elastic solid

The oral presentation will highlight the generality of the concepts studied and will be given an important place in understanding the calculations presented in the book in order to properly assimilate. Digital artwork will be developed.

Project on the serious game "Car Traffic"

- Link to the car traffic simulator
- Link to the associated pedagogical numerical resource

Objectives: At the end of the project on the dynamics of this road traffic model, the students of this course will be able to apply the method of the characteristics to calculate the evolution of a density of cars in the presence of small disturbances or important disturbances like the alternation of a traffic light.

Pre-requisites

Fluid mechanics skills in the first year of a Fluid Mechanics Department

Useful info

Non-contractual information.
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