Turbulent Flows Introduction

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

Code ELP: N7EM02A

Presentation

Objectives

- Presentation of classical methods of treatment and resolution of turbulent flows
- Introduction of the concept of turbulent viscosity and the associated assumptions and limitations
- Application to cases of canonical turbulent flow (jet, boundary layer ...)
- Phenomenological introduction of turbulent field statistics (multi-point time statistics) and aspects of dispersion and mixing by turbulent flows
- Opening on the different numerical simulation strategies of turbulent flows.

Description

- 9 courses
- 6 TD
- 2 TP computer
- 2 experimental labs
- 1 exam

Introduction to turbulent flow
1- Introduction
2- derivation of Reynolds equations
3- Free shear flows (jets, wakes, layer of mixtures)
4- Wall flows (boundary layers, pipes)

Non-contractual information.
Last update on 18 December 2024

5- Turbulent mixing and natural convection
6- Structure of the turbulence

Pre-requisites

- Basis on Mechanics of continuous media and fluid mechanics (notion of constraints, Navier-Stokes equations)
- Concepts of statistics and signal processing (moment, correlation, spectrum, distribution function)

Non-contractual information.
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