

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)

- 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)