Boundary layer

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

- **Code:** N7AM01A
- **Open to exchange students:** No

Presentation

Objectives

Introduction to asymptotic calculation methods (perfect fluid, boundary layers) and analytical resolution of simple laminar flow problems. Wall transfer analysis (momentum, heat flow, mass transfer)

Description

Review of perfect fluid flow
Dynamic, mass and thermal laminar boundary layers
- Localization of viscous effects in real fluid flows at high Reynolds numbers: advection-diffusion balance
- Characteristic boundary layer parameters: thickness, wall transfer
- Local equations of the isovolume dynamic boundary layer: Prandtl model - detachments
- Integral equations and global balances in isovolume evolution: von Karman equations

Methods and examples for calculating boundary layer flows
- Solving local equations
- Calculation by integral method: von Karman-Polhausen equations.

Half of the course is devoted to practical exercises.