UE Data sciences & Inverse problems

ECTS
3 credits

Component
UFR PhITEM (physique, ingénierie, terre, environnement, mécanique)

Semester
Printemps

> **Teaching language(s):** English, French

> **Open to exchange students:** Yes

> **Code d'export Apogée:** PAX8SRAG

Presentation

Description

In every fields of science (economy, health, physics, chemistry,..), we measure/collect data or observations and try to understand and interpret them.
To interpret these complex data, we propose "simple" models, for example:

- in meteorology, data are temperature, humidity, etc, models are collection of boxes/cells linked through physical relationships.
- in earth-science, data are collected from satellites, ground instruments, and models propose a simplified view of earth dynamic

In the first case we are more interested in the data (what is the forecast for next week?) than in the model (cells),
In the second case we focus on the interpretation of the data rather than the data themselves.

The relation model->data is called the direct problem, the reverse is called the inverse problem.

Solving an inverse problem is answering the question: Given some data, how can we retrieve the model and parameters that explain them?

The course explores the solution of linear inversion problems and how to solve iteratively non linear inverse problems.
This is done by using a light theoretical background and playing on computer with applications.

prerequisite: basic knowledge of linear algebra (vector, matrices, transposition, dot product, etc...), some python (or matlab) programming experience

Language: english or french

Course parts

TD	Tutorials (TD)	18h
CMTD	Lectures (CM) & Teaching Unit (UE)	9h

Useful info

Campus

❯ Grenoble - University campus