Inverse problems

Niveau d'étude
Master 2

ECTS
3 crédits

Volume horaire
26h

Période de l'année
Semestre 3

Présentation

DESCRIPTION

The lectures include:
(1) Notations and reminders: vectors, matrices, scalar products, norms, variances, covariances, linear systems.
(2) Over-determined linear problems: definition, examples, least squares, data error handling, weighting, model errors and statistics, norms.
(3) Under-determined and mixed-determined linear problems: Definition, examples, Lagrange multipliers, null space, minimum norm, regularisation, data error handling, weighting, model errors, Bayesian approaches.
(4) Non-linear problems: Definition, examples, linearisation, gradient methods, regularisation, model errors and statistics.

The lectures are supported by four practicals of four hours each.

OBJECTIFS

This course is an introduction to inverse problems, so that students can use simple data management and interpretation techniques. The aim is for them to know and to understand the underlying assumptions of the techniques used, to understand the importance of good management of measurement errors, and to be able to assess the impact of these errors on the solutions obtained.

HEURES D'ENSEIGNEMENT

Inverse problems	Cours Magistral	10h
Inverse problems	Travaux Pratiques	16h

PRÉ-REQUIS OBLIGATOIRES

Basic knowledge of mathematics