Introduction to Inverse Problems and Parameter Identification
(3 Lectures)

O. Kavian

Laboratoire de Mathematiques Appliquees
University of Versailles St. Quentin
Versailles, France

In a great many problems, having their origin areas ranging from Physcis, Mechanics, Geology until Medical Sciences, one has to solve partial differential equations where some unknown coefficients are involved. In these problems one tries to recover these unknown coefficients via *boundary measurements* of certain quantities. For instance in gravimetry and geological prospections, through measurements of variations of the gravitation acceleration g at different altitudes one hopes to find some informations on the geological structure of a certain area. In *Electrical Impedance Tomography*, through measurements of the intensity and the electrical potential on the surface of human body, one tries to find some informations on the tissues inside, using nondestructive methods of testing.

From a mathematical point of view, these problems amount to the determination of certain coefficients in partial differential operators acting on functions defined in some domain $\Omega \subset \mathbb{R}^N$, assuming that some information is given on the boundary $\partial\Omega$ of the domain.

In these introductory lectures we present a few problems which have been extensively studied, and explain some of their important practical applications.