DEPARTAMENTO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

Facultad de Ciencias MATEMÁTICAS

Instituto de Matemática Interdisciplinar

SEMINARIO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

Ángel Arroyo
UCM

Stability results for inverse problems on manifolds

Abstract

We consider a general inverse problem between infinite-dimensional Banach spaces, that is, for an operator F between Banach spaces, the problem of inverting the equation $F(x)=y$, where y is a measured data and x is the unknown quantity to be recovered. In an ideal setting, with infinite-precision measurements and no noise, many important problems can be solved and stability holds, allowing the reconstruction of the unknown x from the measured data y. However, in real applications, the problem of inverting this equation turns out to be a more delicate process since only a finite quantity of measurements can be acquired and they are usually affected by noise. In this sense, Lipschitz and H\"older stability estimates for inverse problems are of great interest since they allow for good numerical reconstructions.

In this talk, we assume that the unknown quantity x belongs to a finite-dimensional manifold. Under this assumption, which arises in many real-world scenarios where natural objects have a low intrinsic dimension and belong to a much larger ambient space, we prove uniqueness and H\"older and Lipschitz stability results. In addition, we apply these general result to two classical nonlinear ill-posed inverse boundary value problems: the Calder\'on's inverse conductivity problem with triangular inclusions and the Gel'fand-Calder\'on's problem for the Schr\"dinger equation with spherical inclusions.This is a joint work with Giovanni S. Alberti and Matteo Santacesaria from University of Genoa, Italy.

Organized by: Departamento de Análisis Matemático y Matemática Aplicada and Instituto de Matemática Interdisciplinar (IMI)

Date: Thursday, April 20, 2023,13:00h
Place: Room 209 (Seminario Alberto Dou)
Facultad de CC. Matemáticas, UCM