INVERSE PROBLEMS SEMINAR

In Fall 2006, the Inverse Problems Seminar will concentrate on the

Boundary Rigidity Problem.

This problem arose in differential geometry, and reads as follows.

Problem. Let (M, g) be a Riemannian manifold with boundary ∂M. If one knows the geodesic distance $d_g(x, y)$ between any two boundary points x, y, does this determine the metric g?

The problem was considered earlier by geophysicists, and is known as the *inverse kinematic problem*: Can one determine the interior structure of Earth (sound speed) by measuring travel times of acoustic waves (earthquakes) at points of the surface?

Restricting to so called *simple* metrics, R. Michel in 1981 conjectured that a simple metric g is determined by d_g up to diffeomorphism. After partial results, the conjecture was proved in two dimensions in

L. Pestov and G. Uhlmann, *Two dimensional compact simple Riemannian manifolds are boundary distance rigid.* Ann. of Math. **161** (2005), p. 1093-1110.

The main ingredient is a surprising connection to Calderón's *inverse conductivity problem*. In the seminar, we will go through the article of Pestov-Uhlmann to understand this recent connection between two seemingly unrelated problems. There is an exciting interplay of analysis and geometry, and anyone interested in learning about these areas is welcome to attend. The basic concepts will be developed along the way.

The seminar will be held Mondays at 14–16 alternating between Exactum (B120) and TKK (U322), the first meeting 18.9. in Exactum.

Welcome!

Matti Lassas   Lassi Päivärinta   Mikko Salo   Erkki Somersalo