Joint DIFFERENTIAL GEOMETRY/PDE and INVERSE PROBLEM SEMINAR

Wednesday, November 16, 2005
Padelford C-36
3:50-5pm

Variations of the Dirichlet to Neumann Map

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We consider the following geometric version of the the Dirichlet to Neumann (DN) map. Given a compact Riemannian manifold (M, g) with boundary, the DN map $\Lambda_g : C^\infty(\partial M) \to C^\infty(\partial M)$ is defined by $\Lambda_g h = \partial u/\partial\nu|_{\partial M}$, where u is the solution to the Dirichlet problem

$$\Delta_g u = 0, \quad u|_{\partial M} = h$$

and Δ_g is the Laplace – Beltrami operator. Given a symmetric tensor field $f = (f_{ij})$ on M, we consider the variation $g_t = g + tf$ of the metric g and culculate the derivative $\dot{\Lambda}_f = d\Lambda_{g_t}/dt|_{t=0}$. We are interested in studying tensor fields f satisfying $\dot{\Lambda}_f = 0$. A complete description of such tensor fields is obtained in the two-dimensional case and some partial results, in the multidimensional case. Then we apply the latter results for studying the linearized version of the boundary rigidity problem. Our main result is as follows: if a symmetric tensor field $f = (f_{ij})$ on a simple two-dimensional Riemannian manifold integrates to zero over every geodesic joining boundary points, then f is a potential field. This statement was known before under stronger assumptions on the metric.

For more information about this seminar, visit the DG/PDE Seminar Web page (from the Math Department home page, `www.math.washington.edu`, follow the link **Seminars, Colloquia, and Conferences**).

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