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Inverse problems for elliptic PDEs, analysis and applications

The inverse Robin problem for bounded coefficient : uniqueness and non-uniqueness results

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Abstract: In this talk we consider the classical Robin inverse problem, which consists in finding the ratio between the normal derivative and the trace of the solution (the Robin coefficient) on a subset of the boundary, given the Cauchy data (both the normal derivative and the trace of the solution) on the complementary subset. More specifically, we consider a Robin coefficient which is merely in L^∞ and a Neumann data in L^2. In the $2D$ case we prove uniqueness of the Robin coefficient for a problem governed by the Laplace equation in a Dini-smooth domain, and give some indications about the generalization of such result in a Lipschitz domain and for a problem governed by a conductivity equation with a conductivity chosen in $W^{1,r}$, where $r > 2$. We also prove a non-uniqueness result in the $3D$ case. In two dimensions, the proof relies on basic tools of real and complex analysis, while in higher dimension, the proof relies on a famous counterexample to unique continuation by Bourgain and Wolff.
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