Conference on Applied Inverse Problems 2007:
Theoretical and Computational Aspects

Minisymposium: *Determination of defects from boundary measurements*
Organizers: Elena Beretta and Elisa Francini

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Stable determination of polyhedra by a single far-field measurement

We discuss optimal stability estimates for the determination of a finite number of sound-soft polyhedral scatterers in $\mathbb{R}^3$ by a single far-field measurement. The admissible multiple polyhedral scatterers satisfy minimal a priori assumptions of Lipschitz type and may include at the same time obstacles, screens and even more complicated scatterers. We characterize any multiple polyhedral scatterer by a size parameter h which is related to the minimal size of the cells of its boundary.

We present two different kinds of results. First, we show that, provided the error ε on the far-field measurement is small enough with respect to h, then the corresponding error, in the Hausdorff distance, on the multiple polyhedral scatterer can be controlled by an explicit function of ε which approaches zero, as $\varepsilon \to 0^+$, in an essentially optimal, although logarithmic, way. Then, we show how to improve this stability estimate, provided we restrict our attention to polyhedra and ε is even smaller with respect to h. In this case we obtain an explicit estimate essentially of Hölder type.

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