



FMSP Lectures

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A Carleman estimate for an elliptic operator in a
partially anisotropic and discontinuous media

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Abstract:

We prove a Carleman estimate for the elliptic operator $A = -\nabla \cdot (B \nabla \cdot)$ with an arbitrary observation region. The structure of the $n \times n$ matrix B gives the partially anisotropic character: a block diagonal matrix in which the first block C_τ is an hermitian matrix of order $(n-1)$ and the second block c is a positive function. The coefficients of the matrix C_τ are \mathcal{C}^1 and c is piecewise \mathcal{C}^1 in $\bar{\Omega}$, a bounded connected cylinder $\Omega = \Omega' \times (-H, H) \subset \mathbb{R}^n$. The interface $S := \{x \in \Omega; x = (x', 0)\}$ denotes the set where discontinuities of c can occur. This Carleman estimate is obtained through the introduction of a suitable mesh of a neighborhood of \bar{S} and an associated approximation of B , both depending on Carleman large parameters.

In fact, a local estimate is sufficient. We shall give some extensions of the used method.

Joint work with Assia Benabdallah