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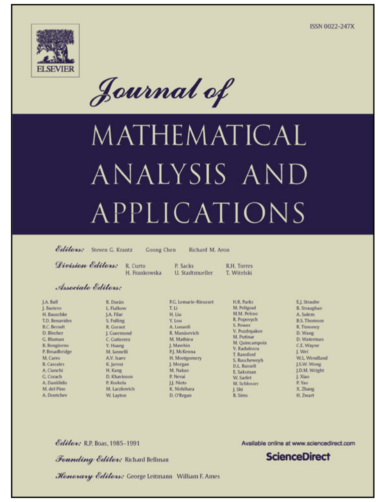

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Optimal stability estimate in the inverse boundary value problem for periodic potentials with partial data

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Abstract

We consider the inverse boundary value problem for operators of the form $-\triangle + q$ in an infinite domain $\Omega = \mathbb{R}\times\omega \subset \mathbb{R}^{1+n}$, $n \geq 3$, with a periodic potential q. For Dirichlet-to-Neumann data localized on a portion of the boundary of the form $\Gamma_1 = \mathbb{R}\times\gamma_1$, with γ_1 being the complement either of a flat or spherical portion of $\partial\omega$, we prove that a log-type stability estimate holds.

1 Introduction

For an equation of the type

$$-\triangle u(x) + q(x)u(x) = 0, \quad x \in \Omega, \tag{1}$$

the inverse boundary value problem is the question of determining the potential q, given knowledge of pairs $(u|_{\partial\Omega}, \partial_\nu u|_{\partial\Omega})$ of Dirichlet and Neumann data, either on the whole boundary, or on some proper subset of it. One way to encode the given information is the Dirichlet-to-Neumann map $\Lambda_q : u|_{\partial\Omega} \to \partial_\nu u|_{\partial\Omega}$. An interesting sub-problem is the one of uniqueness, i.e. showing that if $\Lambda_{q_1} = \Lambda_{q_2}$, then $q_1 = q_2$. A more general question is that of stability:

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