Inverse Scattering and a Problem of Hans Lewy

ABSTRACT

In 1959 Hans Lewy asked the question: do there exist non zero solutions of two different PDE in a bounded domain that have the same Cauchy data on the boundary? It turns out that closely related questions appear in the study of inverse scattering problems for inhomogeneous media. In this talk we discuss Lewy's problem in connection with inverse scattering theory.

We formulate and investigate the well-posedness of a nonstandard boundary value problem for a set of two PDE's, which we refer to as the interior transmission problem. In particular, the uniqueness question for the interior transmission problem is essentially the Lewy's problem. We also discuss related open questions and their importance in inverse scattering problems.