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Unique Continuation for a Hyperbolic Equation and its Application to Inverse Problems

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ln this work we consider the timelike Cauchy problem for the following hyperbolic equation

$$\partial_t^2 u - \sum_{i,j=1}^{n} a_{ij}(x,t)\,\partial_{ij}^2 u + \sum_{i=1}^{n+1} a_i(x,t)\,\partial_i u + r(x,t)u = f(x,t)$$

and the related inverse problem where $a_{ij} = a_{ji} \in C^2(Q),\ a_i, r \in L_{loc}^{\infty}(Q)$, here we use the following notations: $x = (x_1, ..., x_n) \in \Omega \subset \mathbb{R}_x^n$, $t = x_{n+1} \in (-T, T)$, $\partial_{n+1} = \partial_t = \frac{\partial}{\partial t}$, $\partial_t^2 = \frac{\partial^2}{\partial t^2}$, $\partial_i = \frac{\partial}{\partial x_i}$, $\partial_{ij}^2 = \frac{\partial^2}{\partial x_i \partial x_j}$, $1 \le i, j \le n$.