Carleman-based reconstruction algorithm

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Abstract

We are interested in coefficient inverse problems for evolution partial differential equations (wave or heat type). While uniqueness and stability properties for theses problems are already well known, we develop an original Carleman-based reconstruction (C-bRec) algorithm to solve them. Thanks to Carleman estimates, we prove its global convergence, *i.e* it converges to the unknown coefficient from any initial guess.

In this talk, we present in details the simplest case of the determination of a time-independent potential in a wave equation from a single measurement of the Neumann derivative of the solution on a part of the boundary. The numerical implementation of this strategy presents some challenges that we also propose to address. Several numerical examples in one and two dimensions will illustrate the efficiency of the algorithm.

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