Lamm, Patricia K.; **Murphy, Katherine A.**

Estimation of discontinuous coefficients and boundary parameters for hyperbolic systems.
(English) Zbl 0645.65087
Q. Appl. Math. 46, No. 1, 1-22 (1988).

This paper deals with the problem of identifying various distributed parameters of interest in (acoustic) seismic problems for piecewise smooth, one-dimensional (i.e. horizontally stratified) media. It extends the ideas of *H. T. Banks* and the second author [SIAM J. Control Optimization 24, 926-950 (1986; Zbl 0613.93018)] to the case of discontinuous coefficients, including the determination of the location of the discontinuities. The method employed requires the knowledge a priori of the number of discontinuities, although the first author [ibid. 25, 18-37 (1987; Zbl 0612.93014)] has shown in examples that this assumption is not too restrictive.

Some numerical examples are included that show the viability of the method, as well as some indication on the practical aspects of its implementation, which are not apparent in the theoretical treatment of convergence which occupies the main bulk of the paper. A good grasp of previous development and of functional analysis is necessary to go through those theoretical results.

Reviewer: V.Pereyra

MSC:

65Z05	Applications to the sciences
35R30	Inverse problems for PDEs
35L05	Wave equation
65J10	Numerical solutions to equations with linear operators (do not use 65Fxx)
86A15	Seismology (including tsunami modeling), earthquakes
65N30	Finite element, Rayleigh-Ritz and Galerkin methods for boundary value problems involving PDEs
93B30	System identification
93C20	Control/observation systems governed by partial differential equations

Keywords:

boundary parameters; hyperbolic systems; inverse problems; parameter identification; identification of the wave equation; (acoustic) seismic problems; discontinuous coefficients; numerical examples; convergence

Full Text: DOI