

Gel'fand-Levitan-Krein equation and Boundary Control method

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We consider a problem of determining the coefficient (density of the medium) in multi-dimensional inverse acoustic problems when the sources and the receivers are located at the plane boundary of the medium.

Nonlinear multidimensional inverse acoustic problem is reduced to the system of linear integral equations (multidimensional analog of Gel'fand-Levitan-Krein equation [1,2]).

The main idea of boundary control method is to reduce the nonlinear inverse problems to the system of linear algebraic equations. We prove the unique existence of the solution of the boundary control problem and investigate the problem of choice the sequence of sources in boundary control method.

We apply SVD analysis to Gel'fand-Levitan-Krein equation and Boundary Control method for constructing stable algorithms of solving two-dimensional inverse acoustic problem.

References

1. Kabanikhin, S. I. and Lorenzi, A. *Identification Problems of Wave Phenomena. Theory and Numerics*. VSP, Utrecht, 1999.
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