Testing multi-frequency linear sampling indicators on experimental data.

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Abstract: The Linear Sampling Method (devised by Colton and Kirsh in [2]) is a qualitative method for solving inverse scattering problems in the resonance region. This is a non-iterative method which does not require any a priori information on the nature of the scatterer.

The method only requires to approximately solve a small linear system on each (sampling) point in the domain to be inspected. The size of these systems does not grow with the number of sampling points (that, is, with the resolution) and the matrix does not change between points.

This method has been applied on problems modelled by the Helmholtz equation in acoustics, electromagnetism and vibrations as well as on the Maxwell equations.

In this communication we will show part of the results obtained in [4] were we study a database collected by the Institut Fresnel de Marseille and made available in [1]. This database contains multi-static and multi-frequency measurements of the scattered electric field when several dielectric and conducting targets are irradiated.

In particular, we test two multi-frequency indicators developed in [3], as well as a new one. We also show a very fast adaptative implementation which allows to greatly reduce the number of sampling points, further reducing the computational cost of the method.

References:

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