
Averaged Steklov eigenvalues as macroscopic indicator functions

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Abstract

Inspired by the so-called transmission eigenvalues, a new class of simple spectra for inverse scattering problems is introduced. They can be interpreted as some averaged Steklov eigenvalues. We present the general structure of these eigenvalue problems and then explain/prove how the associated eigenvalues can be reconstructed from multi-static data at a fixed frequency using the inside-outside duality method. The simple structure of the spectrum allows the design of an efficient non-iterative inversion method to identify macroscopic indicator functions for highly cluttered media. Some numerical results are presented to discuss and validate the theoretical results using synthetic data.

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