Identification of an unbounded bi-periodic interface for the inverse fluid-solid interaction problem

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Abstract

This paper is concerned with the inverse scattering of acoustic waves by an unbounded periodic elastic medium in the three-dimensional case. A novel uniqueness theorem is proved for the inverse problem of recovering a bi-periodic interface between acoustic and elastic waves using the near-field data measured only from the acoustic side of the interface, corresponding to a countably infinite number of quasi-periodic incident acoustic waves. The proposed method depends only on a fundamental a priori estimate established for the acoustic and elastic wave fields and a new mixed-reciprocity relation established in this paper for the solutions of the fluid-solid interaction scattering problem.

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