数学与系统科学研究院

计算数学所网络学术报告

报告人：Directeur de recherche / Senior scientist(CNRS) Marc Bonnet

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报告题目：

Volume integral equations for elastodynamic scattering by inhomogeneities. Application to small-defect asymptotics and identification using topological derivative.

邀请人：　殷涛 副研究员

报告时间：2021 年 9 月 27 日（周一）

下午 15:30-16:30

报告工具：Zoom ID：（883 8124 8783）

密码：amss

Abstract:

This talk addresses volume integral equation (VIE) formulation for the scattering of acoustic (or elastic) waves by material inhomogeneities that affect the leading-order term of the governing differential operator, and their use for the derivation and justification of the small-inclusion solution asymptotics and the topological derivatives (TDs) of objective functionals. In particular, we show how a simple reformulation of the zero-frequency VIE allows to establish its well-posedness by means of a simple Neumann series argument, for any inhomogeneity contrast. This in turn yields a well-posedness result for the frequency-domain VIE. We then show how the relevant VIEs provide (upon coordinate rescaling) a convenient and systematic foundation for both the derivation of asymptotic models and their justification. Finally, we explain the instrumental role played by the previously-mentioned reformulation of the zero-frequency VIE in the mathematical justification of qualitative inverse scattering methods based on the TD concept when the strength of the sought scatterers satisfies a limitation expressed in terms of the operator norm of a certain volume integral operator. We will close with numerical examples involving TD-based qualitative inverse scattering.

欢迎大家参加！