Contribution ID: **3** Type: **not specified**

Nonlinear impedance boundary conditions in inverse obstacle scattering

Friday, 7 July 2023 10:35 (25 minutes)

Nonlinear impedance boundary conditions in acoustic scattering are used as a model for perfectly conducting objects coated with a thin layer of a nonlinear medium. We consider a scattering problem for the Helmholtz equation with a nonlinear impedance boundary condition of the form $\frac{\partial u}{\partial \nu + ik\lambda u = g(\cdot,u) \quad \text{on } \partial D,}$ where ν denotes the unit normal vector, $\lambda \in L^\infty(\partial D)$ is a complex-valued impedance function, and $g : \partial D \times \mathbb{C} \to \mathbb{C}$ gives an additional nonlinear term with respect to the total field u. The contributed talk is devoted to the well-posedness of the direct problem, the determination of the domain derivative, and the inverse problem, which consists in reconstructing the shape of the scattering object from given far field data. Numerical results are presented relying on an all-at-once regularized Newton-type method based on the linearization of the forward problem and of the domain-to-far-field operator.

Primary author: FINK, Leonie

Presenter: FINK, Leonie