Type: Minisymposium Contribution

A stability result for the identification of a displacement discontinuity jump on linear elasticity equations

Tuesday, August 13, 2024 5:00 PM (30 minutes)

This work presents an inverse problem where we seek to recover the discontinuity jump of the displacements field that verifies a linear elasticity equation, from measurements of the displacement field or traction field on a subdomain of the bordary. This inverse problem allows us to study subduction earthquakes, which are of great importance to the geophysical community.

To obtain the stability result, the problem is rewritten using a mixed variational formulation with a unique solution. By applying Carleman inequalities appropriately, it is possible to obtain a new energy estimate that, by adding an additional condition, makes it possible to obtain the desired estimate.

Some numerical tests will be presented that allow us to complement the theory presented simulating a realistic case of a subduction earthquake on the coast of Chile.

References

1. Oleg Yu. Imanuvilov and Masahiro Yamamoto. An inverse problem and an observability inequality for the Lamé system with stress boundary condition. Applicable Analysis, 88(5):711–733, May 2009.

2. Jorge Aguayo and Rodolfo Araya. A priori error estimates for a coseismic slip optimal control problem, 2024. Submitted for publication to Applied Numerical Mathematics.

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