
Topological sensitivity applied to cavity reconstruction from elasticity linear surface measurements and Kohn-Vogelius formulation

Mourad Hrizi*^{†1} and Maatoug Hassine

¹Faculty of Science of Monastir – Tunisia

Abstract

In this work, we focus on the geometric inverse problems in linear elasticity related to the detection, topology and geometry of an cavity in bounded domain Ω via a part of the exterior boundary measurement on $\partial\Omega$. We propose a one-shot geometric algorithm based on the asymptotic expansion for the Kohn-Vogelius formulation using the topological gradient method. The inverse problem is formulated as a topology optimization one. A topological sensitivity analysis is derived from an energy function. Then, we present a numerical method for the geometric reconstruction of the unknown cavity using a level curve of the topological gradient. Finally, we illustrate the efficiency and accuracy of the proposed algorithm by some numerical results.

*Speaker

[†]Corresponding author: mourad-hrizi@hotmail.fr