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Non-Linear Ultrasonic imagery of high contrast objects

Régine Guillermin and Philippe Lasaygues

Laboratory for Mechanics and Acoustics CNRS, 31 chemin Joseph Aiguier, 13009 Marseille, France

This study is concerned whith the ultrasonic imagery of elastic materials like cylinders or tubes by diffraction tomography technic. The aim of this work is then to solve a non-linear inverse scattering problem. Various methods can be employed, generally involving a minimization of the differences between modeling data and measurements. The Distorted Born Iterative (DBI) method belongs to the class of algebraic reconstruction algorithms and have therefore been investigated in literature.Very promising results have been obtained both on synthetic and experimental data especially for electromagnetic inverse diffraction problems, but as far as the authors know few ultrasonic experimental results are available. This method was developed to increase the domain of application of the Born approximation to high contrast targets. Iterations are performed numerically solving a forward and an inverse problems at every iteration. This yields quantitative information about the scatterer, such as the speed of sound. Inversions of both numerical and experimental data are presented.