

Thesis: Numerical Method for Patch-Wise Update of Inverse Scattering Problems

Problem description:

Inverse Scattering Problems such as Ultrasound Computed Tomography (USCT) are a challenge to solve. The underlying reason is that for an interactive solution minimizing the discrepancy between forward solution and measured data one has to perform a numerical solution of the wave equation in 2D or 3D for each source and all of this tens of thousand times to reach the minimum. This parameter estimation problem seeks for sound speed and absorption for each location of a given domain Ω .

A local update of these parameters will offer new degrees of freedoms, e.g. reducing the number of iterations or applying end-to-end trained neural networks, which have then the potential to accelerate the solution process significantly.

Job tasks:

In the thesis, it is the plan that you first implement the strategy of <https://core.ac.uk/download/pdf/84318932.pdf> and then further develop this strategy to do a patch wise-update of the solution.

Requirements:

You should have a solid background in numerical methods and programming for this project.

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