MECHANICS SEMINAR

Multigrid strategies in Full-Waveform Inversion

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Microsoft Teams - https://tinyurl.com/semmec0221

Abstract.

   In this seminar, we present the method of Full-Waveform Inversion (FWI) for the seismic inversion problem, showing how it is possible to extract valuable information about the earth's subsurface from acoustic and seismic signals. This type of data is of particular interest for the exploration geophysics community and can be extremely useful in the evaluation of potential offshore oil reservoirs. The solution of the seismic inversion problem via FWI, which is posed as a PDE constrained optimization, has significant limitations in terms of convergence and computational cost due to the presence of multiple points of local minima in the misfit functional and the high cost of computing gradients and Hessians. To address the problem of convergence, most current formulations require an even greater computational power. This creates a challenging computational problem, specially for industrial applications. We then present a few ideas related to multigrid and the multigrid optimization method, and show how we may be able to reduce the overall computational costs of the FWI method using multigrid strategies, making it more viable for large scale seismic inversion problems.