Title: LocalizedWavefield Inversion (LWI): an Adaptation of Multi-Block ADMM for Localized FWI

Abstract: Full-waveform inversion (FWI) is a high-resolution and computationally intensive imaging technique to reconstruct unknown parameters in the computational model in which the waves propagate; however, an accurate model of only part of this medium is required for some applications. To decrease the computational burden of such problems, target-oriented FWI was proposed where the redatumed data on the part of the medium or localized solvers for the wave equation are used.

On the other hand, the classical formulation of FWI suffers from non-linearity and ill-posedness, which makes FWI sensitive to the initial model, the low-frequency content of the data, and limited illumination. In this study, we propose a localized version of the alternating direction method of multipliers (ADMM)-based FWI method, which was proposed to solve these problems in classical FWI. In our localized FWI or LWI, the medium is decomposed into a few subdomains, where some of them are updated, and the others are kept fixed based on an adaptation of multi-block ADMM, which is a powerful algorithm for solving inverse problems with decomposition and block separability. Numerical tests on the Marmousi model for a time-lapse application confirm the computational efficiency and robustness against background velocity model errors.