

# ACOUSTIC FULL-WAVEFORM INVERSION VIA OPTIMAL CONTROL

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## ABSTRACT

Full-waveform inversion (FWI) is a recent technique in seismic tomography to reconstruct physical parameters sampled by waves. Compared with other methods relying only on partial waveform information such as travel times or phase velocities, FWI exploits the entire waveform content. In this talk, we discuss an optimal control method for acoustic FWI. The aim is to reconstruct the speed wave parameter entering the hyperbolic PDE model in the coefficient of the second-order time derivative of the acoustic pressure. For the given optimization problem, we present necessary first-order optimality conditions based on adjoint techniques where the adjoint state has only low regularity properties. This is particularly favourable since then no Sobolev smoothing effect occurs in the optimal solution. Further, under specific regularity and compatibility assumptions, we present second-order sufficient optimality conditions. The talk will be concluded by numerical examples.

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