

On Optimization Techniques for Solving Joint Inversion Geophysical Problems

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Abstract

In geophysical applications, the goal of joint inversion is to characterize the earth structure beneath the surface by using jointly different data sets for the same exploration site of the earth. The data sets sample the same portion of the propagating medium (consistency), and the joint data may improve the constraints of each independent data set (complementarity). We are implementing state-of-the-art optimization techniques in a joint inversion code developed by Chuck Ammon and Jordi Julia that will exploit the nonlinearity of the problem in the prediction of the earth subsurface. In this talk, we present the motivation of the joint inversion, a basic study of the linear and nonlinear optimization methods being compared, and a study case using teleseismic P-wave receiver functions and surface wave dispersion velocities to estimate the earth structure (i.e. shear velocity).

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