



Direct nonlinear inversion of viscoacoustic media using the inverse scattering series

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Abstract

The objective of seismic exploration is obtaining structural subsurface information from seismic data by recording seismic waves motion of the ground. The recorded data have a non-linear relationship with the property changes across a reflector. In this work, the multi-parameter multi-dimensional direct non-linear inversion is investigated based on the inverse scattering task-specific sub-series. The result is direct and non-linear and has the potential to provide more accurate and reliable earth property predictions for larger contrast and more complex. The inverse scattering method has a direct response for imaging and inversion problems for a large contrast and a multi-dimensional corrugated target. We are derived the direct non-linear inversion equation for three parameter viscoacoustic cases. Numerical tests show that non-linear inversion results provide improved estimates in comparison with the standard linear inversion. When the non-linear term add to linear term the recovered value of parameters are much closer to the exact value.