LOCAL RADON TRANSFORMS VIA GENERALIZED DECONVOLUTION (MonPmOR12)

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Abstract :

The Radon transform is a powerful method that has been used to filter coherent noise from seismic records and to reconstruct seismic data. In addition, it has a long history in image processing as a tool for feature extraction. An impor−tant shortcoming in exploration seismology, however, is the requirement of simple integration paths that often do not match well enough the spatio−temporal structure of seismic waveforms. The latter can be avoided by adopting local Radon transforms. We show that local Radon transforms (with arbitrary integra−tion paths) can be implemented with a generalized deconvo−lution approach. In this case, the data are represented via the convolution of Local Wavefield Operators (LWO) and an ensemble of filters that represent the local Radon panels. Deconvolving the LWOs from the data yields the unknown suite of filters that can be used to reconstruct seismic data, reject coherent noise, and analyze seismic waveforms. This paper also discussed two regularization strategies for the computation of the local Radon transform. The first one is based on conventional regularized least squares; the second one is based on a sparse reconstruction approach where we attempt to estimate sparse local Radon panels.

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