

## Sparsity and Continuity Enhancing Seismic Imaging

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Abstract/Excerpt

A non-linear singularity-preserving solution to the least-squares seismic imaging problem with sparseness and continuity constraints is proposed. The applied formalism explores curvelets as a directional frame that, by their sparsity on the image, and their invariance under the imaging operators, allows for a stable recovery of the amplitudes. Our method is based on the estimation of the normal operator in the form of an 'eigenvalue' decomposition with curvelets as the 'eigenvectors'. Subsequently, we propose an inversion method that derives from estimation of the normal operator and is formulated as a convex optimization problem. Sparsity in the curvelet domain as well as continuity along the reflectors in the image domain are promoted as part of this optimization. Our method is tested with a reverse-time 'wave-equation' migration code simulating the acoustic wave equation.