

Stable seismic data recovery

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Abstract

In this talk, directional frames, known as curvelets, are used to recover seismic data and images from noisy and incomplete data. Sparsity and invariance properties of curvelets are exploited to formulate the recovery by a ℓ_1 -norm promoting program. It is shown that our data recovery approach is closely linked to the recent theory of “compressive sensing” and can be seen as a first step towards a nonlinear sampling theory for wavefields.

The second problem that will be discussed concerns the recovery of the amplitudes of seismic images in clutter. There, the invariance of curvelets is used to approximately invert the Gram operator of seismic imaging. In the high-frequency limit, this Gram matrix corresponds to a pseudo-differential operator, which is near diagonal in the curvelet domain.