Application of the Karhunen-Loève transform to diffraction separation

Yedlin, M.; Jones, I.; Narod, B.

Summary: The Karhunen-Loève (K-L) transform is applied to the separation of diffractions from reflections, for the model problem of a rigid half-plane. The basic transform and its interpretation in the context of seismic data are briefly reviewed. The transform, computed via the singular value decomposition, is applied to model data generated using an acoustic transceiver, which travels above a metal plate representing the half-plane. The K-L transform yields a clear separation between the edge diffraction and reflection. This is followed by an application of the slant K-L transform to remove dipping wall reflections which interfere with the edge diffraction.