

## Abstract

Non-linear filtering is a technique commonly used in signal processing, especially in image processing. Surprisingly, its use is still very limited in seismic signal processing. Most current techniques for noise removal involve the use of linear filters. However, these techniques are less successful in identifying isolated spikes or in separating individual frequency components. This paper presents two image-based non-linear filters, namely the anisotropic non-linear diffusion (ANLD) filter and the trilateral filter (TLT). We introduced these filters as an alternative to linear filters for identifying and removing random and/or coherent noise from seismic data while preserving the signal of interest and improving resolution. Important aspects of these filters are their adaptive behaviour and signal preservation. Furthermore, they are easily implemented and consume less time and memory, compared to existing filters. We have successfully used these filters on synthetic data corrupted by different percentages of noise, i.e. 5%, 10% and 50% and on real seismic section imaging complex structures containing strong random noise. Results show quite similar behaviour between ANLD filters and trilateral filters, but they are much more robust than the classical f-k filter