



## **The use of ensemble empirical mode decomposition as a novel denoising technique**

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Denoising is of a high importance in geophysical data processing. This paper suggests a new denoising technique based on the Ensemble Empirical mode decomposition (EEMD). This technique has been compared with the discrete wavelet transform (DWT) thresholding.

Firstly, both methods have been implemented on synthetic signals with diverse waveforms ('blocks', 'heavy sine', 'Doppler', and 'mishmash'). The EEMD denoising method is proved to be the most efficient for 'blocks', 'heavy sine' and 'mishmash' signals for all the considered signal-to-noise ratio (SNR) values. However, the results obtained using the DWT thresholding are the most reliable for 'Doppler' signal, and the difference between the calculated mean square error (MSE) values using the studied methods is slight and decreases as the SNR value gets smaller values.

Secondly, the denoising methods have been applied on real seismic traces recorded in the Algerian Sahara. It is shown that the proposed technique outperforms the DWT thresholding. In conclusion, the EEMD technique can provide a powerful tool for denoising seismic signals.

**Keywords:** Ensemble Empirical mode decomposition (EEMD), Discrete wavelet transform (DWT), seismic signal.