



On Seismic Ground Roll Filtering Using the Wavelet Transform and Neural Network

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Here, we present an adapted filtering technique for the non-stationary signals. It is based on the wavelet transform and its rebuilding formula. This technique is used generally to detect and extract locally in the time-scale field particular events from seismic data.

We show the efficiency of this technique to filter the ground roll from reflection seismic vibroseis recording (shot gather). The results for two different filtering processes are presented, one of these results is based on the annulment of the transform coefficients in the selected zone relating to the ground roll, and the other one is based on their attenuation (roll-off). Obtained results shows the efficiency of the first process especially when the wavelet transform is calculated only on the noisy zone and when the ground roll is made up of two or more pseudo-Rayleigh waves, in this case iterations are mandatory to improve the signal to noise ratio using the second process.

The current work shows also the use of the artificial neural network on the prediction of the mute parameters in the F-K domain to be used on the Ground Roll attenuation. The proposed idea is very robust and useful in case of 3D seismic data. A set of 3D seismic Inlines are used for the training of the Multilayer Perceptron (MLP) neural network machine. Application to real data shows clearly the robustness of the proposed technique.

Keywords: Filtering - Ground roll - Wavelet transform - Seismic – Reflection - Signal to noise ratio – Artificial neuronal network –3D-MLP- Training.