Analysis of Geophysical Time Series by using Dynamic Fourier Techniques

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Abstract:
This work is devoted to the study of modeling geophysical time series obtained from natural earthquakes and mining explosions. We observed that the measurements of a sequence of geophysics are stochastically dependent on the time needed. The time domain signal is transformed by means of the Fourier technique to the frequency domain where it is equivalent to an Amplitude Spectrum and a Phase. According to the Fourier theory, a given signal can be synthesized as a summation of sinusoidal waves of various amplitudes, frequencies, and phases. We have therefore applied dynamic Fourier technique to analyze the seismograms of a set of mining explosions reported in catalogs as earthquakes, and have compared them with natural earthquakes that occurred in the same region. The purpose of the analysis is to summarize the spectral behavior of the signal as it evolves over time. Our results suggest that the Fourier representation of seismograms in the frequency-time domain is effective in enforcing the characteristic parameters to discriminate the signals of earthquake and explosion time series.